

Oracle® Forms Recognition
Designer User Guide
10g Release 3 (10.1.3.5.0)

October 2009

ORACLE®

Oracle Forms Recognition Designer Guide

10g Release 3 (10.1.3.5.0)

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Chapter 1 About Oracle Forms Recognition Designer

Oracle Forms Recognition is a product suite by Oracle, for automatically processing incoming documents.

In principle, Oracle Forms Recognition deals with any document that is electronically available. This includes scanned images, faxes, e-mails, and files. Oracle Forms Recognition automatically classifies these documents and extracts meaningful information from them.

Oracle Forms Recognition uses a trainable, self-learning algorithm that minimizes user definition and intervention tasks.

As part of the Oracle Forms Recognition suite, Oracle Forms Recognition Designer enables you to customize the automatic processing of incoming documents: which document classes are relevant in your enterprise, which information is to be extracted from the classified documents, how the processing results are to be verified.

To process large volumes of documents, Oracle Forms Recognition organizes documents into batches, which are defined in the Oracle Forms Recognition project file. The project files and stored settings are automatically passed to Oracle Forms Recognition Runtime Server for production processing.

In addition, Oracle Forms Recognition Designer enables you to test your custom application. All custom settings are saved as an Oracle Forms Recognition project file. The finished project file is forwarded to Oracle Forms Recognition Runtime Server for processing.

Oracle Forms Recognition Runtime Server runs unattended as a server process in the background. Several mechanisms ensure that the system is stable — meaning that it can automatically recover from most error situations. Multiple instances of Oracle Forms Recognition Runtime Server can be started simultaneously in a network or on a single machine. These instances cooperate and allow for optimal load distribution.

Quality assurance and correction are done in Oracle Forms Recognition Verifier. QA is also controlled by the project file. Batches that cannot be automatically processed in their entirety by Oracle Forms Recognition Runtime Server are forwarded to Oracle Forms Recognition Verifier, for manual correction by operators who are subject matter experts in the type of document being processed.

Before Oracle Forms Recognition can be implemented, the underlying network environment must meet certain minimum platform and environmental requirements. This chapter serves as a vehicle to set expectations, on the part of the destined organization, of the minimum infrastructure components that must be in place to ensure a successful implementation of Oracle Forms Recognition.

Chapter 2 About This Manual

2.1 Intended Audience

This documentation is for users who intend to create custom applications with Oracle Forms Recognition Designer. We assume that you are an experienced, knowledgeable user of the Microsoft Windows operating system and of Microsoft Windows applications.

2.2 Reading Suggestions

This manual is organized as follows:

- ***Chapter 3 (Basic Concepts and Techniques)*** describes the user interface and some basic concepts you need to understand to work with Oracle Forms Recognition Designer. This chapter also contains a functional description of controls you will need to work with Oracle Forms Recognition Designer. You should be familiar with this chapter before you start working with other chapters.
- ***Chapter 4 (Setting Up the Classification)*** describes how to set up document classification in Oracle Forms Recognition.
- ***Chapter 5 (Planning Applications)*** outlines the basic steps of application planning.
- ***Chapter 7 (Setting Up the Data Extraction)*** describes how to set up data extraction in Oracle Forms Recognition.
- ***Chapter 8 (Setting Up Supervised Learning)*** discusses Supervised Learning.
- ***Chapter 10 (Regular Expressions)*** contains information about regular expressions. You may need this information to improve extraction results obtained with format analysis.
- ***Chapter 9 (Advanced Recognition Settings)*** contains information about recognition techniques. You will need this information to improve classification and extraction results.
- ***Chapter 11 (Advanced Evaluation Settings)*** contains information about the evaluation and validation mechanism in Oracle Forms Recognition. You will need this information to improve classification and extraction results.
- ***Chapter 12 (Setting Up the Verification)*** describes how to set up forms in Oracle Forms Recognition's quality assurance tool, Verifier, and how to test these forms.

2.3 Related Documentation

This manual is part of a set of five guides and reference materials. Other materials in the documentation suite are:

- ***Oracle Forms Recognition Installation Guide***
Explains how to install Oracle Forms Recognition.
- ***Oracle Forms Recognition Runtime Server User's Guide***
Explains how to administer the Oracle Forms Recognition batch processing program.

- ***Oracle Forms Recognition Verifier User's Guide***
Explains how to use the Oracle Forms Recognition verification and manual indexing program.
- ***Oracle Forms Recognition Script Documentation***
Explains how to develop with the Oracle Forms Recognition Designer SAX Basic and WinWrap Basic.

Chapter 3 Basic Concepts and Techniques

3.1 Starting Designer

There are two ways to start Oracle Forms Recognition Designer:

To start the program with a new project:

- If the program was installed normally, you can start it from the Windows Start menu by using the command sequence Start > Programs > Oracle Forms Recognition > Oracle Forms Recognition Designer.
This starts the program with a new project. You can now create a new project (Section [3.8.2 Creating Projects](#)) or load a previous project (Section [3.8.4 Opening Projects](#)).
- To use a command line sequence to start a program in a recently edited project or specified project, use one of the following command line calls:
 - Oracle Forms Recognition /l
This starts the program and loads the most recently edited project.
 - Oracle Forms Recognition /p <project file name>
This starts the program and loads the specified project.



You can run multiple instances of Oracle Forms Recognition Designer simultaneously.

For more information on projects, please refer to section [3.8 \(Working with Projects\)](#).

3.2 About Roles, Users, and Authentication

In Oracle Forms Recognition, users are assigned to groups, and groups are assigned to roles.

Administrators and users must login to Oracle Forms Recognition Designer and Verifier to load existing projects. The system authenticates the user name/password combination and either denies permission to the project or allows users to perform the functions set by their permissions for the project (assuming the functionality is enabled.)

Users can be assigned to one or more groups, and established groups can have one or more roles. A user must be a member of at least one group, and a group must have at least one role assigned to it.

There are five roles: Administrator, Verifier, Verifier Settings, Learn Set Manager, and Supervised Learning Verifier.

The roles of these groups follow:

- **Administrator:** The Administrator (ADM) role is to manage users, groups, and user-to-group assignments. Administrators install the system, configure applications, and manage data. They also design and maintain projects. This role is the most powerful of the four roles, because it encompasses the permissions for all other groups.

- **Learn Set Manager:** The Learn Set Manager (SLM) role is to define, modify, and maintain the Learn Set. This functionality is accessible only through Verifier.
- **Supervised-Learning Verifier:** The Supervised Learning Verifier (SLV) role is to collect and manage local training data. Supervised Learning Verifiers are subject-matter experts who can propose Learn Set candidates to improve system performance. This functionality is accessible only through Verifier.
- **Verifier:** The role of the Verifier group (VER) is to verify documents that could not be automatically processed. Typically, members of the Verifier group are clerks. This functionality is accessible only through Verifier.
- **Verifier Settings:** The Verifier Settings (SET) role is to change the Oracle Forms Recognition Verifier configuration. This role is given to users who are considered to have enough knowledge of the application to make changes that will be beneficial to all Oracle Forms Recognition Verifier users.

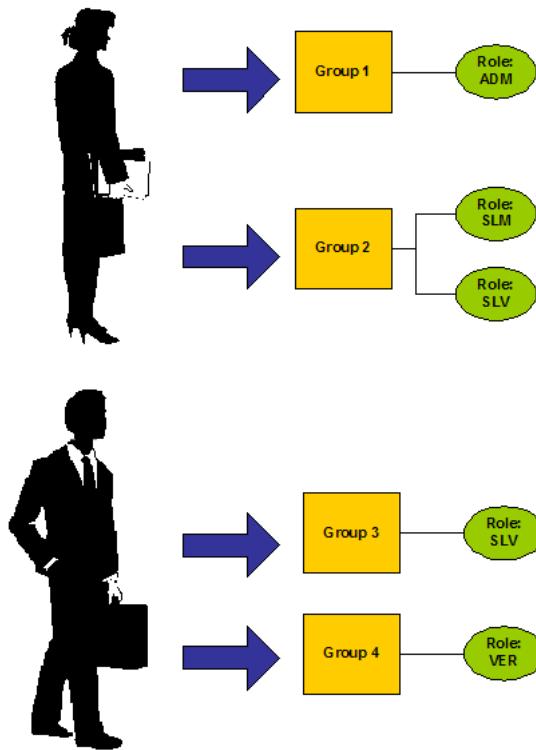


Figure 3-1: Designer Users with group and role assignments

Two criteria determine what users can do in Verifier, both of which are established in Designer:

- Which groups the users are assigned to.
- The functionality enabled for the project.

Users inherit the roles of the groups they are members of. These roles dictate the components that can be used by members of each group. However, even if a user has permissions to perform certain tasks, the functionality is inaccessible unless it was enabled in the project settings.

For example, members of the Learn Set Manager group will not be able to use Verifier Train Mode unless Verifier Train Mode is enabled in Settings. (section **3.7.6 Verifier Train Mode**)

3.3 Logging In

3.3.1. Logging In to Designer

To use Designer, you must be assigned to a group that has the Admin role. Users without these permissions cannot use Designer.

As an administrator, you must log in to any Designer project you load.

You do not have to log in when you create a project, but you are essentially logged in as an administrator when you save the new project.

That is, when you save a new project, you are logged in as Admin. No password is required the first time you log in to the new project. Your first action should be to change the Admin password; not immediately changing the password leaves open a security hole.

3.3.2. Logging In to Verifier

Likewise, a user is prompted to supply a user ID and password when loading a project in Verifier. Users who forget their passwords must contact their project administrator to have their password reset.

3.4 Creating User Accounts and Groups

3.4.1. User Interface

User accounts and group assignments are done from the Options menu.

The user interface consists of three tabs: Users, Groups, and Change Password.

3.4.2. Establishing and Changing Passwords

Passwords are created and modified from the Options menu by selecting Users, Groups and Accounts and then choosing the Change Password tab.

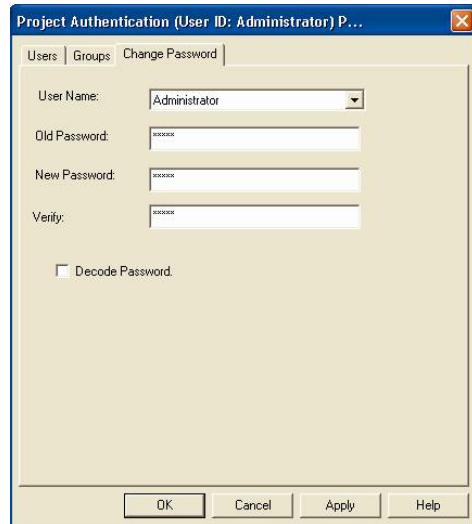


Figure 3-2: The Change Password tab is used to create or reset passwords

3.4.3. Creating the Administrator Password

As an administrator, your first task is to change your password for each existing project. If you don't do this, of course, anyone will be able to login to your project and make changes that could potentially affect the entire workflow. To change your password:

Load an existing project.

- On the Options menu, click Users, Groups and Accounts.
- Use Administrator (not case-sensitive) for user name, and leave the password blank.
- On the User Authentication properties box, click the Change Password tab. Create a new password and click OK.

3.4.4. Establishing User Groups

User Groups are created and modified from the Options menu by selecting Users, Groups and Accounts and then choosing the Groups tab.

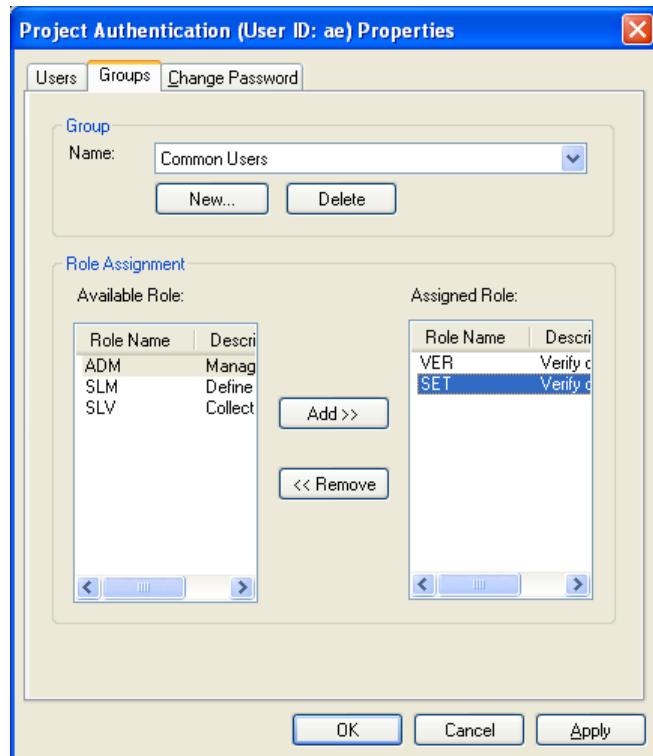


Figure 3-3: On the Groups tab, you can create or delete groups, and assign or remove group roles.

3.4.5. Creating Groups

By default, the first time the administrator logs in, the only existing user group is Administrator (ADM), and the only member of the ADM group is the Administrator user.

To create new groups:

- 1) Click the Groups tab.
- 2) Click the New button.
- 3) Type a name for the new group. The Groups field is restricted to 20 alphanumeric characters.
- 4) For Description, select one of the four group roles (Administrator, Verifier, Learn Set Manager, or Supervised Learning Verifier.)
- 5) Click OK.

3.4.5.1. Assigning Roles to Groups

When you first create a group, you can only associate one role to it. However, you can assign or remove roles from an already-established group.

To add a role to a group:

- 1) Select the role in the Available Role option group and click the Add button.
- 2) Click OK when you are finished.

To remove a role:

- 1) Select it from the Assigned Role option group.
- 2) Click OK when you are finished.



You cannot delete the admin user or the ADM role. You can delete additional users or groups.

After you've established user groups, you are ready to assign users to them.

3.4.6. Creating and Managing User Accounts

User Accounts are created and modified from the Options menu by selecting Users, Groups and Accounts and then choosing the Users tab.

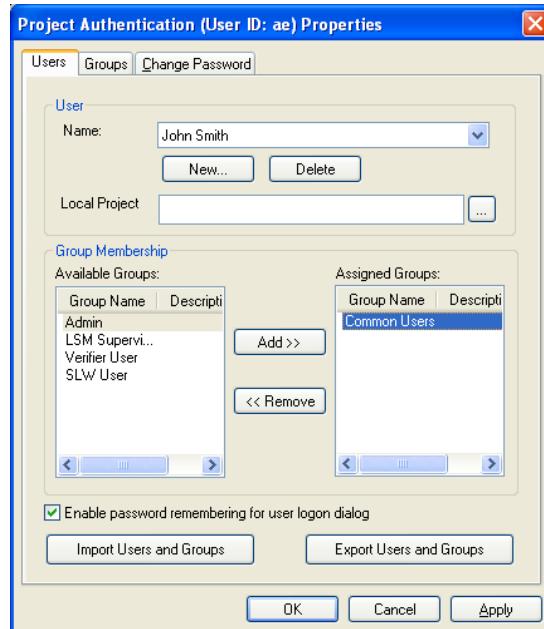


Figure 3-4: On the User's tab, you can create or delete individual users, assign or remove users from groups, and import multiple users from an external file.

3.4.6.1. Creating New User Accounts

To create new user accounts:

- 1) On the User tab, click New.
- 2) Type a name for the user and assign a default password. User names cannot and passwords cannot exceed 20 alphanumeric characters.
- 3) Click OK.

After you've created a user account, you must assign it to at least one group. Users who are not assigned to a group will not be able to log in to the project.

To give the user the option of remembering their user name and password between Oracle Forms Recognition Verifier logons, select Enable password remembering for user logon dialog.

3.4.6.2. Changing a User's Password

To change a user's password:

- 1) On the Change Password tab, check the Decode Password checkbox.
- 2) Type the user's old password.
- 3) Type the new password in the New Password and Verify Password text boxes.
- 4) Click OK.



Another way to change a user's password is to delete the user and recreate the user's account. However, this method is more cumbersome than the one described above because the administrator must also reassign the user to appropriate groups. (section [3.4.6.3 Assigning Users to Groups](#))

3.4.6.3. Assigning Users to Groups

To assign a user to a group:

- 1) Select a user name from the pull-down list.
- 2) In the Available Groups selection box, select a group and click the Add button.
- 3) To remove groups, select a group in the Assigned Groups selection box and click Remove.

3.4.6.4. Importing and Exporting Users and Groups

In an Oracle Forms Recognition implementation, the definition of user roles can and should be used on more than one project. The definitions of all users' roles for a project can be exported in bulk to a binary file and then imported in bulk into another project. This is done with the Import and Export buttons on the Users tab of the User Authentication dialog box.

To export a list of users:

- 1) On the Users Tab, select the group to export and click the Export Users and Groups button.
- 2) Name the file and click OK. By default the file is saved as an authentication file (*.sec) to the project root, but you can change the target folder if necessary.

To import a list of users from another project:

- 3) On the Users tab, click the Import Users and Groups button. Browse to and select the file to import. Click OK.

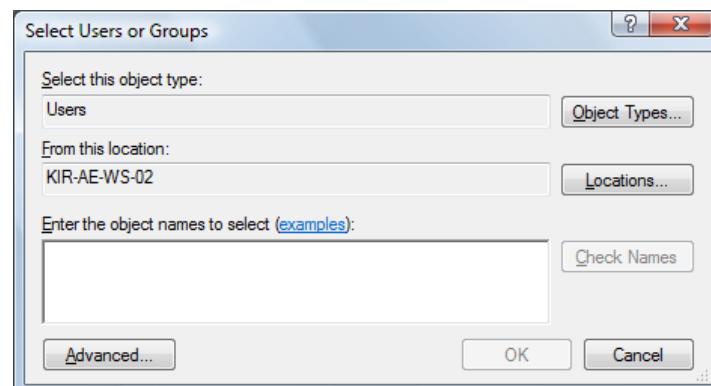
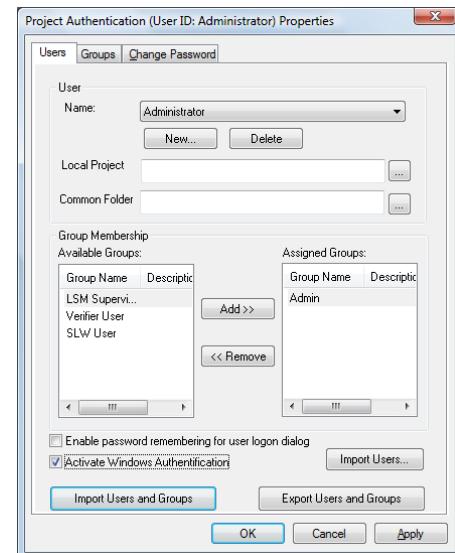


You should not manually edit authentication files.

3.5 Windows Based User Authentication

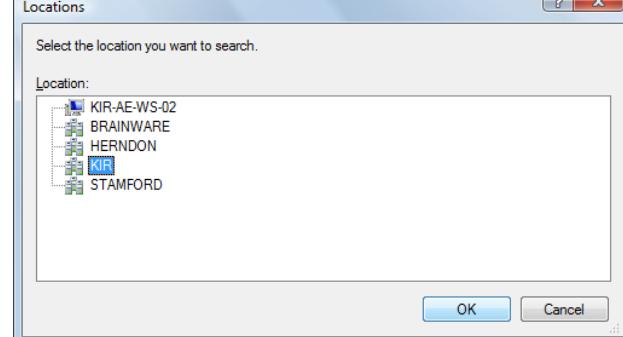
3.5.1. Description

To enable Windows based authentication in Oracle Forms Recognition for a desired project, open the corresponding project file in Oracle Forms Recognition Designer application, select “Options”, “Users, Groups and Accounts...” menu item and enable “Activate User Authentication” check-box on “Users” tab of the Project Authentication Settings dialog:

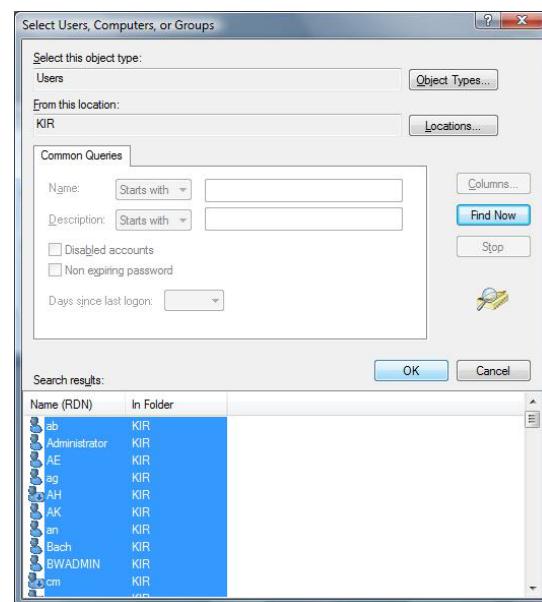


To import required Windows users, click on “Import Users...” button:

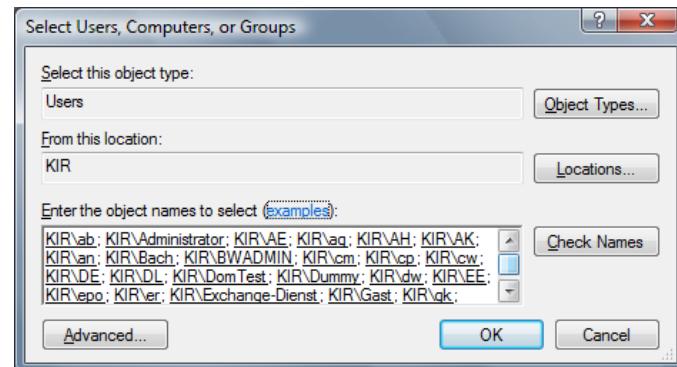
Now click on “Locations...” button to select required Windows domain to import the user accounts from:



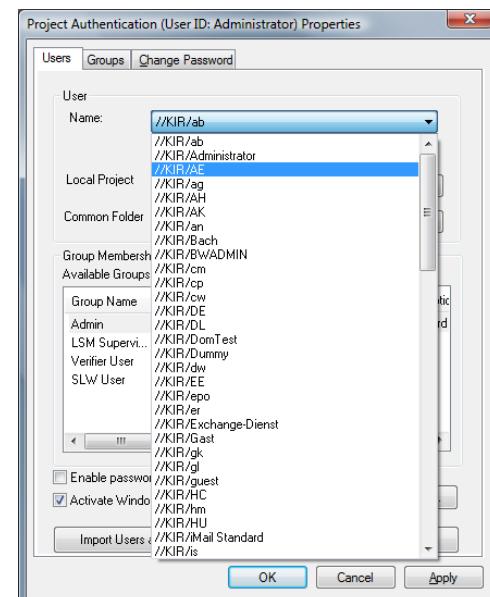
Then click on “Advanced...” button to expend the extended search settings and click on the “Find Now” button to locate the users in the selected domain. As soon as the users appear in the list view, you can either choose the desired ones (press and hold the “Ctrl” key to apply multiple selection) or import all available users at once (select the first item in the list and then keep clicking “Page Down” button until all items in the list have been selected):



Press “OK” button to confirm the selection. Now review the selected users:

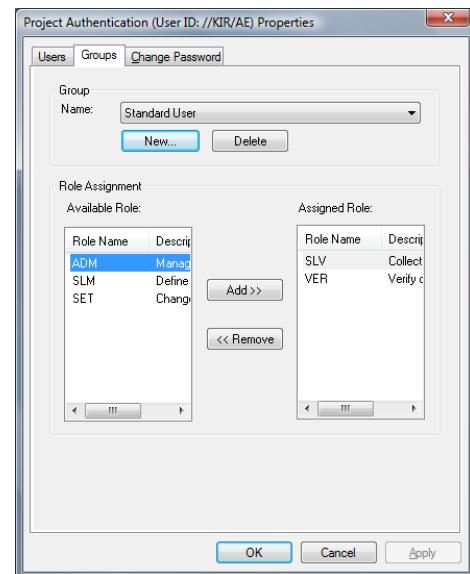


Click "OK" one more time to finish importing of Windows users into the Oracle Forms Recognition project. The newly imported user accounts can now be reviewed in the Oracle Forms Recognition authentication settings:

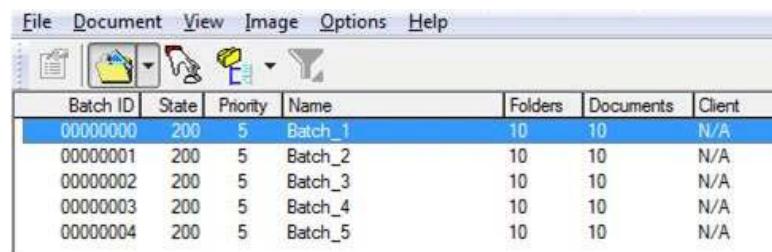


Note that all newly imported users are, by default, assigned to a special "Standard User" group. This group, by default, has "SLV" and "VER" Oracle Forms Recognition rights, i.e., rights to run Oracle Forms Recognition Verifier in Advanced mode. The standard user rights assignments for this group can be adjusted at any time according to the specific project requirements:

As soon as the project is saved, the Windows based authentication has been activated and the next time this project file is opened in Oracle Forms Recognition Verifier or Designer application (or in any other Oracle Forms Recognition application that requires project level authentication), the Oracle Forms Recognition's authentication subsystem will always try to login automatically using the currently logged in Windows user.



For example, if the Verifier application is run on a workstation where "KIR\AE" user is logged in, the Verifier Logon is going to proceed automatically:



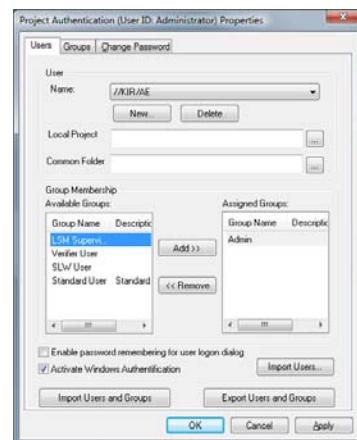
Since by default the "Standard User" group does not include administrative Oracle Forms Recognition rights or the imported users, trying to login with the same sample user in Designer application is going to lead to a warning message like the one below, because Oracle Forms Recognition Designer application requires administrative privileges:



The warning message should be followed by a normal log on screen, so that the user could try to log on using, for example, one of the available internal Oracle Forms Recognition project's accounts:

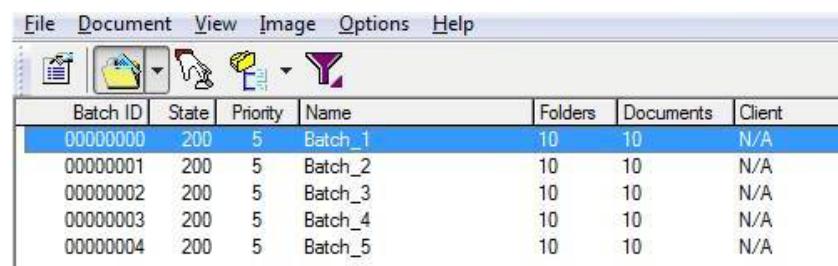


Note: All newly imported users are imported with empty passwords and therefore the system does not allow them to login as "another" Windows user with the normal Log on dialog box (see the screenshot above) unless the password for the Windows user has been explicitly set in Oracle Forms Recognition.



Individual user's settings can also be modified, for example, in order to assign administrative Oracle Forms Recognition privileges to some specific users, e.g., to the same user "AE" located in the domain "KIR", like it is shown on the screenshot below:

Now the user can log on to both Oracle Forms Recognition Designer and Verifier applications automatically. The Verifier application is going to display the user as an administrator:



Note: In case the currently logged in user account is not a member of the pre-imported Windows users list, Oracle Forms Recognition applications are supposed to show the normal Log on dialog where the user has to enter a user name and password. In such a case, all previously available Log on features, like remembering the password, still remain applicable.

3.5.1.1. Usage

The Windows based user authentication feature can be used for:

- Simplification of the user log on procedure for Oracle Forms Recognition Verifier users – Users log in just once in Windows and then log in to the Verifier application with the same log on information automatically and without any visual interaction.
- Synchronization of Windows authentication and internal Oracle Forms Recognition authentication processes – This makes initial setup of Oracle Forms Recognition users easier and faster to apply (all required Windows users can be imported into Oracle Forms Recognition subsystem automatically at once) and simplifies administration of user accounts in the overall customer environment.

3.6 Exiting Designer

To exit Oracle Forms Recognition Designer:

- 1) On the File menu, click Exit.
- 2) On the Confirmation message box, click OK.

3.7 Working with Modes

3.7.1. What Are Modes?

Oracle Forms Recognition Designer supports seven modes of operation:

- Document Selection (Section [3.7.2](#))
- Definition (Section [3.7.3](#))
- Train (Section [3.7.5](#))
- Runtime (Section [3.7.7](#))
- Verifier Design (Section [3.7.8](#))
- Verifier Test (Section [3.7.9](#))
- Verifier Train (Section [3.7.6](#))

Each mode supports a particular set of tasks used during the design of an Oracle Forms Recognition application. When you switch from one mode to another, the toolbar and the window below it also change to provide the tools and controls used in the new mode.

3.7.2. Document Selection Mode

3.7.2.1. Purpose

Use this mode to select a document set that will be used in learning and testing.

3.7.2.2. Selection

To switch to Document Selection mode:

- On the View menu, click Document Selection Mode.

Or



- On the toolbar, click Switch to Document Input Selection. Depending on the current input type (Directory, Learn Set, or batch) the appearance of this button varies.

If the paths for Batch and Image Roots are not set, these icons are disabled.

- If you change the input type, Document Selection Mode is activated automatically. Please see the Settings Input Mode tab (batch and image path) and the Train Mode tab (Learn Set path.)

3.7.2.3. Settings

The current document set can be:

- A directory of files: Use directories as input type only if you already have the corresponding Workdocs. You can also use files from directories to optimize your Learn Set. If Workdocs are not available, Oracle Forms Recognition will create new Workdocs for the .tif files. This can be time consuming, because OCR has to take place.
- A batch: Oracle Forms Recognition Runtime Server creates batches and works on them. Use batches as the primary input type for classification design. Processing results can only be saved persistently as Workdocs with batches. Use reference batches with documents from given classes to verify the quality of the classification and extraction.
- A part of the Learn Set: Once you have defined a classification scheme, you need a Learn Set to train the classification and extraction. Use the Learn Set as document input to review your sample documents.

To specify the location of the Learn Set:

- On the Options menu, select Settings.
- Select the Train Mode tab.
- For Learn Set Manager, type or browse to a directory. To create a new directory, click the Browse button, click New directory, and type a pathname.

To select an input type:



- On the Options menu, select Settings. Or, in the toolbar, click the Show settings button.
- On the Settings dialog box, select the Input Mode tab.

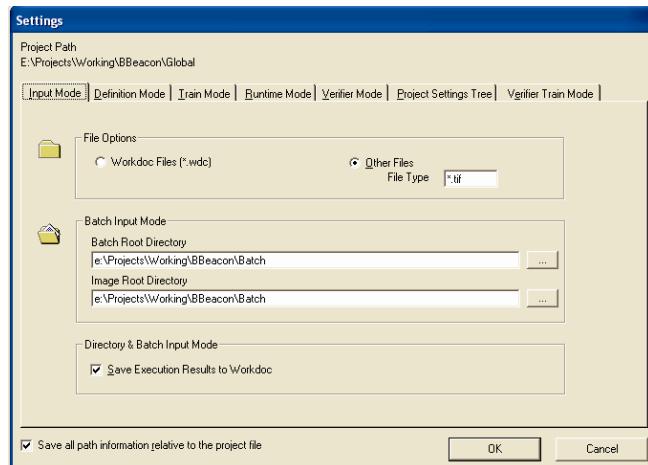


Figure 3-5: Establishing Input Settings

3) Specify the file format under File Options.

You can either select Other Files and enter the extension of your image file format (*.tif, *.jpg, *.bmp, *.gif or similar). In this case, the corresponding Workdocs should already exist in the same directory. You can also use Workdocs without image files. In this case, select Use Workdoc Files (*.wdc).



You cannot process non-image file types such as Word documents this way. Use batches to process non-image file types. Please refer to the Oracle Forms Recognition Runtime Server User's Guide for details.

To specify the location of batches:



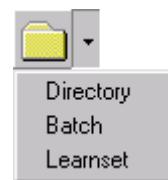
- 1) On the Options menu, select Settings. Alternatively, in the toolbar, click the Show settings button.
- 2) In the Settings dialog box, select the Input Mode tab.
- 3) Specify the location of your batch files under Batch Root Dir. For each batch file, there is a subdirectory containing the image files that will be batch-processed. Specify the root of these subdirectories under Image Root Dir. In general, both root directories should be the same.



Batch location must be defined before you can select batches as input type.

To select the input type:

- 1) Click on the drop-down arrow associated with the Switch to Document Input Selection button.
- 2) From the list, select the input type. Depending on your selection, the appearance of the button varies.



Button	description
	Indicates document input from directories.
	Indicates document input from the Learn Set.
	Indicates document input from batches.

Table 3-1: Controls of Document Selection Mode

- 3) The Document Selection Mode is activated automatically.

3.7.2.4. User Interface

The user interface of Document Selection Mode enables you to further refine your document selection.

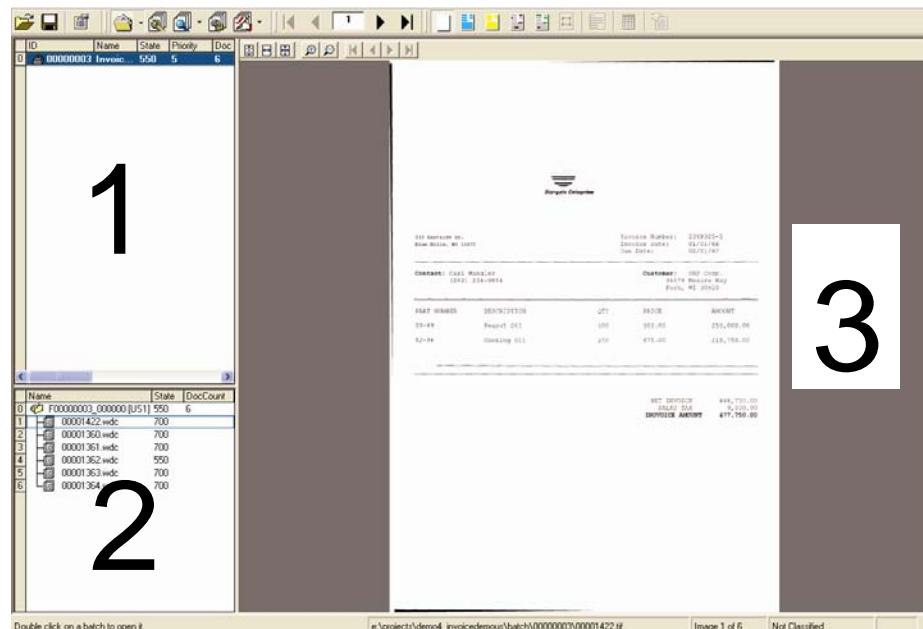


Figure 3-6: Refining settings through the Document Selection Mode

1. Document Set Selection

Depending on your settings (please see section [3.7.2.3](#)), this pane shows:

- A tree view of directories from the file system
- A list view of batches from the batch root directory
- A list view of classes a Learn Set has been created for.

If you double-click one of the entries, the pane below shows the contents of the current selection.

2. Document Selection

This pane shows the documents from your document set. This can be

- A list view of files from the selected directory
- A tree view of folders and document from the selected batch
- A list view of files from the selected class.

If you click one of the entries, the selected document is displayed in the pane on the right side.

3. Document Display

This pane displays the currently selected document.

3.7.2.5. Input Type Directory

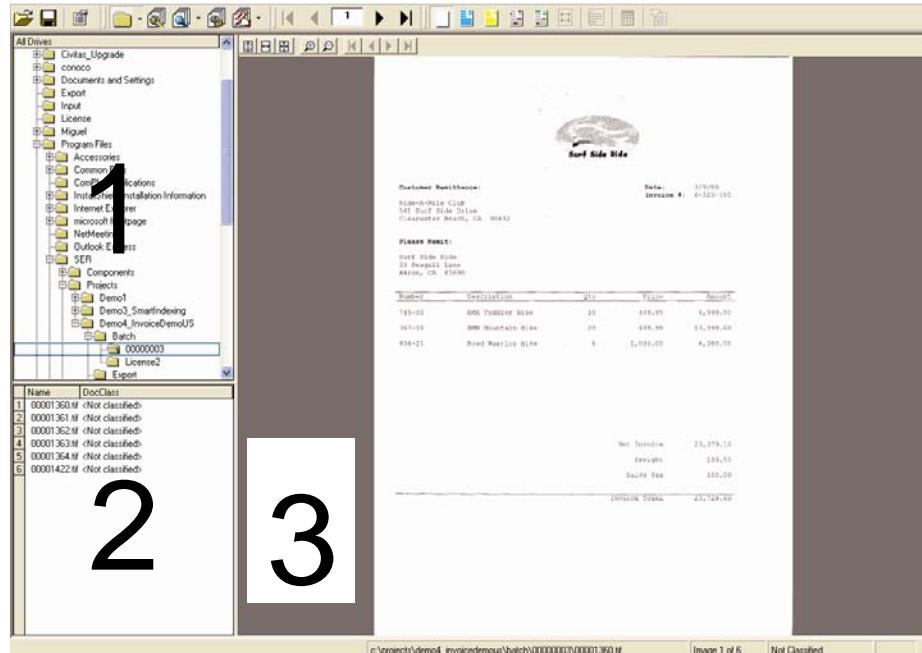


Figure 3-7: Importing files from a directory

1. Directory List

A “tree view” of directories from the file system. If you double-click one of the entries, the pane below shows the content of the current selection.

2. Workdoc / Other Files List

A “list view” of files from the selected directory. If you click one of the entries, the selected document is displayed in the pane on the right side.

3. Document Display

This pane displays the currently selected document.

For drives or directories, you can:

- Open a directory

- Create batches for this project from the directory
- Refresh the selected directory

To select a directory option, select the directory from the drive/directory list and click Edit.

To create batches from a directory, select a directory from the directory list and select Edit/Import New Batch From Directory. Oracle Forms Recognition inserts the selected batch in the Batch directory. Please see Project Settings – Input Mode Tab. A progress bar is displayed while the insertion is in progress.

3.7.2.6. Input Mode Batch

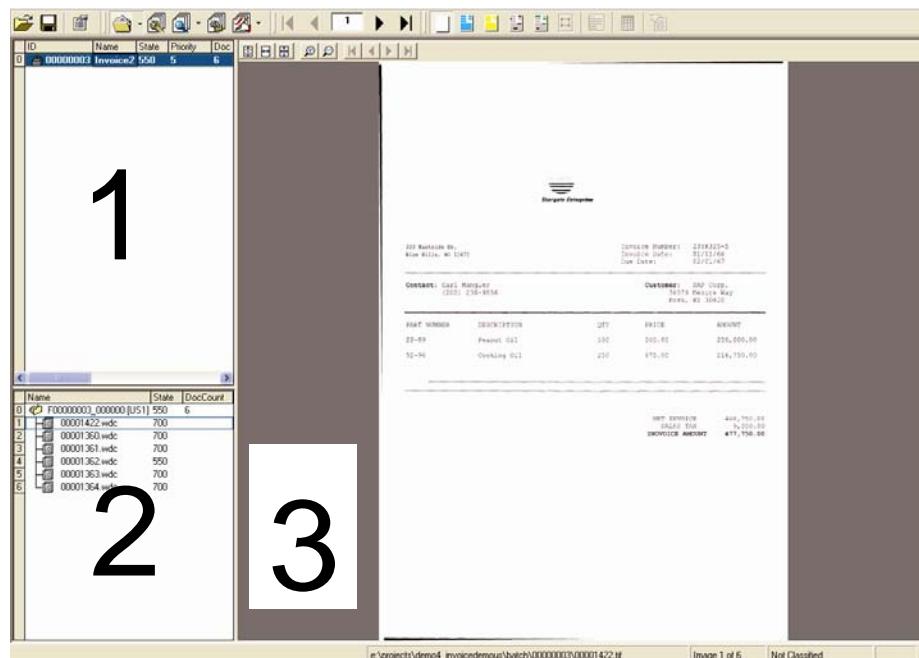


Figure 3-8: Importing files from a batch

1. Batch List.

A “list view” of batches from the batch root directory. If you double-click one of the entries, the pane below shows the content of the current selection.

2. Document/Folder List.

A “tree view” of folders and documents from the selected batch. If you click one of the entries, the selected document is displayed in the pane on the right side.

3. Document Display.

This pane displays the currently selected document.

You have several options for working with batches and documents in Input Mode.

For batches, you can:

- Close a batch.
- Create a batch.
- Rename a batch.
- Change a batch state - Select from a drop-down box to change the state of a batch.
- Change a batch priority - Select from the drop-down box to change the status of a batch in a batch group.
- Add a folder - Enter in a name to add a new folder.
- Delete a batch - Deletes the selected batch.

For folders, you can:

- Rename a folder. Enter a new name to rename the folder.
- Delete a folder and documents from the list.
- Add document. This adds a Workdoc to a folder.

For documents, you can:

- Split a multipage document into separate Workdocs.
- Append to preceding. Appends a Workdoc to the preceding Workdoc to make a multipage document.
- Change state. Changes the status of a document to a new value that you assign.
- Delete a batch. Deletes the selected Workdoc from the batch.
- To select a batch option, select the batch from the batch list and select Edit, Batch, or right-click the desired batch.

To select a folder option, select the folder from the Document/Folder list and select edit folder or right-click on the desired folder or document.

To select a document option, select the Workdoc from the document/folder list and select Edit>Folder or right-click on the desired document.

You can also drag and drop a folder to another batch or move a selected document to another folder within the same batch.

3.7.2.7. Input Type Learn Set

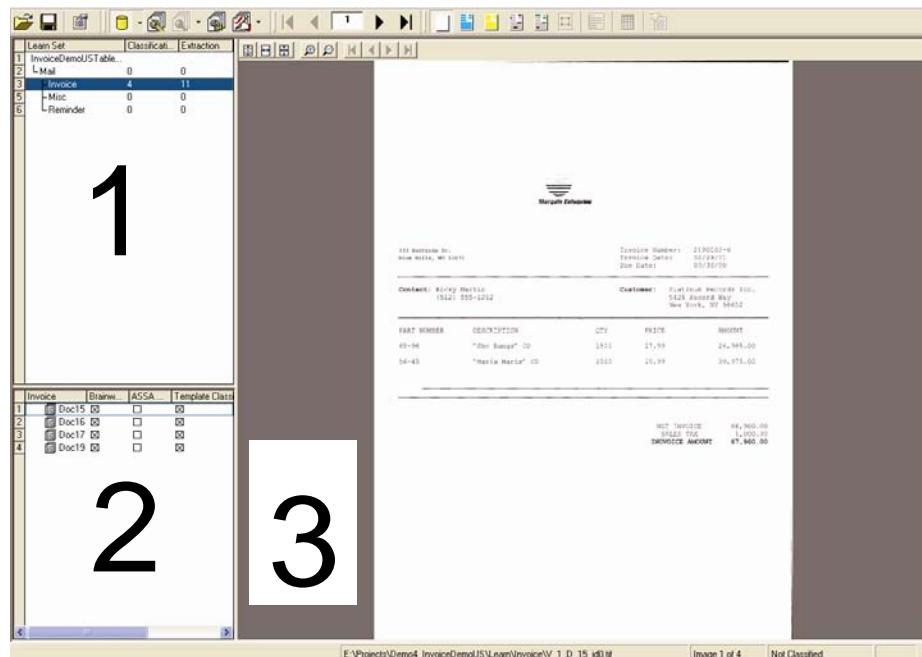


Figure 3-9: Inputting from a Learn Set.

1. Document Class View.

A “list view” of classes that a Learn Set has been created for. If you double-click one of the entries, the pane below shows the content of the current selection.

2. Classification Extraction/Learn Set (learned documents.)

A “list view” of files from the selected set.

3. Document Display.

This pane displays the currently selected document.

For document classes, you can:

- View Classification Learn Set. A list of documents and their classification Learn Set are shown.
- View Extraction Learn Set. A list of documents and their extraction Learn Set are shown.

For Learn Sets, you can:

- Remove from Learn Set. Delete the selected document from the Learn Set. Documents in the class will have to be learned again.
- Click the checkboxes for the classification/extraction engines. If a checkbox is selected, the document will be added to the Learn Set of the document class for this engine. If the checkbox is cleared, the document will be removed from the engine for this Learn Set. Documents in the class will have to be learned again.

To select a document class option:

- 1) Select a document class from the Document Class View list.
- 2) Select Edit > Learn DocClass.

To select a Learn Set option:

- 1) Select a document from the Classification/Extraction Learn Set.
- 2) Select Edit > Learn Set Document.

3.7.2.8. Creating Test Documents

After you establish your document settings, you can create test documents that will automatically select files from a chosen directory and place them in your batch directory.

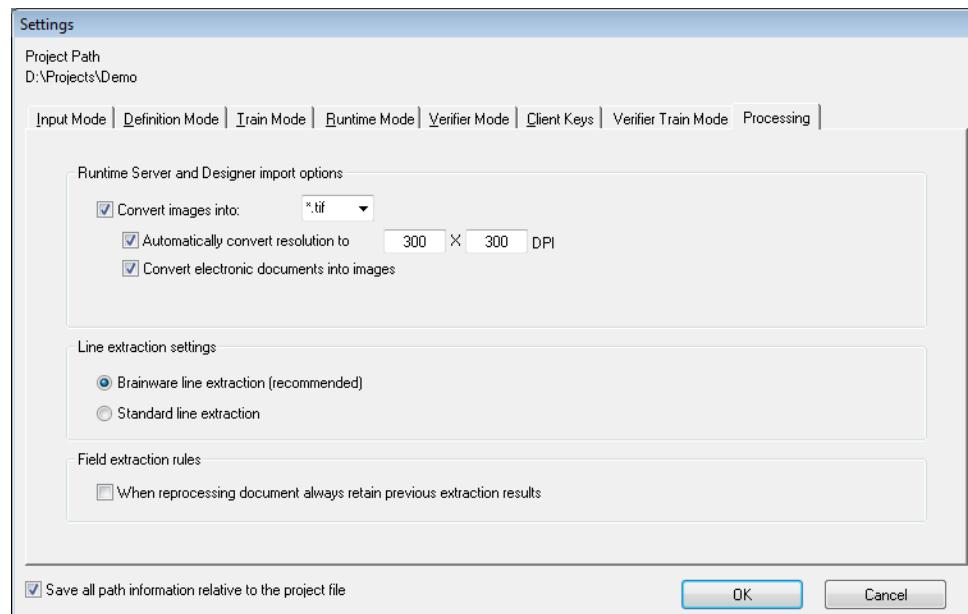
To import a new batch:

- 1) Click the arrow next to the Switch to Document Input Selection button.
- 2) From the list, select the Directory Input type.
- 3) Select a directory from the directory list for the origin of your files.
- 4) Select Edit, Import New Batch from Directory. Oracle Forms Recognition inserts files into the batch directory. A progress bar appears during the insertion.

3.7.2.9. Automatic Conversion of Documents during Import Phase

Description

On the “Processing” tab of project settings in Oracle Forms Recognition Designer, it is possible to configure a couple of options allowing automatic conversion of documents during import into the Oracle Forms Recognition system:



These options are available in the “Runtime Server and Designer import options” group box on the property page. The root option is “Convert

images into:" allows selecting one of 39 currently supported image formats to convert the incoming document into.

Below is the detailed list of the currently supported image formats the converted documents can be saved on the disk with:

ID	Brief Format Description	File Extension	Supports Multiple Pages
1	Brooktrout file, Image Type: Bitmap.	BRK	No
2	Brooktrout file.	BRK	No
3	Native bitmap file format of the Microsoft Windows environment.	BMP	No
4	Native bitmap file format of the Microsoft Windows environment, RLE-compressed.	BMP	No
5	Monochrome bitmap, to provide a standardized graphics interchange for electronic graphics and image processing applications.	CAL	No
6	Windows Clipboard, RLE or uncompressed color bitmap.	CLP	No
7	Color table, RLE Monochrome, 24-bit RGB Bitmap. To allow the storage of multiple PCX files in one file.	DCX	Yes
8	Encapsulated PostScript, monochrome Metafile Storage and interchange of single images.	EPS	No
9	Image Object Content Architecture 4, 8, 16-bit palette gray-scale and color, G3 compression.	ICA	No
10	Image Object Content Architecture 4, 8, 16-bit palette gray-scale and color, G4 compression.	ICA	No
11	ICO resource file, Storage and interchange of iconic bitmaps (icons), across many Windows applications, regardless of the pixel resolution and color scheme of the display hardware.	ICO	Yes
12	IMNET graphics.	IMP	No
13	Electronic Art's Interchange File Format, RGB palette up to 24-bit, binary Bitmap.	IFF	No
14	JPEG File Interchange Format, Interchange of .JPG files between applications on different platforms.	JPG	No
15	Mixed Object Document Content Architecture, To allow multiple IOCA images to be stored in one file, G3 compression.	MOD	Yes
16	Mixed Object Document Content Architecture, To allow multiple IOCA images to be stored in one file, G4 compression.	MOD	Yes
17	NCR Image.	NCR	No
18	NCR Image, compression G4.	NCR	No
19	Macintosh PICT, to capture a picture as a set of Macintosh QuickDraw library function calls.	PCT	No
20	PC Paintbrush File Format, Storing images for ZSoft Corporation's paint program, such as PC Paintbrush.	PCX	No
21	Portable Network Graphics, TrueColor up to 48 bpp, Effective lossless compression of TrueColor images.	PNG	No

ID	Brief Format Description	File Extension	Supports Multiple Pages
22	Adobe Photoshop, all colors including RGB, CMYK, multi-channel Bitmap.	PSD	No
23	Sun Raster Data Format, RGB color map or TrueColor Bitmap, Bitmap format for Sun UNIX platforms.	RAS	No
24	SGI Image File Format, Display of images from the SGI image library.	SGI	No
25	Truevision Targa, Alpha data 1 or 8-bits Bitmap (2D raster).	TAG	No
26	Tagged Image File Format, Standardized data storage and interchange of images obtained from scanners and incorporated into desktop publishing.	TIF	Yes
27	Tagged Image File Format, Standardized data storage and interchange of images obtained from scanners and incorporated into desktop publishing, G3 compression.	TIF	Yes
28	Tagged Image File Format, Standardized data storage and interchange of images obtained from scanners and incorporated into desktop publishing, G3 compression, 2-dimensional.	TIF	Yes
29	Tagged Image File Format, Standardized data storage and interchange of images obtained from scanners and incorporated into desktop publishing, G4 compression.	TIF	Yes
30	Tagged Image File Format, Standardized data storage and interchange of images obtained from scanners and incorporated into desktop publishing, Huffmann compression.	TIF	Yes
31	Tagged Image File Format, Standardized data storage and interchange of images obtained from scanners and incorporated into desktop publishing, JPEG compression.	TIF	Yes
32	Tagged Image File Format, Standardized data storage and interchange of images obtained from scanners and incorporated into desktop publishing, LZW compression.	TIF	Yes
33	Tagged Image File Format, Standardized data storage and interchange of images obtained from scanners and incorporated into desktop publishing, packed.	TIF	No
34	X BitMap, none compression, primarily for storing cursor and icon bitmaps for the X System graphical user interface.	XBM	No
35	X PixMap, none compression, to store X Window Pixmap information to disk.	XPM	No
36	X Window Dump, 16, 24 or 32 TrueColor Bitmap, no compression, and storing screen dumps from the X Window System.	XWD	No
37	Microsoft Windows Metafile, no compression. Convenient storage and interchange for applications run under MS Windows.	WMF	No
38	Lura Document format.	LDF	No
39	JP2 JP2000 Format.	JP2	No

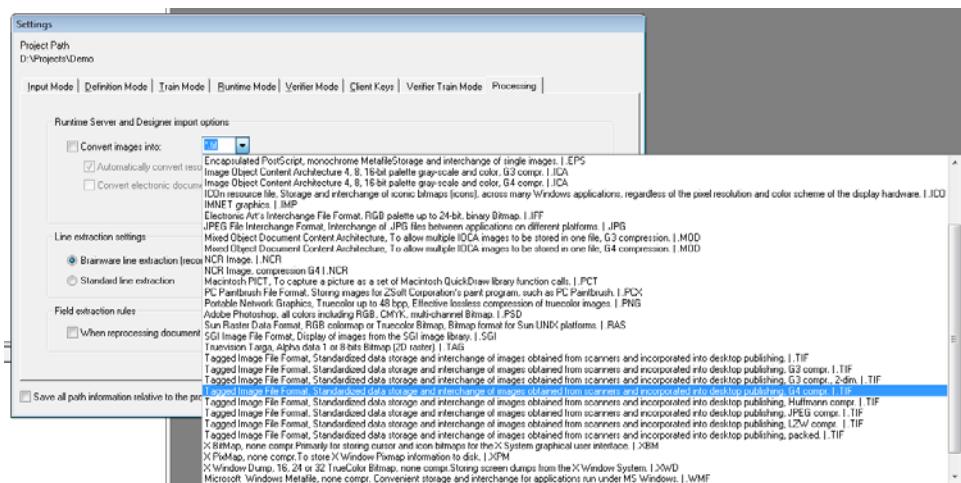
The other two options “Automatically convert resolution to” and “Convert electronic documents into images” can activate automatic conversion of image files’ resolution to user specified values, in DPI units (recommended

values are 300 x 300 DPI) and automatic conversion of electronic documents (like Excel files, Word documents, PowerPoint presentation, PDF files, etc.) to the same image format. Both sub-options only have an effect when the root one “Convert images into ...” is turned on.

The default values for all the new options are:

- “Convert images into” – Unchecked in order to satisfy general backwards compatibility requirement. Recommended value is checked. The default value for the image format is supposed to be the one with ID 29 from the formats’ table above.
 - “Automatically convert resolution to” – Checked. At the same time, as noted above, the checked state affects the importing in Oracle Forms Recognition only if “Convert images into” option is on. The default values for both X- and Y-resolution is 300 DPI (dots per inch).
 - “Convert electronic documents into images” – By default Unchecked.

When expanding the dropdown list, the currently configured image format is selected:

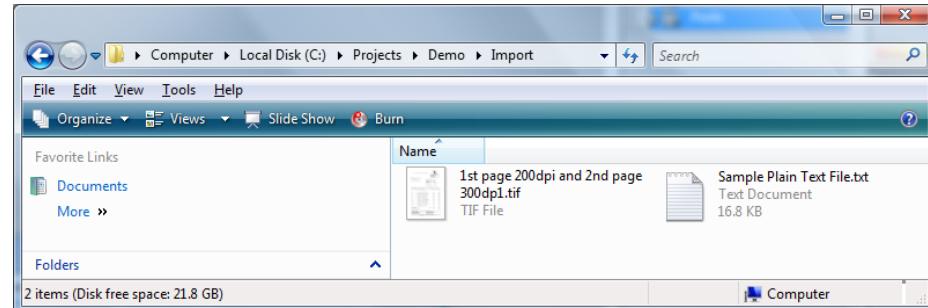


The above mentioned options affect the following parts of processing in Oracle Forms Recognition:

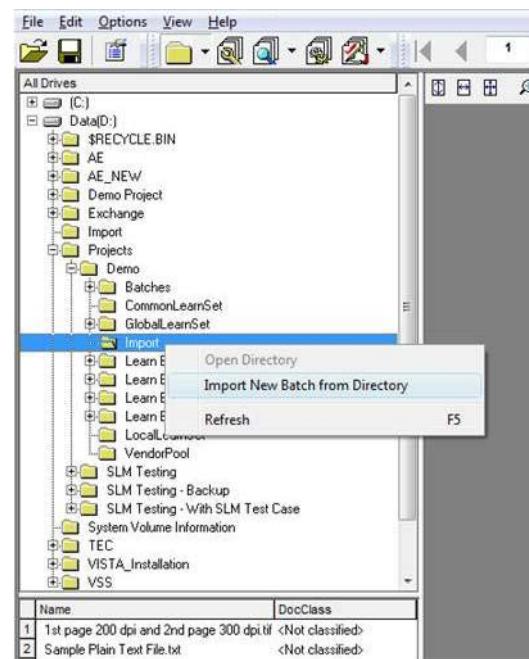
1. Importing of documents in Document Browsing mode of Oracle Forms Recognition Designer application.
 2. Importing of documents in Oracle Forms Recognition Runtime Server application.

During conversion, the original imported documents remain unchanged, while the documents attached to the Oracle Forms Recognition's WorkDocs associated with the imported files are converted to the desired image file format. If the desired format supports multi-page document files (see "Supports Multiple Pages" column in the table of formats above), the imported pages of an image file or an electronic documents are all going to be stored in a single document files referenced by a single WorkDoc. Otherwise, the imported pages are going to be split into individual document files – all attached to the same single WorkDoc.

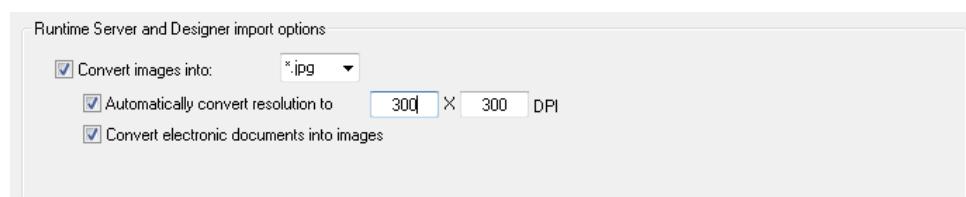
For example, when importing one 10-page plain text file and one 2-page TIF file (with mixed resolution for different pages: first page with 200x200 DPI (common FAX resolution) and the second page with (desired for Oracle Forms Recognition) 300 x 300 DPI:



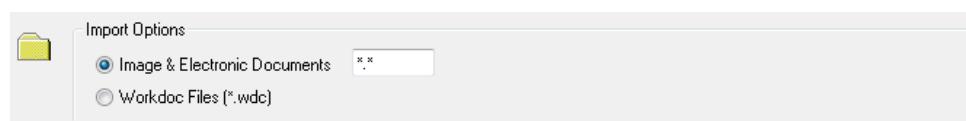
In Document Browsing mode of Oracle Forms Recognition Designer:



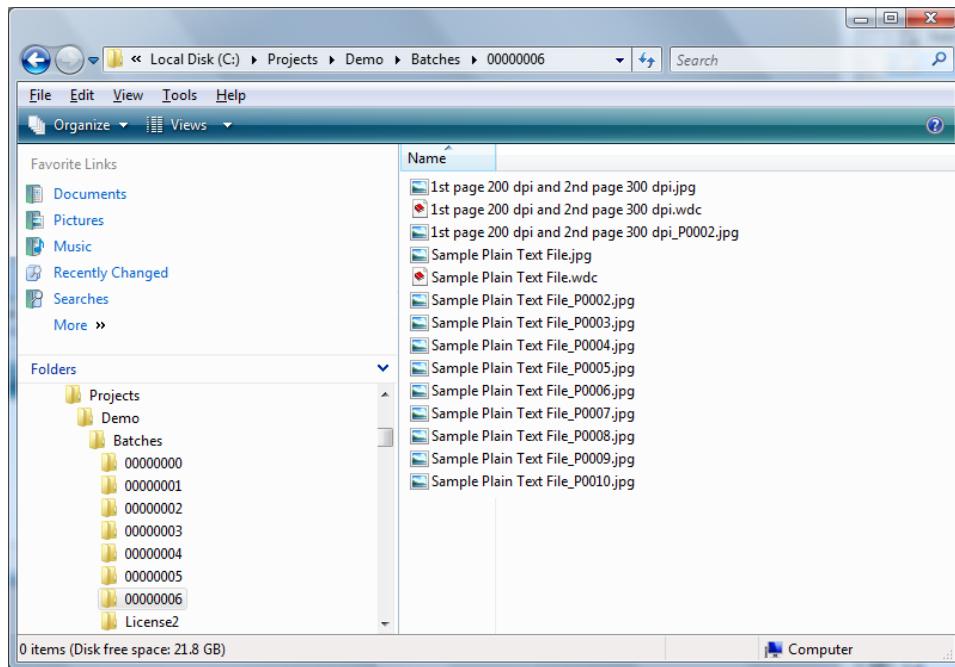
With the following project level conversion settings:



Also the following Designer's import settings:



The Oracle Forms Recognition's importing sub-system is going to produce the following outcome:



For example, two Oracle Forms Recognition documents (two WorkDocs) with one individual JPEG file per each imported page of the 2-page TIF file and 10-page Text file. In this connection, all 12 JPEG files have the desired 300 x 300 DPI resolution.

Usage

The Import Options can be primarily used for the following purposes:

- Stabilization of document processing in Oracle Forms Recognition in relation to unification of the documents' resolution (usually it is supposed to be 300 x 300 DPI for all learnset and extracted images) and, in some rare case, to prevent from degradation of extraction results when processing certain types of electronic documents where the corresponding subsystem in Oracle Forms Recognition (third-party INSO library) is not capable of delivering good quality results for some properties of the processed electronic files (i.e., in cases when image based processing with OCR post-processing appears to be better in terms of extraction quality).
- Unification of processed documents, i.e., when different incoming formats are converted into a single, most optimal in terms of temporary data storage and data processing.
- Further archiving, when original documents are supposed to be archived in an external database along with the extracted data entries in one unified format.

3.7.3. Definition Mode

Definition Mode is the main working mode of Oracle Forms Recognition Designer.

3.7.3.1. Purpose – Definition Mode

Use this mode to design the settings for the project and to establish classification and data extraction, and to execute an export during classification/extraction.

When processing batches, you can generate a default export file. In Definition Mode, you can also test single documents or an entire document set.

To switch to Definition Mode:



- On the View menu, select Definition Mode.
- Alternatively, on the toolbar, click the Switch to Definition Mode button.

3.7.3.2. Settings – Definition Mode

In Definition Mode, you can automatically process an entire document set in a single run. To do this, you need enough time to view the results for one document before the next one is displayed.

To set the processing delay:



- On the Options menu, select Settings or, in the toolbar, click the Show settings button.
- In the Settings dialog box, select the Definition Mode tab.
- Under Definition Mode:
 - either type the delay in seconds into the sec text box, or
 - use the slider to set a value.

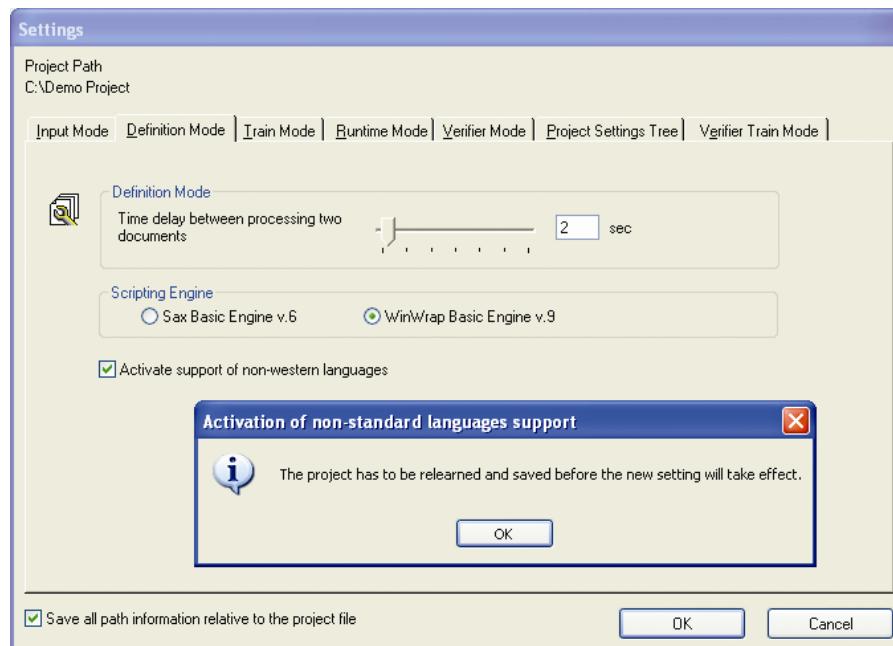


Figure 3-10: Settings for Definition Mode

3.7.4. Support of non-western languages support

Oracle Forms Recognition 4.1 provides a generic approach to the support of “non-western” languages, where essential parts of their alphabet are not covered by letters of the English alphabet with the same key codes; for example, Greek, Polish, Russian, and Arabic.

An automatic phonetic translation is applied from non-western language(s) into English and then an unambiguous conversion back to the original language(s). The conversion is applied for the following workflow steps in Oracle Forms Recognition:

- Classification
- Extraction
- Validation
- Learning

These processes can be executed on a non-native PC (e.g. on a UK or US workstation or server) to process documents that contain auxiliary information and information to be extracted in supported non-western languages.

For the purpose of scripting using non-western characters, e.g. when implementing validation routines, the method can also automatically convert the entire custom script code for processing documents in Oracle Forms Recognition Runtime Server. This feature is only important if the SAX Basic V.6 script engine is used to implement custom scripts. The WinWrap V.9, engine fully supports Unicode and conversion of the script code is not required.

The following Oracle Forms Recognition engines allow phrases, format strings, etc. to be entered with visual input using the characters of the currently supported non-western languages:

- Phrase Classification engine
- Table Analysis engine
- Format Analysis engine
- Associative Search engine (the includes the ability to import Unicode CSV files)

Configuring the Phrase Classification, Table Analysis and Format Analysis engines using phrases / strings in the desired non-western language should be applied on the corresponding non-western PC or on any PC where this language is set as the default system's Unicode language.

This is also applicable for all other Oracle Forms Recognition engine that do not require any visual input in non-native languages like the Brainware Extraction engine, the Oracle and ASSA Classification engines, the Brainware Layout Classification engine, and so on.

Once support for non-western languages has been activated, the project has to be saved and relearned.

Please see section [3.7.7](#) for export options.

3.7.4.1. User Interface – Design Project Level

The user interface of Definition Mode is the core of Oracle Forms Recognition Designer.

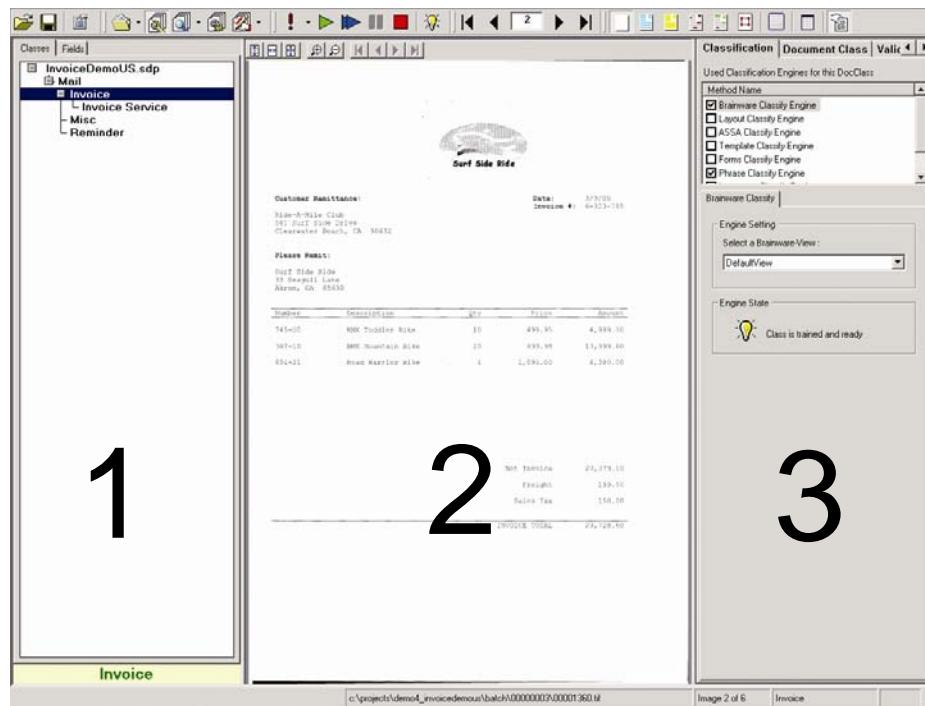


Figure 3-11: User Interface of the Definition Mode

1. Project/Class/Field Definition window.

Its two tabs enable you to select a project, class, document, or field to work on.

2. Document View.

Displays the most recently selected document.

3. Property Editors.

This pane displays the currently selected document.

3.7.4.2. Project-Level Properties

Four types of project-level properties are available for definition when you select the *.sdp file on the Class tab on the left side of the screen: Project; Classification, Validation and Supervised Learning. All four property types can be accessed on dedicated tabs on the right side of the screen. These tabs are called editors.

To access these property editors, select Show Properties on the Edit Menu, or click the Show Properties button on the toolbar.

Project Editor

The Project Editor contains general classification settings such as interpretation, thresholds, and distances for standard classification and parent classification, OCR, word segmentation, and storage.

Classification Editor

The Classification Editor enables you to assign a default class to which documents will be assigned if they cannot be automatically classified. It also displays the engines used to classify Document Classes. (Please see [Chapter 4](#) to learn how to use the Classification Editor.)

Validation Editor

At the project level, the only validation setting available is whether to permit or forbid Forced Validation. (Please see [Chapter 6](#) to learn how to use the Validation Editor.)

Supervised Learning Editor

Supervised Learning is configurable only at the project level. Please see section [4.16](#) and section [5.7](#) to learn about configuring Supervised Learning.

3.7.4.3. Class-Level Properties

Three types of project-level properties are available for definition when you select a base class or derived class from the Class tab on the left side of the screen: Classification, Document Class, and Validation.

Classification Editor

At this level, the Classification Editor is used to select a classification engine for the document class and to establish settings for the selected engine. (Please see [Chapter 4](#).)

Document Class Editor

The Document Class Editor is used to establish settings for the selected document class. (Please see [Chapter 4](#).)

Validation Editor

The Validation Editor is used to establish validation settings and to enable the Standard Validation Engine. (Please see [Chapter 6](#).)

3.7.4.4. Field-Level Properties

Four types of field-level properties are available for definition when you select a field on the Field tab on the left side of your screen: Analysis, Evaluation, Field, and Validation.

Analysis Editor

This editor is used to select the analysis (extraction) engine. (Please see [Chapter 7](#)) and the settings from the selected engine

Evaluation Editor

This editor is used to select the evaluation engine, if this is necessary for the selected analysis engine

Field Editor

This editor is used to establish OCR settings for the selected field.

Validation Editor

The Validation Editor is used to establish validation settings and to enable the Standard Validation Engine. (Please see [Chapter 6](#).)

3.7.5. Train Mode

3.7.5.1. Purpose – Classification Learn Set

Use this mode to train classification using the properties defined in Definition Mode and the current document set selected in Document Selection Mode. Although learning is also available in Definition Mode, only Train Mode allows the creation of Learn Sets.

3.7.5.2. Selection – Classification Learn Set

To switch to Train Mode:

- From the View menu, select Train Mode.
- Alternatively, in the toolbar, click the Switch to Train Mode button, and select Train Mode from the drop-down menu



3.7.5.3. Settings – Classification Learn Set

Train Mode requires particular settings that enable you to create a Learn Set for classification and data extraction.

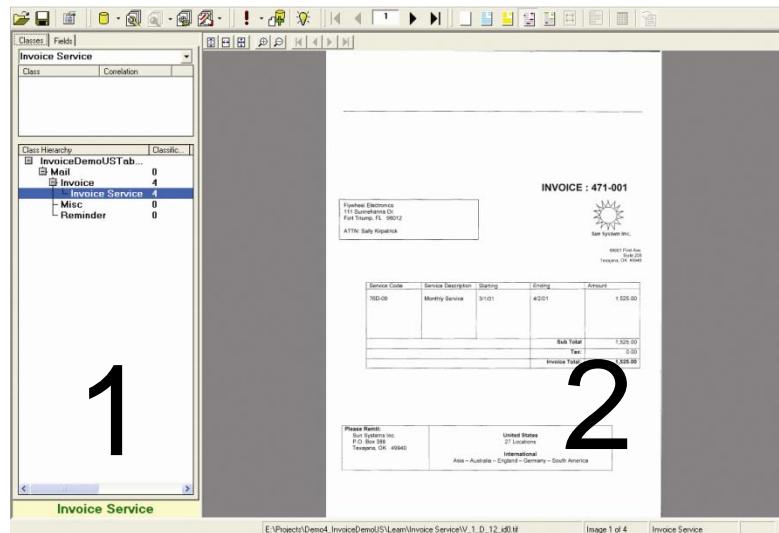
To set the options for Train Mode:



- From the Options menu, select Settings. Alternatively, in the toolbar, click the Show settings button.
- In the Settings dialog box, select the Train Mode tab.
- Under Train Mode:
 - To create a Learn Set or add documents to it, mark the Add trained documents to the Learn Set... check box. Clear the check box only if you want to use Train Mode for demonstration purposes. By default, the check box is checked when you create a new project.
 - Mark the Execute classification for new documents only... check box if you want Designer to classify each new document that is to be added to the Learn Set for data extraction. You can use this option if your sample documents do not belong to the same classes. Clear the option if you work with sorted input.
- Under Train Manager:
 - Select a directory where the documents of the Learn Set will be stored. Every time you add a sample document to the Learn Set of a class, it will automatically be copied there.

3.7.5.4. User Interface – Train Mode (Classification Learn Set)

The user interface of Train Mode enables you to train classification and extraction. This section shows the user interface for training classification.



3-12: Train Mode Interface for Classification Learn Sets

1. Class/Field Correction

The left pane contains two tabs, one for classes, the other for fields. The Classification tab is where you:

- Manually assign a document to a class
- Correct class assignments proposed by the program

When the Class tab is selected, the document will be added to the Classification Learn Set.

2. Document Display

The right pane displays the current document.

3.7.5.5. Purpose – Extraction Learn Set

Use this mode to train extraction using the properties defined in Definition Mode and the current document set selected in Document Selection Mode.

3.7.5.6. Selection – Extraction Learn Set

To switch to Train Mode:



- From the View menu, select Train Mode.
- Alternatively, in the toolbar, click the Switch to Train Mode button, and select Train Mode from the drop-down menu.

3.7.5.7. Settings – Extraction Learn Set

Train Mode requires particular settings that enable you to create a Learn Set for classification and data extraction. These settings are the same as those described in section [3.7.5.3](#).

To set the options for Train Mode:



- 1) From the Options menu, select Settings. Alternatively, in the toolbar, click the Show settings button.
- 2) In the Settings dialog box, select the Train Mode tab.
- 3) Under Train Mode:
 - To create a Learn Set or add documents to it, mark the Add trained documents to the Learn Set... check box. Clear the check box only if you want to use Train Mode for demonstration purposes. By default, the check box is checked when you create a new project.
 - Mark the Execute classification for new documents only... check box if you want Designer to classify each new document that is to be added to the Learn Set for data extraction. You can use this option if your sample documents do not belong to the same classes. Clear the option if you work with sorted input.
- 4) Under Train Manager:
 - Select a directory where the documents of the Learn Set will be stored. Every time you add a sample document to the Learn Set of a class, it will automatically be copied there.

3.7.5.8. User Interface – Extraction Learn Set

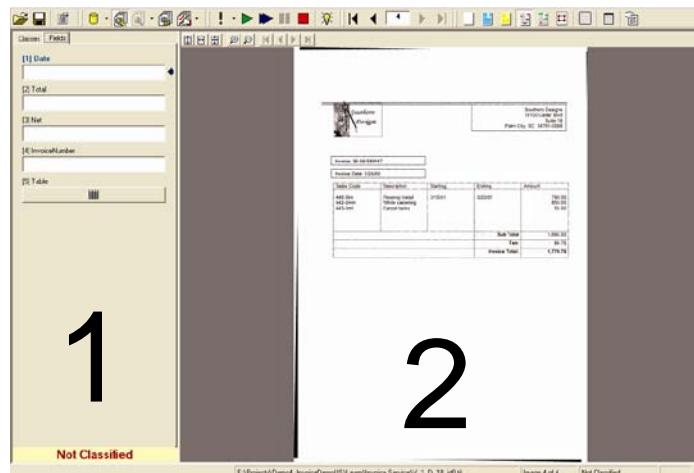


Figure 3-13: Train Mode Interface for Extraction Learn Sets

1. Class/Field Correction

The left pane contains two tabs, one for classes, the other for fields. The Fields Tab is where you:

- Manually select the correct field for data extraction from several candidates
- Correct candidate selections for data extraction proposed by the program.

When a field on the Field tab is selected, the document will be added to the Extraction Learn Set.

2. Document Display

The right pane displays the current document.

3.7.6. Verifier Train Mode

3.7.6.1. Purpose

Use this mode for Automatic Supervised Learning – an extension of Verifier that uses Associative Learning to extract supplier information and extract it to a base Document Class, learn the new class, and migrate the local project to the global Learn Set.

To use the Verifier Train Mode, you must have already created a Verification Form.

The combination with the template classification can be used to create new document classes.

Use the Verifier Train Mode to check the extraction result. When a supplier is extracted correctly and this document is added to the Learn Set, a new class is created automatically. To do this, settings must be established for the project level in Definition Mode on the Supervised Learning editor and on the DocClass level on the Document Class tab (classification field) must be made.

3.7.6.2. Selection

To switch to Verifier Train Mode:

- On the View menu, select Verifier Train Mode. Alternatively, in the toolbar, click the arrow next to the Switch to Verifier Design Mode button.
- On the drop-down menu, select Verifier Train Mode.



3.7.6.3. Settings

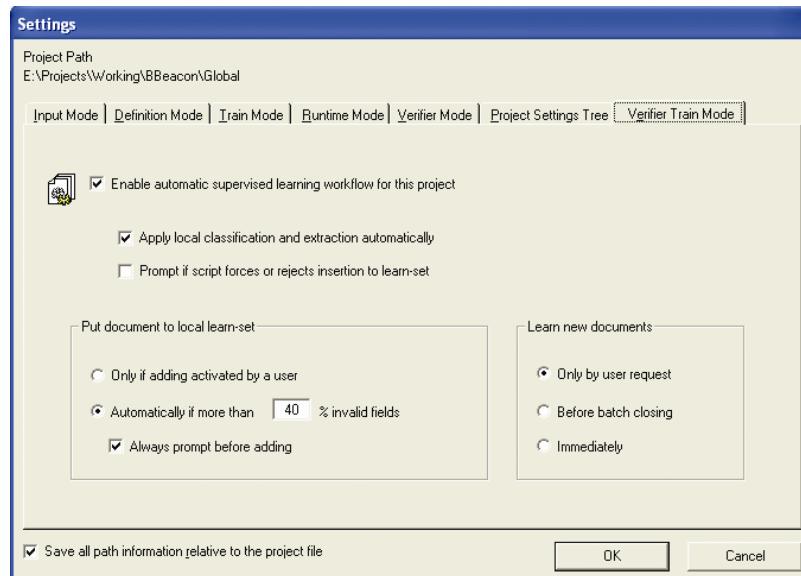


Figure 3-14: Verifier Train Mode Settings



- 1) From the Options menu, select Settings. Alternatively, in the toolbar, click the Show settings button.
- 2) In the Settings dialog box, select the Verifier Train Mode tab.
- 3) Select Enable automatic supervised learning workflow for this project. If this checkbox is not enabled, Supervised Learning will not be available in the application.
- 4) Select to save all project information relative to project file.
- 5) Select to Apply Classification and extraction automatically. New classes will be created using the supplier's name. A Learn Set should also be created if you select this setting.
- 6) Select to prompt if script forces or rejects insertion to the Learn Set.
- 7) Under Put document to local Learn Set, select either
 - Only if adding activated by a user with Always prompt before Adding selected. Verifies that a document was added to a Learn Set if the document count is updated for a class that was created as the result of supplier extraction.
 - Only if activated by a user with Always prompt before adding cleared. Verifies that a document was added to the Learn Set only if the user enabled activation.
 - Automatically if more than N% invalid fields with always prompt before adding selected. Automatically verifies that a document was added to the Learn Set if the number of documents in the class was updated. Learns documents when the specified percentage of fields are invalid before they are manually corrected.
 - Automatically if more than N% invalid fields with Always prompt before adding cleared. Learns documents only when they are initially unclassified.
- 8) Under Learn new documents, select:
 - Only by user request: Learning is initiated only by user request.
 - Before batch closing: Learning is initiated for every batch in the project each time any batch is closed.
 - Immediately. Learning is initiated anytime a document is added to the Learn Set.

3.7.6.4. User Interface

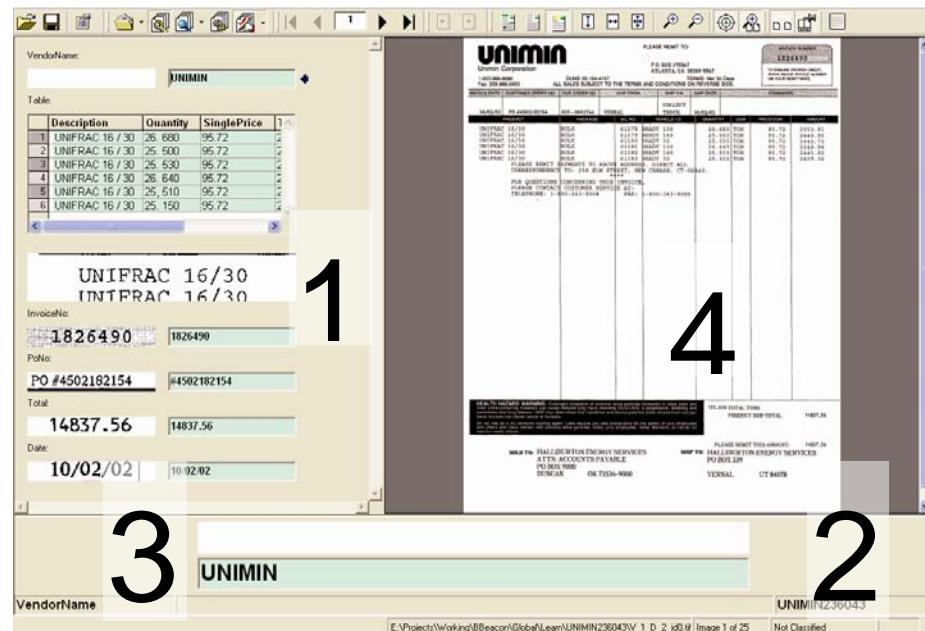


Figure 3-15: Verifier Train Mode User Interface

1. Form Area

The form area contains a set of controls for correction and manual indexing.

- Form fields
- Labels
- Viewers

Each control is assigned to a data extraction field. The viewers show the document areas that were extracted to fill the fields.

2. Current Input Area

This area shows a magnification of the current form field and the associated viewer. It can be used for particularly convenient viewing and editing.

Note that the position of the form areas may vary according to the selected layout, or only a subset of form areas may be present.

3. User Info Area

This area displays the class name of the current document, the name of the current field and – if applicable – a message indicating why the current field is invalid.

4. Document Area

The pane on the upper right side displays the current document.

Button	Description
	Move to previous page.
	Move to next page.
	Highlight all fields.
	Highlight selected fields.
	Highlight all candidates.
	Maximize image height.
	Maximize image width.
	Maximize image size.
	Zoom in.
	Zoom out.
	Keep focus on field.
	Keep zoom on switching to next document.
	Move to next document on validate
	Force document to be validated with selected form.
	Show/hide script.

Table 3-2: Controls in Verifier Train Mode

3.7.7. Runtime Mode

3.7.7.1. Purpose

Use this mode to simulate classification and extraction using the entire document set. Only Runtime Mode allows testing of export scripts. This mode is also useful for performing OCR on a document set that will be used in Definition or Train mode.



Except for the OCR output and the corresponding images, the results of the Runtime Mode are not saved persistently.

3.7.7.2. Selection

To switch to Runtime Mode:



- On the View menu, select Runtime Mode.
- Alternatively, on the toolbar, click the Switch to Runtime Mode button.

3.7.7.3. Settings

For Runtime Mode, you need to define import and export options. In addition, you can either test classification only or classification plus extraction.

To set the options for Runtime Mode:



- 1) On the Options menu, select Settings. Alternatively, in the toolbar, click the Show settings button.
- 2) In the Settings dialog box, select the Runtime Mode tab.

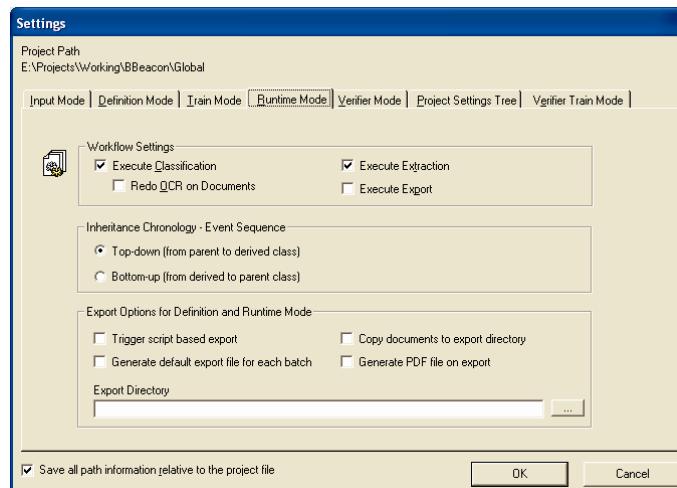


Figure 3-16: Runtime Mode Settings

- 3) Under Workflow Settings:
 - Select Execute Classification to automatically execute a classification of input.
 - Select Execute Extraction to automatically execute extraction of input.
 - Select Redo OCR on Documents to rerun an OCR with selected settings.
 - Select Execute Export to automatically execute an export of input.
- 4) Under Inheritance Chronology - Event Sequence:
 - Select Top Down (from parent to derived [child] class)
 - Select Bottom Up (from derived to parent class)

Parent classes sometimes contain multiple derived classes that might also be parent classes themselves. If a DocClass (more formally known as a Document Class) is derived from one or more parent DocClasses, each event for that DocClass will also be executed in all parent DocClasses, starting at the most senior parent class (Top Down).

Both Bottom Up and Top Down apply to available events. By default, the inheritance chronology is set to Top Down.

For most users, the default setting of Top Down is correct. Change the settings for Inheritance Chronology event sequences only if there are scripts created for those events. Unless there is a lot of code, it is probably easier to change the code, rather than change the event chronology.

Event Chronology is a potential issue only for projects that contain script code for the events cited in Oracle Forms Recognition's scripting reference guide. It should only be necessary to change the event chronology on the Compatibility tab for these projects.

- 5) Under Advanced Validation Option:
 - Select Do not allow script overwriting of standard validation output
- 6) Under Export Options for Definition and Runtime Mode:
 - Select Trigger script-based export to start a predefined script that contains export instructions.
 - Select Copy documents to export directory to copy processed documents from the import to the export directory instead of moving them.
 - Select Generate default export file for each batch to generate an ASCII file with the processing results. The export file will be re-created with each run. It will be written to the export directory. The file name is generated according to the naming convention <Name of the import directory>.exp.
 - Select Generate PDF file on export to generate a PDF file with the processing results. The export file will be re-created with each run and written to the export directory. The file name is generated according to the naming convention <Name of the import directory>.pdf.
 - Select Export Directory and enter a location where images and OCR output will be stored after processing

3.7.7.4. User Interface

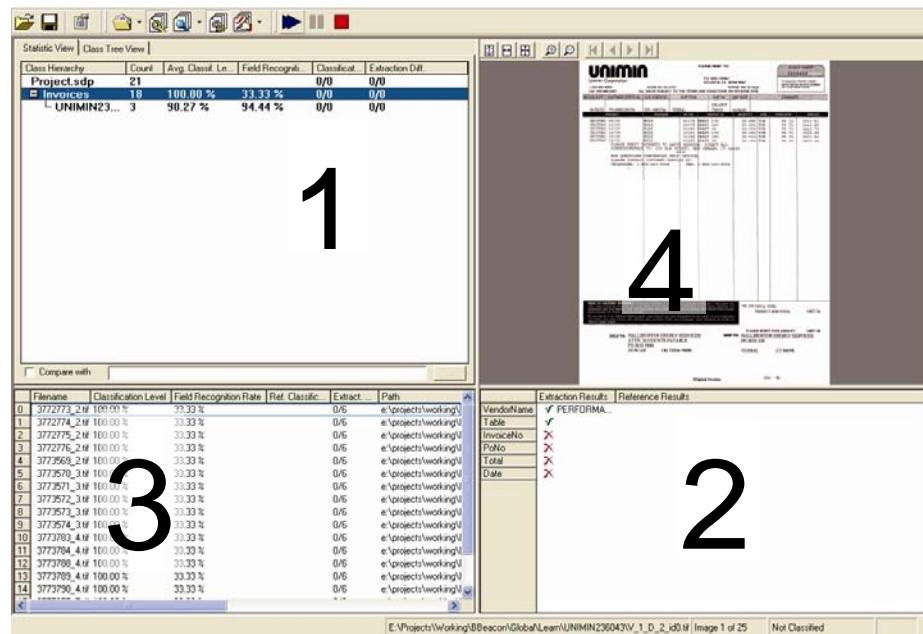


Figure 3-17: User Interface of the Runtime Mode

3.7.8. Verifier Design Mode

3.7.8.1. Purpose

Use this mode to create forms that will be used in Oracle Forms Recognition Verifier to manually correct extracted data and for manual indexing. Also, activate or deactivate Force Validation of a field and set states for classification or extraction for testing a script in the Settings dialog box.

3.7.8.2. Selection

To switch to Verifier Design Mode:

On the View menu, select Verifier Design Mode. Alternatively, in the toolbar, click the Switch to Verifier Design Mode button.

3.7.8.3. User Interface

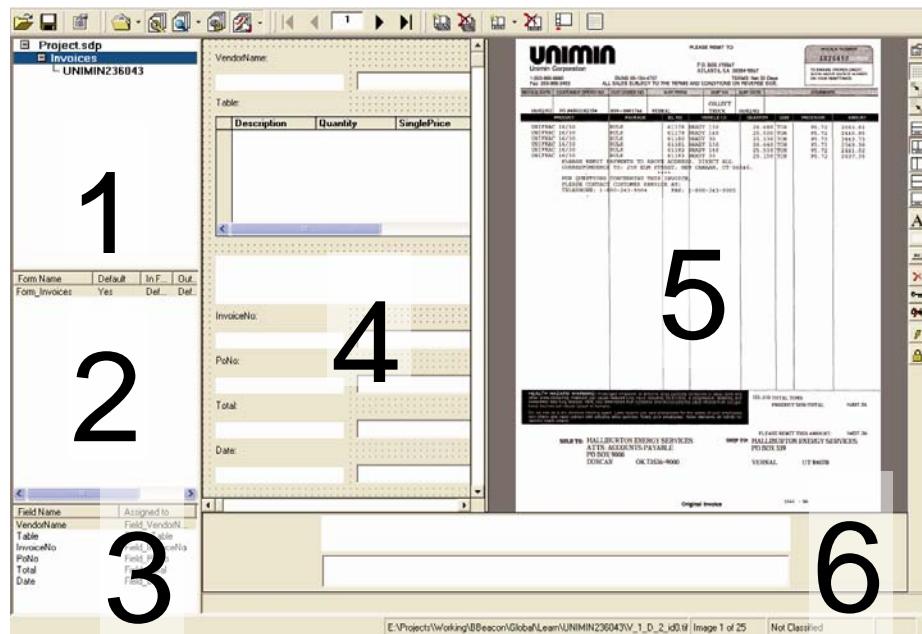


Figure 3-18: User Interface of the Verifier Design Mode

1. Class Selection

The upper pane on the left side contains a hierarchical representation of classes that are defined in the current project.

2. Form Selection

By default, the middle pane on the left side either displays the name and properties of the form that is assigned to the currently selected class. Alternatively, it displays all the forms that are available in the current project. To display all forms, right-click a form name and select Show All from the shortcut menu. To switch again, select a class in the upper pane. Note that the form properties and the remaining commands in the shortcut menu are not yet relevant because at the moment only one form can be defined for each class.

3. Field Selection



The bottom pane on the left side displays a table with the mapping of data extraction fields and verification form fields of the current form. All panes on the left side are visible by default. To hide them, select the menu command View - Verifier Design Mode - Maximize Verification View, or click the toolbar button at right.

4. Form Area

The form area consists of a background and a set of controls that will be used in Oracle Forms Recognition Verifier for correction and manual indexing.

The following control types are available:

- Form fields
- Labels

- Buttons
- Viewers
- Tables

Each control must be assigned to a data extraction field. The viewers are used to show the document area that was extracted to fill a given field.

5. Form Document Area

This area shows the document that has been displayed before selecting the Verifier Design Mode.

6. Form Current Input Area

This area shows a magnification of the current form field and the associated viewer. The area can be used for particularly convenient viewing and editing.

Note that the position of the form areas may vary according to the selected layout, or only a subset of form areas may be present. The layout shown above is the default layout.

Button	Description
	Insert default verification forms for all doc class
	Delete all verification forms
	Insert default form/Insert empty form
	Delete verification form
	Maximize Verification form view
	Show/hide script
Toolbar (right hand side)	
	Show selected object properties
	Show/hide Grid
	Enlarge Grid Step
	Shrink Grid Step
	Data View Layout Style 1
	Data View Layout Style 2
	Data View Layout Style 3
	Data View Layout Style 4
	Data View Layout Style 5
	Add New Label Element
	Add New Viewer Element
	Add New Button Element

Button	Description
	Delete Selected Elements
	Define Smart Indexing
	Delete Smart Index
	Show Action List
	Lock Verifier controls

Table 3-3: Controls in Verifier Design Mode

3.7.9. Verifier Test Mode

3.7.9.1. Purpose

Use this mode to test the verification step with forms that were created in Verifier Design Mode.

3.7.9.2. Selection

To switch to Verifier Test Mode:

- From the View menu, select Verifier Test Mode.
- Alternatively, in the toolbar, click the arrow associated with the Switch to Verifier Design Mode button.



From the drop-down menu, select Verifier Test Mode.

3.7.9.3. Settings

Verifier Test Mode includes settings for Force Validation and Designer Test Mode Document Routing.



- From the Options menu, select Settings. Alternatively, in the toolbar, click Show Settings button.
- For Force Validation, select whether Oracle Forms Recognition Verifier users can validate a field even if its content is invalid by definition.
 - Permitted: The user can force validation by pressing ENTER three times.
 - Forbidden: The user cannot force validation.

Designer Test Mode Document Routing

If you have script code associated with the ScriptModule_RouteDocument event, you can use the states entered in this area to test your scripting in Oracle Forms Recognition Designer's Verifier Test Mode. These states will not be used in Oracle Forms Recognition Verifier.

- Enter values for the states you want to test.
 - Classification Success State
 - Classification Failure State
 - Extraction Success State
 - Extraction Failure State

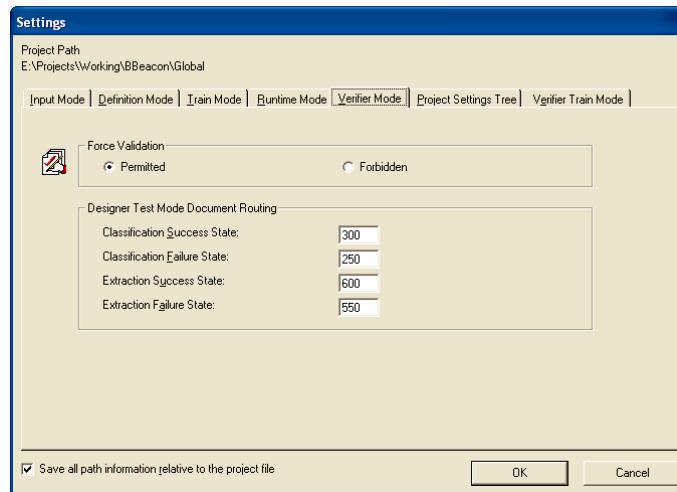


Figure 3-19: Verifier Mode settings: Settings tab for Verifier Test Mode

3.7.9.4. User Interface

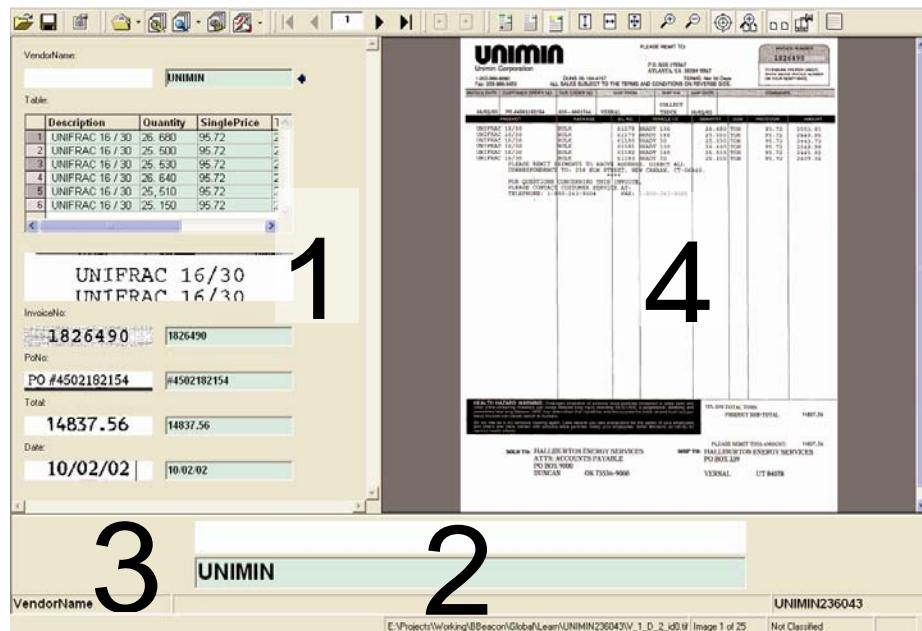


Figure 3-20: User Interface of the Verifier Test Mode

1. Form Area

The form area contains a set of controls for correction and manual indexing.

- Form fields
- Labels
- Viewers

Each control is assigned to a data extraction field. The viewers show the document areas that were extracted to fill the fields.

2. Current Input Area

This area shows a magnification of the current form field and the associated viewer. It can be used for particularly convenient viewing and editing.

Note that the position of the form areas may vary according to the selected layout, or only a subset of form areas may be present.

3. User Info Area

This area displays the class name of the current document, the name of the current field and – if applicable – a message indicating why the current field is invalid.

4. Document Area

The pane on the upper right side displays the current document.

3.8 Working with Projects

3.8.1. What Are Project Files?

In an Oracle Forms Recognition Designer application, the automatic analysis and processing of incoming documents relies on a group of settings and on trained knowledge. For each application, these settings are saved persistently in a project file. The project file stores the following information:

- General settings such as the location of import and export directories.
- Document classes and their hierarchical relationship.
- Oracle neural networks for full-text classification.
- References to Learn Sets for Oracle full-text classification and their status.
- Phrases and rules for rule-based classification.
- Settings for image size classification.
- Neural networks for template classification.
- References to Learn Sets for template classification and their status.
- Field names and field positions for data extraction.
- Analysis settings and standard validation rules for data extraction.
- Field recognition settings for data extraction.
- Table recognition settings for data extraction.
- Oracle neural networks for data extraction and their status.
- Form definitions for data verification in Oracle Forms Recognition Verifier.
- Sax Basic or WinWrap Basic scripts for document classification, data extraction, data validation, data verification, and document export.

For more information on document import, please refer to section [5.1 \(Identifying the Document Import Formats\)](#).

For more information on document classification, please refer to [Chapter 4 \(Setting Up the Classification\)](#).

For more information on data extraction, please refer to [Chapter 7 \(Setting Up the Data Extraction\)](#).

For more information on data verification, please refer to [Chapter 12 \(Setting Up the Verification\)](#).

For more information on document export, please refer to [Chapter 15 \(Setting Up the Document Export\)](#).

3.8.2. Creating Projects

In Oracle Forms Recognition Designer, there is always precisely one active project. There are two ways to create a new project, depending on the application's state.

If Oracle Forms Recognition Designer is active:

- From the File menu, select the New Project command. Then follow the instructions on screen.

If Oracle Forms Recognition Designer is not active or to start a new instance:

- Start Oracle Forms Recognition Designer via the Windows Start menu. This creates a new project automatically.



Note that just creating a new project does not mean that there is already a project file. To create a project file, you first need to save the project. (Please see section 3.8.3).

3.8.3. Saving Projects

When you have modified your current project and attempt to close it, Oracle Forms Recognition Designer prompts you to save changes that could be lost. If you want to save a project without closing it, use one of the following methods:



- On the File menu, select Save Project. This saves an existing project file. If your project is new, you are prompted to enter a file name. The project file is then saved with the extension *.sdp.
- Click the Save Project button on the toolbar.
- You can also save your project under a new name. Select the File menu and then the Save Project As command. You are prompted to specify a new file name.
- Save and Compress is a third option available for saving your project. This functionality prevents the growth of a project file that is saved after a document class is removed.

Because Save and Compress is slower than Save or Save Project As..., the Save and Compress should only be used when you release a project file for production, not when you are actively working on the project.

However, using Save and Compress will not cause the size of the project file to decrease from the size it was before the document class was deleted. Rather, it will keep the size the same as it was before the deletion. To actually decrease the size of the file, you need to use "Save Project As...".

You can save a project with or without network data. To elect either one, in the Save As dialog box, select the file type drop-down box. Select either <project name> (*.sdp), or <project name> skip learn data (*.sdp).

3.8.4. Opening Projects

If Oracle Forms Recognition Designer is active:

There are four ways to open a project:

- On the File menu, select the Load Project command. Then, select an *.sdp file from the file system and open it.
- On the File menu, select one of the recent projects.
- On the toolbar, click on the Load Project button. Then, select an *.sdp file from the file system and open it.
- Login to Designer using one of the command line calls discussed in section [3.1](#).



You can load or save a file with or without network data. When loading, click the File Type dropdown box and select either <project name> (*.sdp), or <project name> skip learn data (*.sdp).

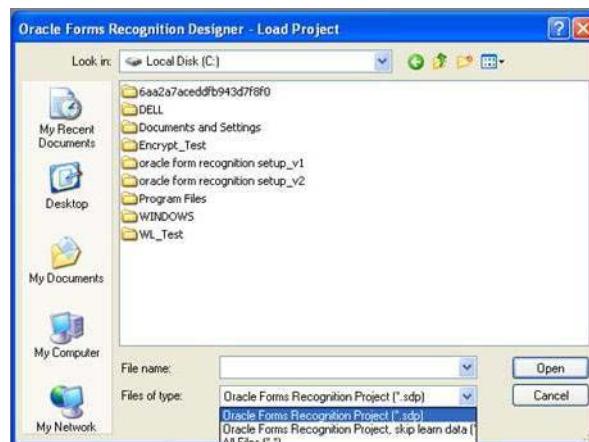


Figure 3-21: Loading an existing project

If Oracle Forms Recognition Designer is not active or to start a new instance:

- Create a link to the project file on your computer's desktop and double-click the corresponding icon to open the project.
- Use the command line call Oracle Forms Recognition /p <project file name> to open the specified project.
- Use the command line call Oracle Forms Recognition /l to open the previously edited project.

3.8.5. Using Version Control

Oracle Forms Recognition Designer features an integrated version-control system. This feature is handy if you are designing complex applications. With version control, you can save your work or back it up in intermediate stages.

For example, you could design your application in stages. In the first stage, define the document classification. Once this part is working, create a version of your project. If anything goes wrong during the design of the extraction part, you can always go back to the version you created earlier.

By default, version control is off. You can activate it when you are about to save an intermediate stage.

To use version control:

- From the File menu, select the Versions command. The Versions dialog box is displayed.

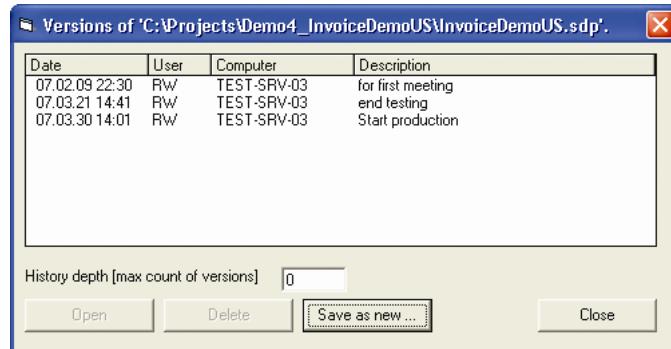


Figure 3-22: Project versions

- To specify the maximum number of versions for the current project, enter an integer in the History Depth text box. Once the maximum number of versions is reached, you will not be able to create additional versions. In this case, increase the maximum number of versions or delete versions that are no longer required.
- To create a new version, click the Save as new button. Then enter a description for the new version.
- To access a previously saved version of your project, select it from the list of versions and click Open.
- To delete a previously saved version of your project, select it from the list of versions and click Delete.

3.8.6. Setting Global Project Variables

The project settings tree is a miniature registry for Oracle Forms Recognition. With it, you can:

- Create keys that represent global variables.
- Assign values to these keys.
- Organize the keys in a hierarchy.
- Edit key values directly in tree.
- Manage sets of values for multiple clients or customers.

The variables are defined in Oracle Forms Recognition Designer and employed in Sax Basic or WinWrap Basic scripts. In Oracle Forms Recognition Designer Runtime Mode, in Oracle Forms Recognition Runtime and Oracle Forms Recognition Verifier, the appropriate set of key-value pairs becomes available when a client is selected.

3.8.6.1. Displaying the Project Settings Tree

To display the project settings tree:



- On the Options menu, select Settings. Alternatively, on the toolbar, click the Show settings button.
- In the Settings dialog box, select the Project Settings Tree tab.

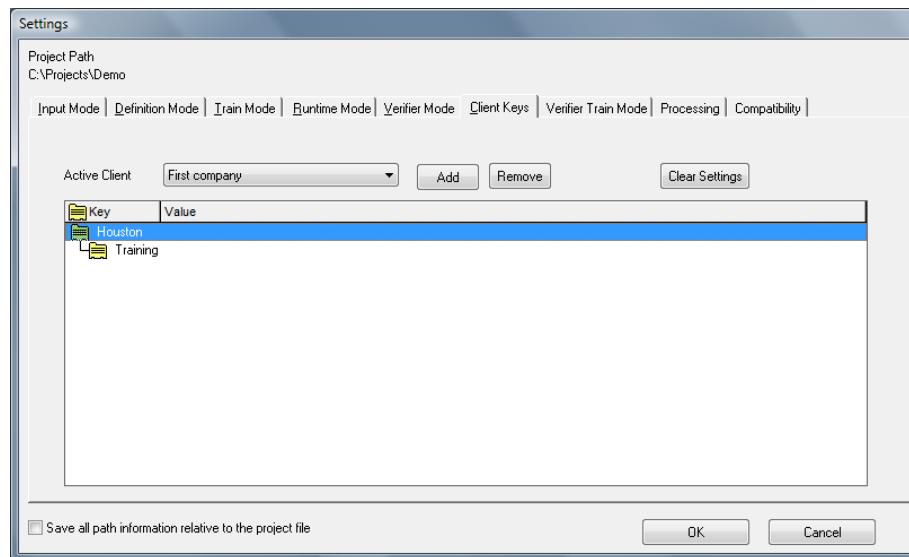


Figure 3-23: Project settings tree.

3.8.6.2. Managing Clients

By default, each Oracle Forms Recognition project contains a standard client named Default. If your project is to be used for more than one client, you can create additional clients.

To create a client:

- 1) In the Project Settings Tree tab, click the Add button.

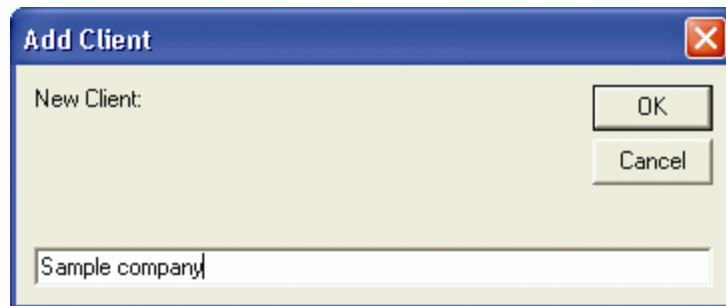


Figure 3-24: Adding a client

- 2) On the Add Client, dialog box, enter a name for the client and confirm with OK.

To select a client:

- In the Project Settings Tree tab, from the Active Client list box, select an entry.

To delete a client:

- In the Project Settings Tree tab, click the Remove button. The active client is deleted when you confirm the following message box.

To delete all clients including the associated keys:

- In the Project Settings Tree tab, click the Clear Settings button. The entire settings tree is deleted when you confirm the following message box.

3.8.6.3. Managing Keys

You can create a hierarchical structure of keys, consisting of root nodes and child nodes. The same keys are used for all clients.

To add a root node to the hierarchy of keys:

- 1) In the Project Settings Tree tab, right-click within the area in the center of the dialog box.
- 2) From the shortcut menu, select *Add Root Key*. The *Add New Key* dialog box is displayed.



Figure 3-25: Adding a key

- 3) Enter a unique name for the key and confirm with OK. The new key is inserted at the top level of the hierarchy.

To add a child node to the hierarchy of keys:

- 1) In the Project Settings Tree tab, right-click an existing key.
- 2) From the shortcut menu, select *Add Child Key*. The *Add New Key* dialog box is displayed.
- 3) Enter a unique name for the key and confirm with OK. The new key is inserted below the parent key.

To remove a key:

- 1) In the Project Settings Tree tab, right-click an existing key.
- 2) From the shortcut menu, select *Remove Key*. The key is deleted when you confirm the following message box.

3.8.6.4. Managing Values

An individual value can be specified for each defined key from the tree. This value is going to be used only for the currently selected “Active Client”.

- 1) In the Project Settings Tree tab, the Active Client drop down list box, select the desired “Active Client” name.
- 2) Click on the key to modify.
- 3) In the “Value” field, type the value that needs to be associated with the key name specified in the “Key” column.

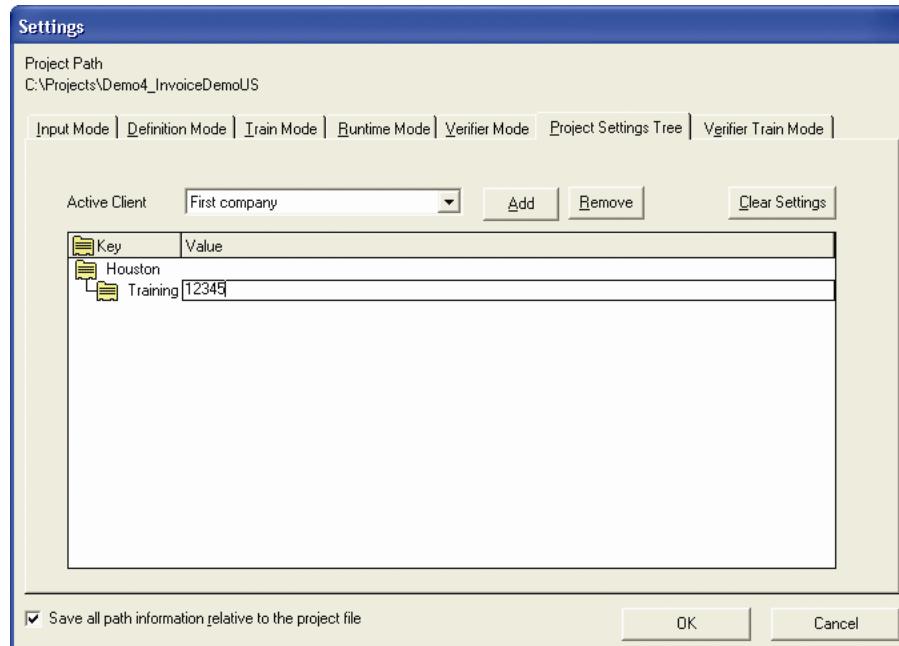


Figure 3-26: Project settings tree with key-value pairs

3.8.7. Making Projects Portable

The project file is portable so that existing applications can easily be reused. Oracle Forms Recognition Designer can either work with absolute or with relative references to the following directories:

- Export directory
- Learn set directory
- Batch root directory
- Image file directory

By default, absolute references are used. For full portability, you should use relative references.

To enable relative references:



- 1) From the Options menu, select Settings. Alternatively, in the toolbar, click the Show settings button.
- 2) In the Settings dialog box, check the Save all path information... check box.

To transfer the project, copy the *.sdp project file and – if applicable – the documents from the Learn Set to the target directory. With absolute references, adjust the path settings in the project options. (Please see section [3.7.](#))

3.9 Working with Documents

3.9.1. What are Workdocs?

Starting with the image or file that is provided as input, Oracle Forms Recognition processes the document and writes the processing result to a structure called a Workdoc.

The Workdoc is created during the initial OCR of an image or the initial filtering of a file. The OCR also includes a layout analysis that identifies words and blocks within the document. All subsequent processing steps use the Workdoc and not the original file. While the document is being processed, each step adds its results to the Workdoc. This includes:

- The document's text
- The location of words
- The geometrical relationship between words
- The classification results
- The fields for data extraction
- The candidates for field contents
- The selected correct candidate for each field
- The fields' validation status.

The Workdoc is saved persistently as a *.wdc file only if it is part of a batch. Otherwise, it only exists temporarily. It is saved in a compressed format, which allows for greater disk space.

The process of analyzing a document is complete when the Workdoc is assigned to a document class and all the fields for extraction are filled and valid.

3.9.2. Viewing Documents

When you have selected your document input, the corresponding set of documents is displayed in the Oracle Forms Recognition Designer viewer. The viewer displays the image or file, and structures in the Workdoc.

Document display is available in:

- Document Selection Mode (Section [3.7.2](#))
- Definition Mode (Section [3.7.3](#))
- Train Mode (Section [3.7.5](#))
- Verifier Train Mode (Section [3.7.6](#))
- Runtime Mode (Section [3.7.7](#))
- Verifier Design Mode (Section [3.7.8](#))
- Verifier Test Mode (Section [3.7.9](#)).

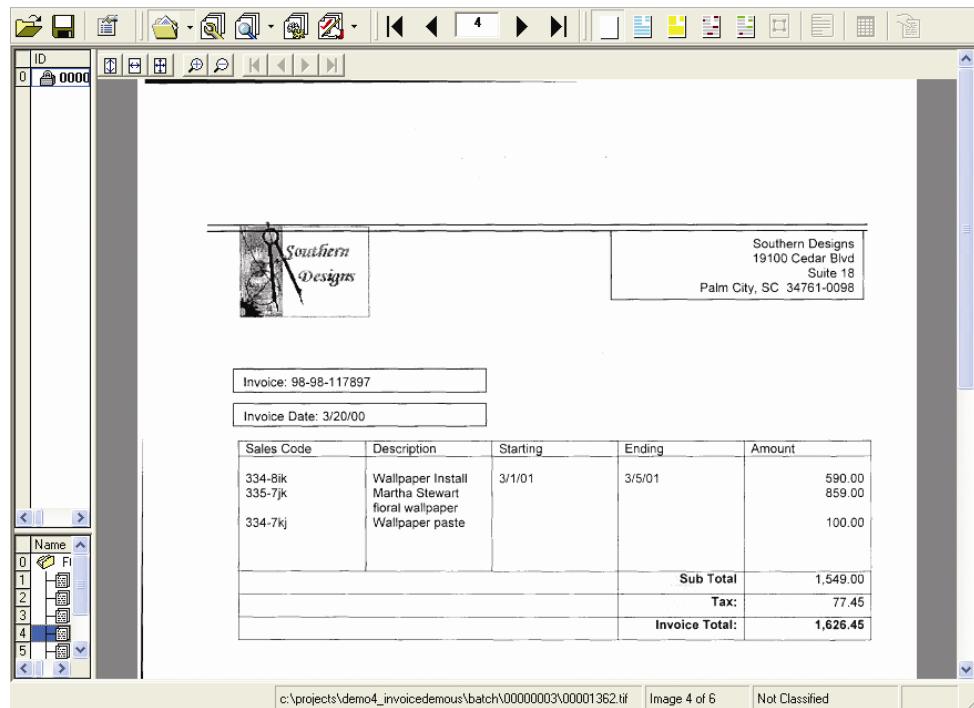


Figure 3-27: The user interface of the Oracle Forms Recognition Designer viewer

The application's status bar displays the total number of documents in the current set and the serial number of the current document.

A navigation bar in the toolbar enables you to navigate through the document set.

Button	Description
	Moves to the first document.
	Moves to the previous document.
	Moves to the next document.
	Moves to the last document.
	Displays the serial number of the current document. To move to a particular document, type its number and press ENTER.

Table 3-4: Controls in the navigation toolbar

The navigation bar is available in:

- Document Selection Mode (Section 3.7.2)
- Definition Mode (Section 3.7.3)
- Train Mode (Section 3.7.5)
- Verifier Train Mode (Section 3.7.6)
- Verifier Design Mode (Section 3.7.8)
- Verifier Test Mode (Section 3.7.9).

The viewer's toolbar provides access to zooming functions and enables you to navigate through multi-page documents.

Button	Description
	Adjusts the document display to the height of the viewer window.
	Adjusts the document display to the width of the viewer window.
	Adjusts the document display to the height or the width of the viewer window so that the entire page is displayed.
	Zooms in.
	Zooms out.
	Moves to the next page of a multi-paged document.
	Moves to the previous page of a multi-paged document.

Table
3-5:

Controls in the viewer toolbar

The Viewer toolbar is available in:

- Document Selection Mode (Section [3.7.2](#))
- Definition Mode (Section [3.7.3](#))
- Train Mode (Section [3.7.5](#))
- Verifier Train Mode (Section [3.7.6](#))
- Verifier Test Mode (Section [3.7.9](#)).

In Definition Mode, you can either display the scanned image or the Workdoc. By default, the Workdoc is displayed. To create reading zones on a document, you need to work with the image. Oracle Forms Recognition Designer automatically displays the image when you start creating zones.

Use the View menu to between image display and Workdoc display:

- Select Show Page to display the image.
- Select Show Workdoc to display the Workdoc.

You may need this to change the recognition settings for the entire document. (Please see section [9.1.2](#))

If Workdocs are visible in the field list of Design Mode, the text is dimmed. When results of the execution are displayed the foreground is black.

3.9.3. Processing Documents

The process selection group enables you to process single or multiple documents. Depending on the state of the program, processing may include:

- OCR (if there is no Workdoc for the current document)
- Classification (if there are classes)
- Data extraction (if there are fields; in Runtime or Train Mode, the Fields tab must also be active)
- Document Export (only available in definition and Runtime Mode)

- Verification (only available in Verifier Test Mode).

The processing status is shown in the status bar. Note that the initial OCR may take a while.

Button	Description
	Processes the current document. The button's drop-down menu enables or disables the debug mode. This button is available in Definition Mode (section 3.7.3) and Train Mode (section 3.7.5).
	Processes the next document. This button is available in Definition Mode (section 3.7.3).
	Processes documents in the current set starting with the current one. This button is available in Definition Mode (section 3.7.3) and Runtime Mode (section 3.7.7).
	Pauses the processing of documents. This button is available in Definition Mode (section 3.7.3) and Runtime Mode (section 3.7.7).
	Stops the processing of documents. Clears any results from previous runs. This button is available in Definition Mode (section 3.7.3) and Runtime Mode (section 3.7.7).
	Adds the current document to the Learn Set of the selected class. This button is available in Verifier Train Mode (section 3.7.6).
	Starts the learning for the current project. This button is available in Train Mode (section 3.7.5) Verifier Train Mode (section 3.7.6) and Definition Mode (section 3.7.3).

Table 3-6: Controls to process documents

3.9.4. Learning

Learning is involved in classification and in data extraction. For classification, learning requires that you provide examples that indicate which documents belong to a specified class. For extraction, learning requires that you select the correct data from a set of extraction candidates.

Oracle Forms Recognition Designer takes the examples you provide and creates Learn Sets from them. It then learns to produce the correct output from input that is similar to the Learn Set.

Use the Learning toolbar to create Learn Sets and trigger the learning.

3.9.5. Highlighting Processing Results

The document highlighting toolbar lets you select highlighting options for the displayed documents. These buttons act as switches.

Highlighting visualizes structures that have been created during document processing. Therefore, this feature is only available when a Workdoc exists. In addition, field and candidate highlighting is only available when fields are defined.

Button	Description	Menu command
	Displays the document without highlighting.	View - Highlight Nothing

Button	Description	Menu command
	Highlights all words in the document in turquoise. Words are a result of the OCR. Each character is stored together with its position. To view the OCR result, point to a word with the mouse. The recognized word is displayed as a tooltip.	View - Highlight Words
	Highlights all blocks in the document in yellow. Blocks are groups of words identified in Definition Mode by their geometrical relationship.	View - Highlight Blocks
	Highlights all candidates for the currently selected field in maroon. A candidate is a possible value for a field identified in the processing step. To view the weight of the candidate, point to it with the mouse. The weight is displayed as a tooltip.	View - Highlight Candidates
	Highlights all fields in the document. If the field is valid it is highlighted in green, otherwise it is highlighted in red. To view the name of the field, point to it with the mouse. The name is displayed as a tooltip.	View - Highlight Fields
n/a	Only relevant in conjunction with table extraction or programming using the Workdoc API. Highlights all words where Visible = TRUE.	View - Highlight Checked Words

Table 3-7: Buttons and menu commands for document highlighting

If table analysis is used, only the best table candidate can be highlighted. Table highlighting must not be triggered using toolbar buttons but is active by default. The behavior varies with the current mode:

In Definition Mode (section [3.7.3](#)) table elements are highlighted during the definition process, and the entire table is highlighted when a document has been processed. Valid elements are highlighted in green. Invalid elements are red.

In Verifier Test Mode (section [3.7.9](#)) the extracted table is available and can be used to control which elements of the document table are highlighted. Valid elements are highlighted in green. Invalid elements are red.

Chapter 4 Setting Up the Classification

Setting up the document classification involves:

- Creating a classification scheme
- Defining classification methods
- Setting parameters for these methods
- Testing
- Optimizing

The evaluation of the target class is fairly complex. A document can only be assigned to a class if a number of confidence values exceed predefined thresholds. Although you can influence the threshold values and the evaluation algorithms, the default settings are fine for most cases.

For further instructions on classification evaluation, refer to [Chapter 11 \(Advanced Evaluation Settings\)](#).

For now, the following background knowledge is sufficient:

- The confidence values indicate the degree of similarity between the properties of a document and the properties of a class.
- A document can be classified if its confidence value with respect to a given class exceeds a predefined threshold. By default, this threshold is 70%.
- In general, there is only one target class per document. If several classes have a high confidence with respect to a document, it must be possible to distinguish reliably. Therefore, a certain difference in confidence between the winning class and the second-best competitor is required as well. By default, this so-called distance is 20 percent.
- If multiple classification methods are applied to a given class, Oracle Forms Recognition will compute a combined result. Normally, classification is based on this combined result.

It is also necessary to ensure that all documents to be processed within the same project have been scanned to the same resolution. If Brainware Table Extraction is to be used the resolution of all documents must be 300 dpi.

4.1 Preparing Sample and Test Documents

Before you begin designing your application, you need to ensure that you have enough documents to set up your project and to test it.

- Create separate directories for sample documents and test documents.
- For each class, create a subdirectory within the sample directory. Each subdirectory should only contain documents that belong to the corresponding class.
- Create separate batches for each subdirectory. The batches will be required as document input. When creating the batches, only the import and the OCR step should be carried out. For further instructions, please refer to the Oracle Forms Recognition Runtime Server User's Guide.

4.2 Creating the Project

To set up a new project:

- 1) Start Oracle Forms Recognition Designer.
- 2) Set the project options as follows:
 - Make sure that manually trained documents can be added to the Learn Set.
 - Specify or create a Definition Mode or Runtime Mode export directory. The software needs this directory to save processing results.
 - Specify or create a Train Mode base directory. The software will write copies of your sample documents to this directory.
 - Specify the batch root directory. The software will take the document input from there.
 - Set all other options as desired.
- 3) Save the project file.

4.3 Creating Classes

Oracle Forms Recognition Designer enables you to create multi-level hierarchical classification schemes by means of base classes and derived classes. Base classes constitute the highest level of a classification tree. Derived classes are specializations of base classes.

When you create a class hierarchy, consider that:

- Derived classes should be a true specialization of their parent class.
- Classes that compete with each other should be disjoint.
- Classes that compete with each other should be based on a similar level of abstraction.

A weird classification tree such as the one shown in **Figure 4-1** will not yield satisfactory results. This classification tree is insufficient because the Invoice class includes two derived classes that aren't parallel: Invoices from Travel Agencies and Invoices March 2000. It's conceivable that Invoices March 2000 would also include invoices that came from travel agencies and therefore would also be part of the Travel Agencies class.

A better classification tree might consist of Invoices from Travel Agencies and Invoices from Mechanics, or Invoices March 2000 and Invoices April 2000.

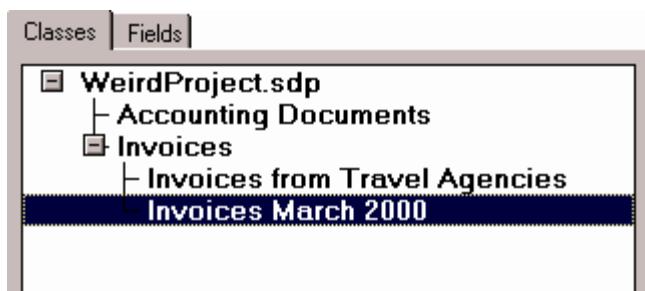


Figure 4-1: Example for a weird classification tree



A working classification tree must contain at least two classes, but four or more classes are better.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.

The pane on the left side of the window displays the Classes tab in the foreground.

Creating a Classification Tree

To create a classification tree:

- 1) To add a base class to your project, right-click any entry in the Classes tab. If your project does not yet contain classes, the only available entry is the root node (either labelled as <new project> or with the project file name.)

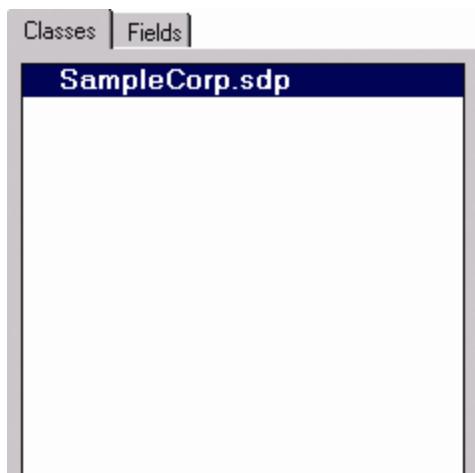


Figure 4-2: Initial state of the Classes tab

- 2) On the shortcut menu, select Insert Base DocClass.
- 3) Enter a class name. Valid names consist of alphanumeric characters without spaces or special characters. Later, you can define a different display name in the Document Class properties. (Please see section [4.3.1](#))
- 4) Click OK to confirm. The new class is inserted below the root class in alphabetical order.
- 5) Repeat step 1 to step 4 until all base classes are created.

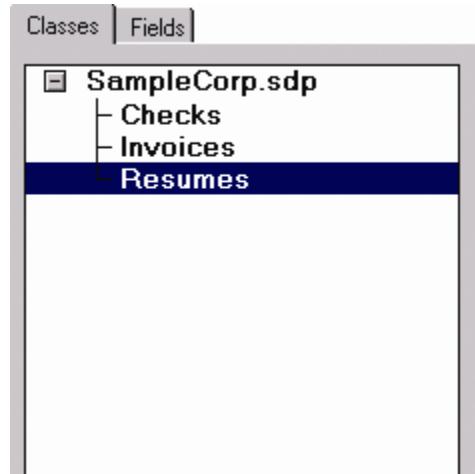
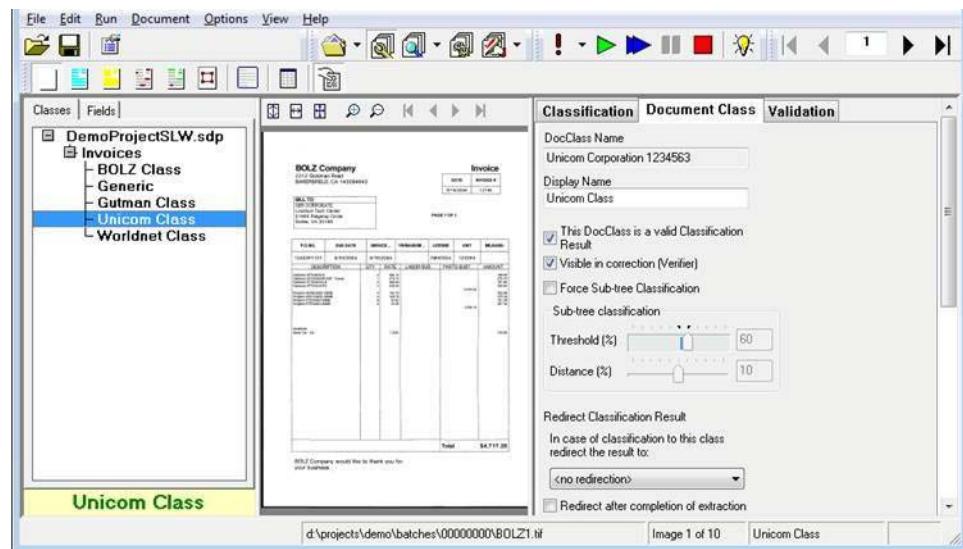


Figure 4-3: Classes tab with base classes

- 6) To add a derived class, right-click the prospective parent class. The parent may either be a base class or a derived class itself.
- 7) On the shortcut menu, select Insert Derived DocClass.
- 8) Enter a class name and confirm. The new class is inserted below the parent class in alphabetical order.
- 9) Repeat step 5 to step 8 until all derived classes are created.

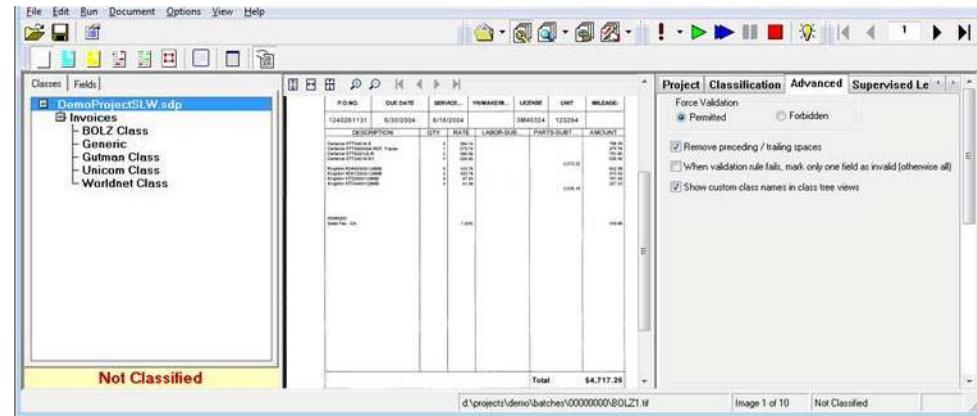
4.3.1. Custom Class Names

The custom class names can be defined for each Oracle Forms Recognition document class in Designer application using “Display Name” edit box available on “Document Class” property page of selected document class’s settings:



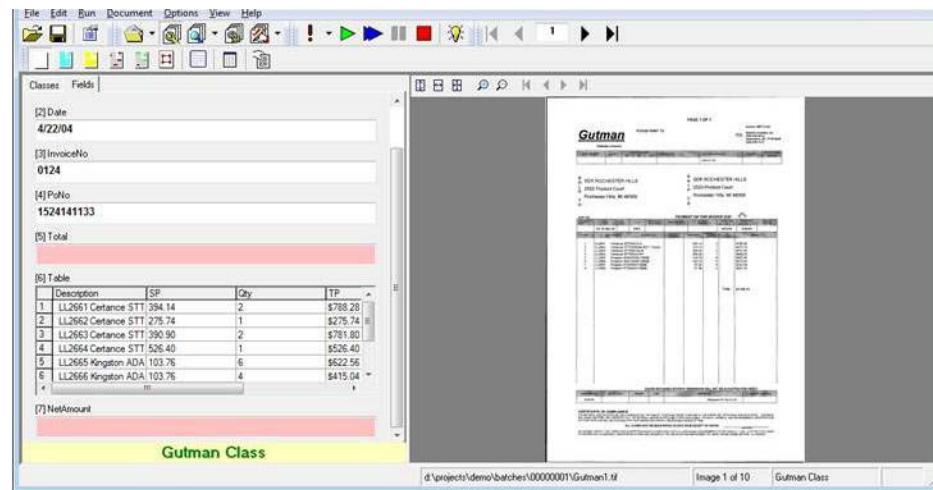
Usage of custom class names can be always switched off and on using the project node’s settings of Oracle Forms Recognition Designer application,

“Advanced” tab, “Show custom class names in class tree views” check-box option. By default this option is enabled but the Designer administrator can always switch off (save the project afterwards):

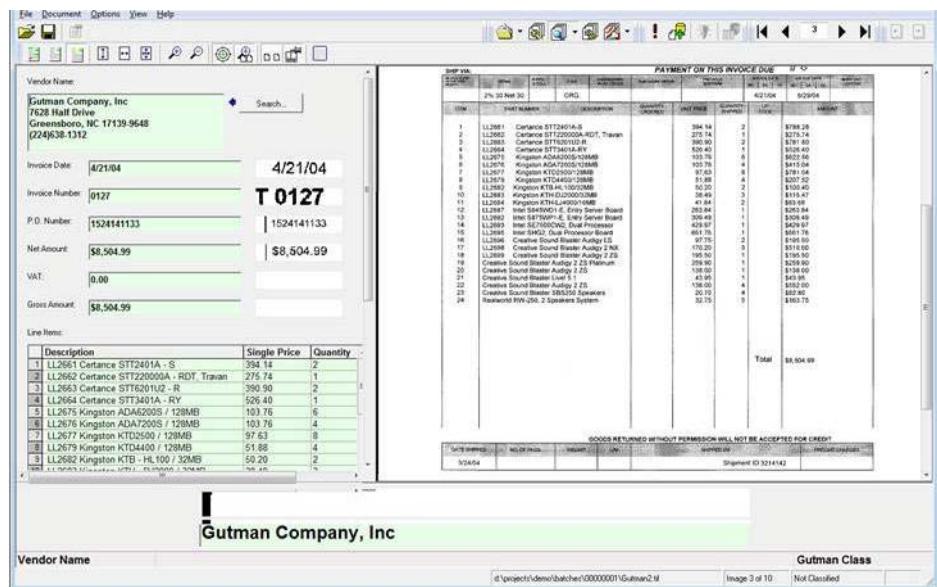


As soon as the new custom class name(s) are defined, this is going to affect both Oracle Forms Recognition Verifier and Oracle Forms Recognition Designer applications, including:

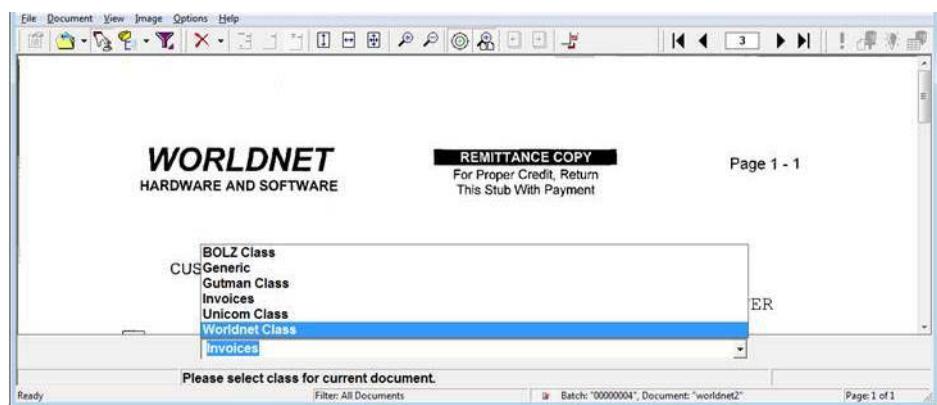
1. “Classes” view of the Definition mode of Oracle Forms Recognition Designer (see the screenshot above), including the list view items and the status bar indicator of the currently selected class.
2. “Fields” view of the Definition mode of Oracle Forms Recognition Designer application, including both status bar indicators of the document class of the opened document it is currently classified to (see screenshot below).



3. “Normal Train” and “Verifier Test” modes of Oracle Forms Recognition Designer application, the status bar indicator (at the right) of the document class of the opened document it is currently classified to (see screenshot below).

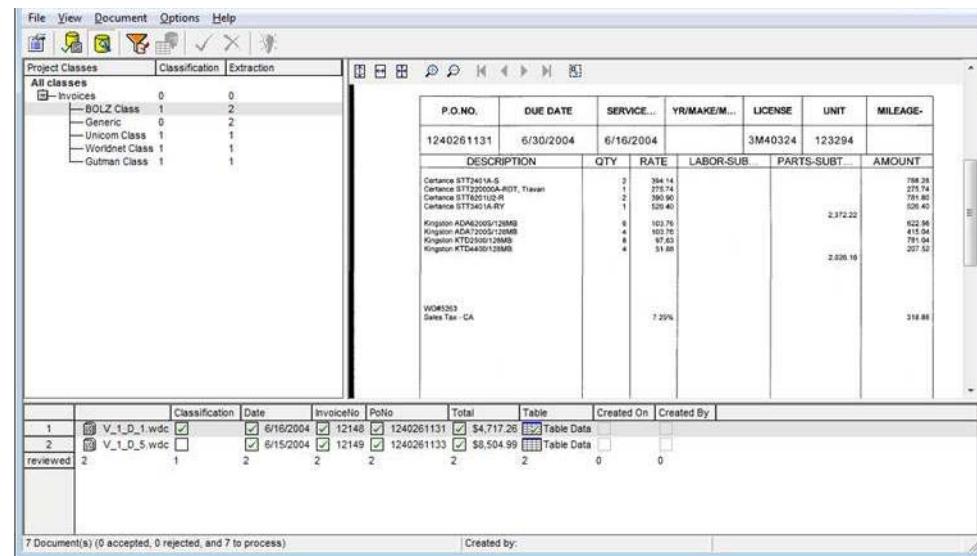


4. Document verification mode of Oracle Forms Recognition Verifier application, the status bar indicator (at the right) of the document class of the currently validated document it is classified to (see screenshot above).
5. Manual Classification view of Oracle Forms Recognition Verifier application, including the list items of the available classes' list and the currently selected class (see the screenshot below).



6. Global Learnset Browsing mode of Learnset Manager tool (can be launched from Verifier application; see the screenshot below).

The other class view modes of Oracle Forms Recognition applications remain unaffected though. For example:



- Learnset mode of Oracle Forms Recognition Designer
- Forms Design mode of Oracle Forms Recognition Designer
- Normal Train mode of Oracle Forms Recognition Designer application
- Runtime mode of Oracle Forms Recognition Designer application
- Accumulated Documents Processing mode of the Learnset Manager tool
- And so on.

Usage

This provides the end-user with user-friendly object names as a replacement to sometimes non-readable system names for classes in Oracle Forms Recognition.

The feature can be especially important for some supervised learning configurations and usage of the Learnset Manager tool, in case the reviewed system class names are not readable at all (for example, equal to the numeric ID field from a customer vendor database).

4.4 Editing Classes

Oracle Forms Recognition Designer provides commands for editing classes. Be careful when using them since you might lose some of the settings you have already made.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.

- The pane on the left side of the window displays the Classes tab in the foreground.
- There must be classes to edit.

Supported Operations

The following operations are supported:

- The Delete DocClass command from the shortcut menu of a class deletes the class including all associated settings. In this case, you lose all trained knowledge for the project. Repeat the training.



Warning: Do not reuse the name of a deleted, learned Document Class in the same project. Doing so may cause inconsistencies within the project. When you create a Document Class, a directory with the name of the Document Class is created that contains the Learn Set documents for this Document Class. This directory will remain when you delete the Document Class from the class hierarchy. If you create a new Document Class with this name, it appears as if Learn Set documents are available when they are not.

- The Rename DocClass command from the shortcut menu of a class renames the class. In this case you lose an existing Learn Set for the class and all trained knowledge for the project. Create a new Learn Set for the class and repeat the training.
- Within a classification tree, you can move classes using Drag & Drop. In this case, you lose all trained knowledge for the project. Repeat the training. You may also have used inherited field properties. Check whether your settings are still consistent and meaningful.

4.5 Selecting Classification Methods

Once you have created classes, specify the classification methods for each class.

You will probably try a single classification method first. Oracle is the recommended primary method. If you need to improve the results, you can use complementary methods. Classification methods can be combined freely.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the Classification Editor is selected.

Selecting Classification Methods

To select one or more classification methods:

- 1) In the Classes tab on the left side of the window, select a class.
- 2) In the Classification Editor on the right side of the window, check the methods that you want to use for the selected class.

- Clear the corresponding check mark to exclude a previously selected classification method.
- 3) Repeat Step 1 and Step 2 until all classes have classification methods assigned.

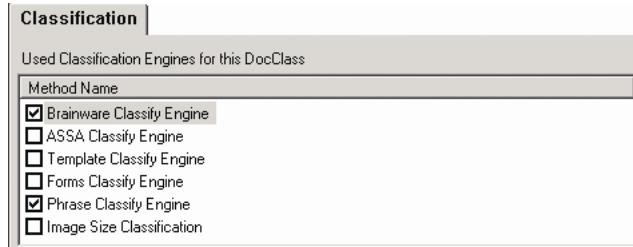


Figure 4-4: Classification tab with classification methods per class.

4.6 Configuring Brainware Classification

For Brainware classification, you do not have to define a complicated set of rules. All you have to do is to take a couple of sample documents and to manually assign them to the respective target classes. Oracle Forms Recognition is then able to learn the way you classify the documents.

4.6.1. Creating Learn Sets

The set of sample documents you need to provide for Brainware classification is called the Classification Learn Set. Carefully select the samples for each class, because the quality of your Learn Set is crucial for the success of the classification.

When you select the sample documents for the Learn Sets, consider the following:

- You need a separate Learn Set for each class.
- You need samples that truly represent the topic you want to cover.
- Avoid documents containing multiple topics, since these documents cannot be classified exclusively to one class.
- In general, do not use the same document in more than one Learn Set.
- Avoid using similar documents for different classes.
- Use only documents with good OCR results for the Learn Set. When in doubt, highlight the OCR results to review the documents. Never use handwritten documents.
- You need at least five sample documents per class. The maximum number of samples per class is limited by memory.
- The number of samples needed to create a good Learn Set depends on the classification task. The broader a field a class is supposed to cover, the more samples are required. For example, you will need more samples to cover the topic “politics” than you will need for invoices of a company.
- Increase the number of samples if classes are very similar to each other.
- Ideally, you should have an equal number of samples for each class. A factor of two is not a problem, a factor of ten certainly is.

The prerequisite for this task is:

- Your project settings must allow manual addition of documents to the Learn Set.

To create Learn Sets:

- 1) Switch to Document Selection Mode.
- 2) Select the first document from the batch that contains the documents for your Learn Set.
- 3) Switch to Train Mode. On the left side of the window, the Classes tab must be in the foreground.

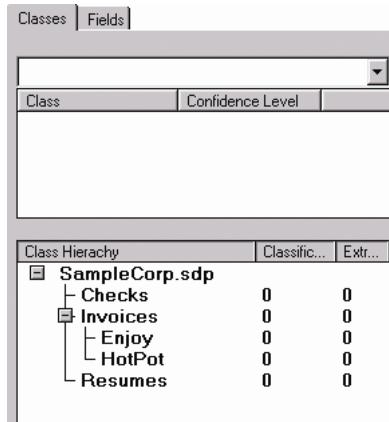


Figure 4-5: Empty learn sets

The list in the lower section of the Classes tab indicates the number of documents in the Learn Sets.

- 4) If required, use the navigation bar in the toolbar to browse to a document that you want to add to a Learn Set.
- 5) In the Classes tab, select a target class from the list box in the upper section.
- 6) In the toolbar, click on the “Add to Learnset” button to add the current document to the classification Learn Set of the selected class. Oracle Forms Recognition writes a copy of the document to a protected directory structure that is reserved for Learn Sets. The entry in the Classification Learn Set column in the list in the lower section of the Classes tab indicates that a document has been added.



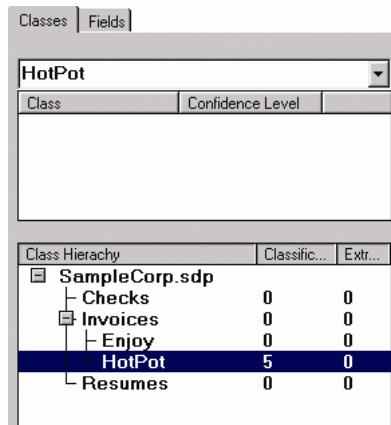


Figure 4-6: Learn set with documents

- 7) Repeat Step 4 through Step 6 until you have assigned enough samples from the current document set.
- 8) To add more documents from other document sets, start again with Step 1.
- 9) Save the project. This saves all changes to the Learn Set and updates the project.



Note that by default the same Learn Set is used for Brainware classification and for template classification. For instructions on how to change this behavior, please refer to section 5.5.3.

4.6.2. Encrypting a Learn Set

If you wish to use confidential documents in a learn set, you can hide them from view by Encrypting the learn set. You can use an encrypted learn set to train a project; however, you cannot read the workdoc files or the associated documents. When you use Encrypt Learnset, Oracle Forms Recognition encrypts an existing learn set and deletes all document files (images and CI documents).



Be sure to make a copy of the Learn Set and use it for the encryption before you proceed. You cannot undo this task.

Task Prerequisite

The prerequisite for this task is:

- The program is in Definition Mode or Train Mode.

Encrypting a Learn Set

To encrypt a Learn Set:

- 1) Select Options, Encrypt Learn Set. A warning message appears.
- 2) Click Yes to encrypt the Learn Set.

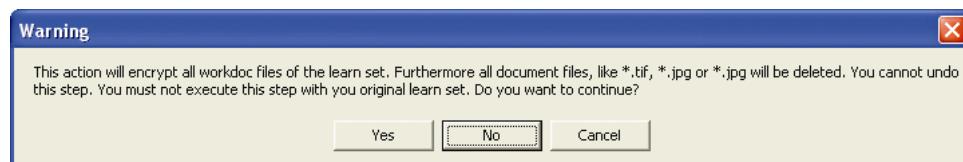


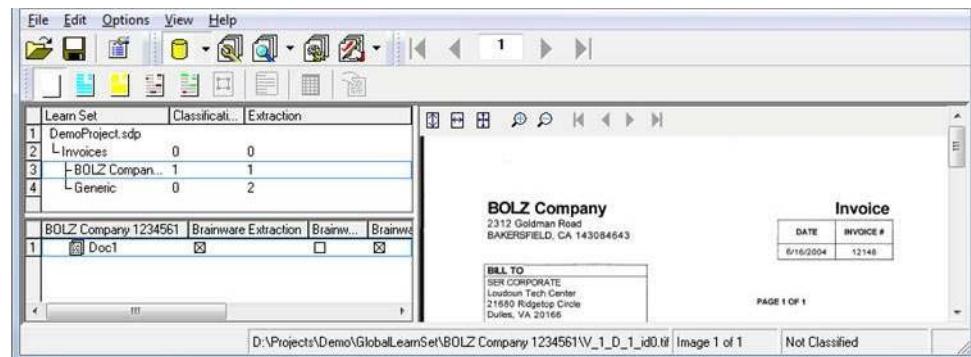
Figure 4-7: Encrypt Learnset warning box

All documents are accessible in the Learn Set. After encrypting a Learn Set, you can still add documents to the Learn Set. You can also repeat the encryption step to encrypt the new documents.

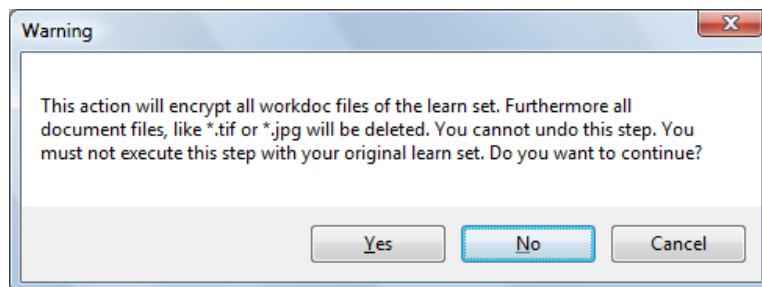
4.6.3. Security Extensions for Learnset Encryption

4.6.3.1. Description

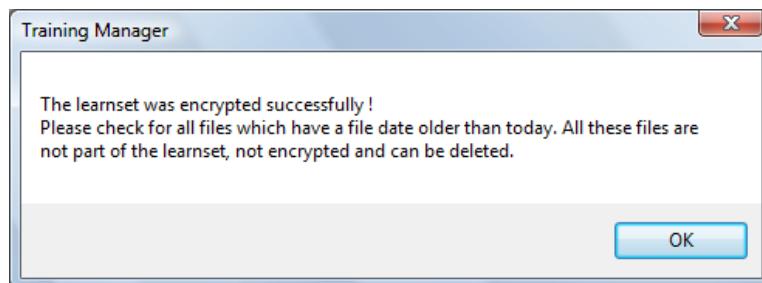
The encryption of Oracle Forms Recognition learnsets can be activated for any Oracle Forms Recognition project in the Designer application. As an example, let us apply the encryption feature for the following demo project with a few documents in its learnset:



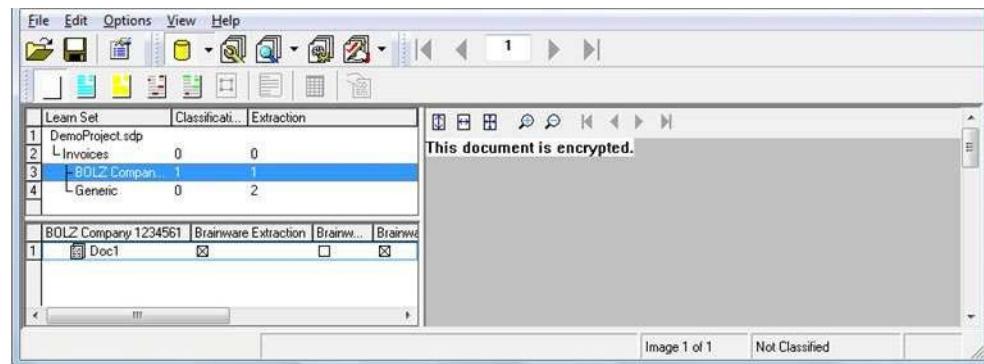
In order to activate the encryption, select “Options” menu, and then click on “Encrypt Learnset” menu item. The system will prompt you for confirmation twice:



Click on “Yes” to start the encryption process. As soon as the encryption process has been finished the system is supposed to show a message box like this:



After that, reviewing of the learnset in Oracle Forms Recognition should no longer show the images associated with learnset documents:



The result of the encryption process affects only the content of the learnset directories, where all WorkDoc files are going to be encrypted, as well as, all the image files – removed from the disk. Make sure to create a backup of the learnset before applying the encryption process.

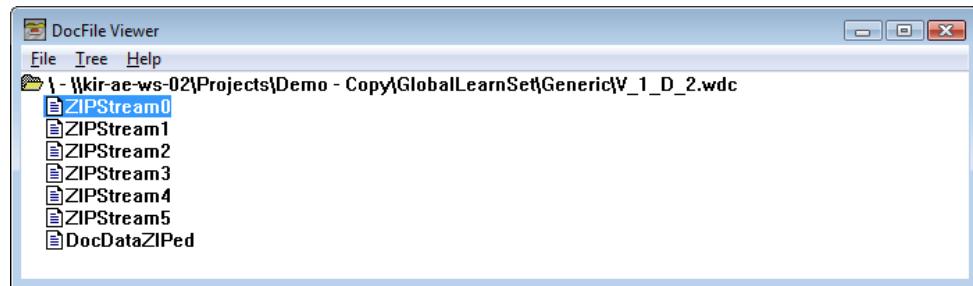
In this connection, the encrypted documents can be still used by the Oracle Forms Recognition applications in terms of re-training and classification/extraction while they cannot be reviewed by the user.

Before the encryption process is applied the learnset directory of a document class it looks like as shown before and includes original image files and the WorkDoc document in a normal non-encrypted form (internally the WorkDoc contains a couple of ZIP streams that, in principle, can be unpacked and reviewed):

Projects ▶ Demo - Copy ▶ GlobalLearnSet ▶ Generic

Name	Date modified	Type	Size
bfe.ptb	2/27/2008 12:52 AM	PTB File	33 KB
bfe.xtr	2/27/2008 12:52 AM	XTR File	17,064 KB
bte.ptb	2/25/2008 10:46 PM	PTB File	0 KB
bte.xtr	2/25/2008 10:46 PM	XTR File	1 KB
V_1_D_2.wdc	2/27/2008 12:52 AM	WDC File	32 KB
V_1_D_2_id0.tif	7/30/2004 3:17 PM	TIFF Image	84 KB
V_1_D_3.wdc	2/27/2008 12:52 AM	WDC File	37 KB
V_1_D_3_id0.tif	7/30/2004 3:30 PM	TIFF Image	89 KB

Screenshot above shows learnset directory content sample.

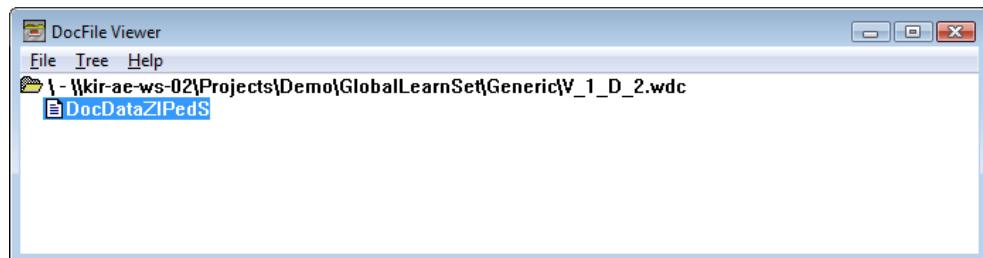


Screenshot above shows non-encrypted WorkDoc structure.

As soon as the encryption has been applied, the learnset directories do not contain any images and the internal WorkDoc structure cannot be unzipped any longer, being modified via an encryption mechanism:

Name	Date modified	Type	Size
bfe.ptb	2/27/2008 12:52 AM	PTB File	33 KB
bfe.xtr	2/27/2008 12:52 AM	XTR File	17,064 KB
bte.ptb	2/25/2008 10:46 PM	PTB File	0 KB
bte.xtr	2/25/2008 10:46 PM	XTR File	1 KB
V_1_D_2.wdc	4/28/2008 12:21 PM	WDC File	28 KB
V_1_D_3.wdc	4/28/2008 12:21 PM	WDC File	33 KB

Screenshot above shows learnset directory content sample after the encryption process has taken place.

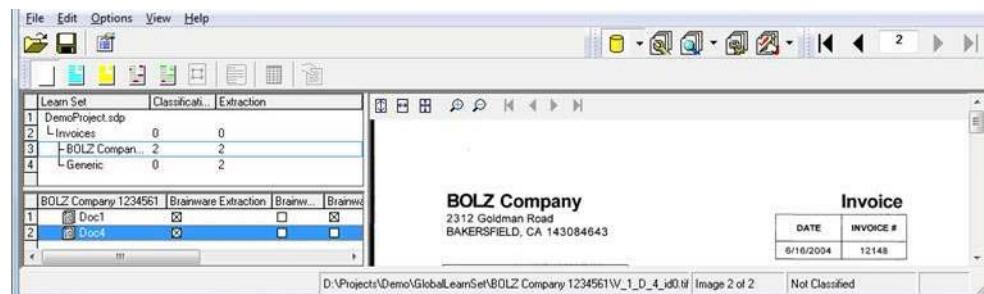


Screenshot above shows the internal structure of an encrypted WorkDoc document.

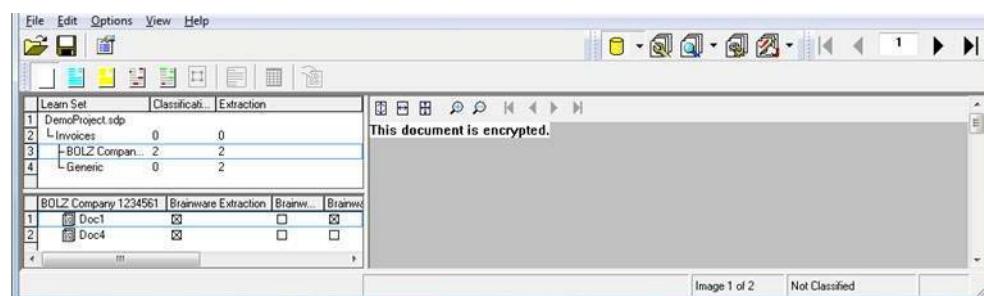


Note: An encrypted learnset and even particular encrypted class of the learnset can be further extended by new documents and relearned cumulatively. At the same time, the OCR process, of course, cannot be reapplied any longer, because the original image data is unavailable.

The example below shows that after adding one more document to the learnset encrypted previously, the system represents the new documents as usual:



At the same time, all the previously encrypted documents remain hidden:



When desired, the encryption of the learnset documents can be applied with a redistributor-specific encryption key. The custom encryption key can be defined in Windows Registry as a string value of "EncryptLearnSetKey" variable under "HKEY_LOCAL_MACHINE \ Software \ Oracle \ Cedar" Registry key. The string content of the variable should not exceed 255 characters. If the custom encryption key is undefined when the encryption process is being started, the system is going to use an internal default key. The custom encryption key can be used in case it is required to get access to the encrypted documents later, e.g., from within the Oracle Forms Recognition's custom script. For this purpose, the developer can call "EnableAccess" method of the SCBCdrWorkdoc interface using the custom encryption key as a parameter.



Important Note: In case a custom encryption key is used to create the encrypted learnsets, setting up the "HKEY_LOCAL_MACHINE \ Software \ Oracle \ Cedar \ EncryptLearnSetKey" on the customer site where the encrypted learnset is used for extraction is NOT required (if re-learning of the entire project is going to be applied).

4.6.3.2. Usage

Encryption of learnsets can be used for secure redistribution of Oracle Forms Recognition learnsets that contain critical customer data that cannot be given from one customer to another in open form.

The feature can be used for secure encryption of any Oracle Forms Recognition learnsets, but it is basically supposed to be applied to so-called generic learnsets. When used for vendor learnsets, Professional Services should take into account that the class names are not encrypted

and remain as they are. In other words, if the class names (or anything else, like Associative Database Search (ADS) fields, etc.) contain any customer information that has to be hidden, this has to be done manually (for example, via renaming of the redistributed classes or via neutralizing the database content of the ADS fields).

4.6.4. Editing Learn Sets



You can add documents to existing Learn Sets at any time using the method described in section 4.6.1.

Occasionally, a document is added to a Learn Set by mistake, or it is assigned to the wrong class. You may also want to use different Learn Sets for Brainware classification on the one hand and template classification on the other.

To review the Learn Set:

- 1) Select the Learn Set as document input. The program automatically switches to Document Selection Mode. A list view of classes is displayed on the upper left.
- 2) Double-click one of the classes to display the documents in its Learn Set in a second list view below.

	Learn Set	Classificati...	Extraction
0	SampleCorp.sdp		
1	Checks	5	0
2	Invoices	0	0
3	Enjoy	5	0
4	HotPot	5	0
5	Resumes	10	0

	Checks	Brainw...	Templa...	Phrase ...	Image Size...
1	<input checked="" type="checkbox"/> Doc37	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2	<input checked="" type="checkbox"/> Doc38	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3	<input checked="" type="checkbox"/> Doc39	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4	<input checked="" type="checkbox"/> Doc40	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
5	<input checked="" type="checkbox"/> Doc41	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Figure 4-8: The classification learnset for the Checks class

- 3) Using the list view of documents, you can now:
 - Browse through the documents – just click one of the documents to display it,
 - Delete a document from the Learn Set: right-click the document and select Remove from Learn Set from the shortcut menu,
 - Move a document to the Learn Set of a different class using drag & drop

- Exclude a document from the learning for specified classification methods – just clear the check mark in the corresponding column. This method is also handy for temporarily removing a document from the Learn Set.

4.6.4.1. Manually Adding New Documents to a Learn set

Although you can add new documents to a Learn Set at any time, you may find that the results are inconsistent when you add new documents to a Learn Set and then save the project without learning. This only happens when you use a project that has a history of learning, as the classification engine has a knowledge base from which to extract information.

Without proper learning, the information from the new documents will not be included in the classification. To remedy this, you can change a Learn Set by manually adding a document to it and then changing the working mode. The documents will automatically go through the learning process once the mode changes.

Task Prerequisites

The prerequisite for this task is:

- Your project settings must allow manual addition of documents to the Learn Set.

Manually Adding a Document to a Learn Set

To manually add a document to a Learn Set:

- 1) Switch to Document Selection Mode and select a document from the batch.
- 2) Switch to Train Mode. On the left side of the window, the Classes tab must be in the foreground.

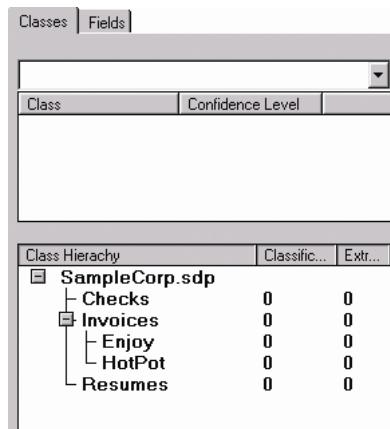


Figure 4-9: Empty learnsets

The list in the lower section of the Classes tab indicates the number of documents in the Learn Sets. If required, use the navigation bar in the toolbar to browse to a document to be added to a Learn Set.

- 3) In the Classes tab, select a target class from the list box in the upper section.



- 4) In the toolbar, click on “Add to Learnset” button to add the current document to the classification Learn Set of the selected class. Oracle Forms Recognition writes a copy of the document to a protected directory structure that is reserved for Learn Sets. The entry in the Classification Learn Set column in the list in the lower section of the Classes tab indicates that a document has been added.
- 5) Repeat until you have finished adding all desired documents.
- 6) Select a working mode. The system will automatically learn the new documents.
- 7) Save the project.



You would normally use this method for small projects and demonstrations when you are most likely to change the mode. For projects large projects in which learning would be a lengthy task, it's best to follow the normal learning procedure (Please see section 4.6.5.).

4.6.5. Learning

During Learning, Oracle Forms Recognition uses your Learn Sets and the manually assigned target classes to identify the correlation between document input and target class. Oracle Forms Recognition learns to classify documents automatically if they are similar to the documents in one of the Learn Sets.

Learning is required:

- Once you have set up your classification scheme and created Learn Sets.
- When you have changed the classification tree by adding, deleting, moving or renaming classes.
- When you have added or removed a classification method that relies on learning.
- When you have changed any parameters affecting these classification methods.
- When you have changed a Learn Set.

Task Prerequisites

The prerequisites for this task are:

- You must have set up a classification scheme with the minimum number of classes.
- You must have specified classification methods that rely on learning.
- You must have created appropriate Learn Sets with the minimum number of samples.
- The program runs in Train Mode or in Definition Mode.

Learning

To learn:

- 1) If required, select the Options menu and then Incremental Learning to change the scope of learning. If this option is enabled, learning only covers changes to the Learn Set. If this option is disabled, the entire project will be learned.
- In the toolbar, click the button with the light bulb.



Learning may take several minutes. The class that is currently learned is indicated in the status bar. Once finished, a success message is displayed.

4.6.6. Checking the Learn Status of a Class

Learning always attempts to cover the entire classification tree. Only classes with insufficient Learn Sets are omitted. You can check at any time whether a class has already been learned successfully or whether it requires relearning.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

Check the Learn Status of a Class

To check the learn status of a class:

- 1) In the Classes tab on the left side of the window, select a class.
- 2) In the Classification tab on the right side of the window, under Used Engines..., select the Brainware Classify Engine method name.
- 3) Check the Classification engine properties. It displays one of the following states:

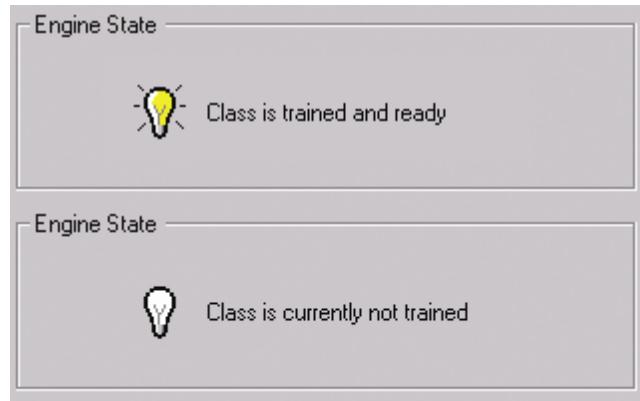


Figure 4-10: Classification Engine Properties

4.7 Configuring Brainware Layout Classification Engine

Setting up Brainware Layout Classification is similar to setting up Brainware Classification. You just need to provide sample documents for learning.

If there is already a Learn Set for Brainware Classification, there is usually no need to create another one for Brainware Layout Classification.

If you need to create a separate Learn Set just for Brainware Layout Classification, follow the guidelines set out in Section **4.6.1**.

To create the Learn Set for Brainware Layout Classification, proceed as described in Section **4.6.1**. To carry out the learning, proceed as described in Section **4.6.5**.

4.7.1. Overview & Purpose

The Brainware Layout Classification engine is for the purpose of so-called “layout” classification using Brainware Classifier technology. While the Brainware Classification engine available in Oracle Forms Recognition is used for “content” or “type” classification, the purpose of Brainware Layout Classification (BLC) engine is to provide with more precise classification between documents with similar templates, like, for example, invoices delivered from different vendors, where it is possible to reach more exact result by taking into account the positional information of the documents’ content and not only the textual content of the documents like in ASSA or Brainware “content” classification engines.

4.7.2. How it Works

Basically, the BLC engine simply applies normal Brainware Classification. Though, each word of both learned and extracted documents is not just used as it is but extended with special character sequences that uniquely identify which zone of the document the word belongs to. Visually this idea can be represented as a document split to a couple of zones (yellow area is the first page of the document and “VAT” is the word we are looking for):

	A ₁	B ₁	C ₁
A ₂		VAT	
B ₂			
C ₂			

Now, the “VAT” word is going to be extended as “VAT_BBBB_AAAA” identifying that we look for the word “VAT” only the {B1; A2} region of the document. This then simply means that if for the learned layout class X the word “VAT” was mostly located in region {C1; C2} and for the other class Y it was usually {B1; A2} the system will prefer Y while for normal Brainware Classification such a difference between X and Y would have been irrelevant. This simple approach allows the content classification engine (in this case Brainware Classifier) to be more precise than the layout classification engine.

4.8 Configuring Language Classification Engine

4.8.1. Overview & Purpose

The Brainware Language Classification is used to automate the classification of processed documents by language.

The engine is supplied with predefined and pre-trained learnsets for nine languages:

- Danish
- English
- Finnish
- French
- German
- Greek
- Russian
- Spanish
- Swedish

The English, French, German, Greek and Russian languages are specifically optimized for invoice processing.

New languages can be added easily by the customer, and the predefined ones are adjustable.

4.8.2. How it Works

The Brainware Language Classification engine takes uses the ASSA content classification technology to distinguish between processed documents written in different languages. The engine imports the data in Unicode format and converts them to non-western language learn sets with a special phonetic English representation suitable for the core ASSA engine. After this conversion the engine creates an ASSA classification pool that is then used for classification purposes. The pre-trained version of this pool is distributed along with Oracle Forms Recognition setup and is available without having to learn anything although it is adjustable if the customer would like to extend the predefined learn set.

When classifying the next incoming document, the system will use the available ASSA classification pool for the classification. During the classification the engine ignores all numeric words found in the document since they are usually irrelevant in terms of language classification.



*Note that in order to use the engine for the non-western languages (the currently supported ones are Greek and Russian), "Activate support of non-western languages" **must be turned on** for the project in the Designer settings, "Definition" tab.*

During classification, the system will search for class language assignments in order to determine into which class the document is going to be classified. To create a new language assignment, select the desired class in the "Classes" view of the Definition mode in Oracle Forms Recognition Designer, open the "Classification" tab, choose "Language Classify Engine" item in the "Languages available for this DocClass" list:

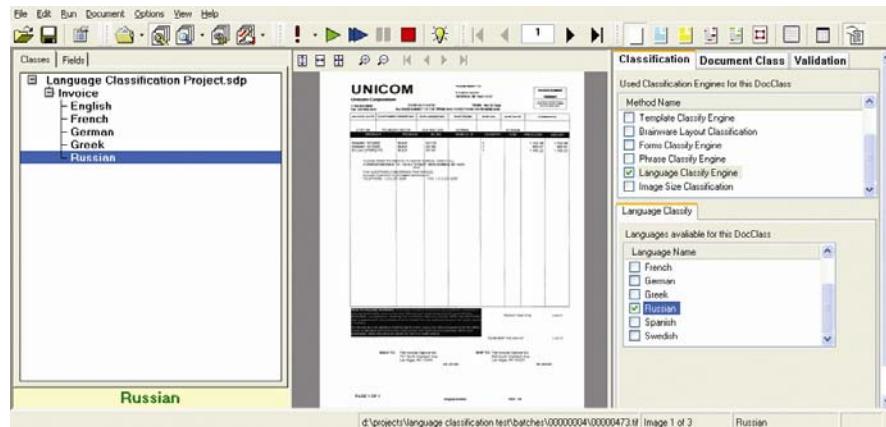


Figure 4-11: Creating a class language assignment for Brainware Language Classification.

If required, you can also assign multiple languages to one document class, e.g., assigning “German” and “Russian” languages to the “Similar Amount Format” class.

4.8.3. Setup the Brainware Language Classification Engine

To configure the Brainware Language Classification engine, open the “Class and Field” properties for the project node in Oracle Forms Recognition Designer and then select the “Classification” tab and choose the “Language Classify Engine” in the “Used Classification Engines for this project” list:

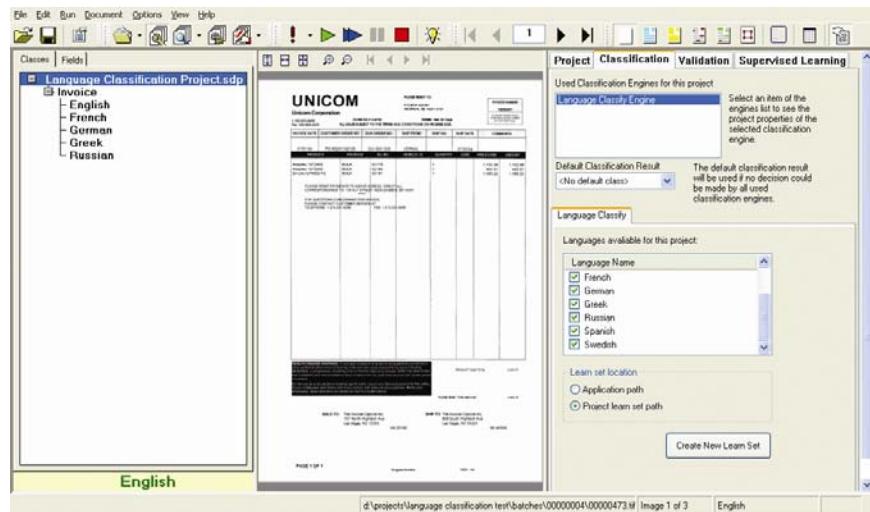


Figure 4-12: Configuring the Brainware Language Classification engine.

The following settings are available on the single “Language Classify” tab:

- “List of languages available for this project” list view, where you can select the languages that are used in your project.
- “Learn set location” setting that defines whether the language classification learn set and its source files are to be stored in the “Application path” (i.e. in the directory, where Oracle Forms Recognition applications are launched from) or in the project learn set (i.e. in the

main project learn set directory, which is configured via the “Base Directory” setting available on the “Train” tab of project settings in Oracle Forms Recognition Designer).

- “Create New Learn Set” button. This is used to regenerate the entire ASSA classification learn set, for example, to update the language classification configuration with a couple of new languages to be used for classification.



Note that the “threshold” and “distance” settings used while evaluating the classification are taken from the “Standard Classification” settings defined on the “Project” tab of the project node settings.

4.8.4. Extending and Adjusting Standard Learn Set with New Languages

When generating a new learn set, the engine automatically searches for all available *.LNG files in the “.\LangPool\Source” folder. During the generation of the pool, the newly imported languages get their names from the corresponding *.LNG files.

4.8.4.1. How to Create Unicode Language Input Files

A Unicode input source language file can be created, for example, in Microsoft Word 2003:

- Open your new input text file with Microsoft Word 2003.
- Select “Save as” from the the “File”, menu. Choose “Text-only” in the “Data type” drop down list box and click on “Save”.
- Microsoft Word should then display a file conversion dialog. Select “Other encoding” from the “Text encoding” group of radio buttons.
- Now select “Unicode” in the list of available encoding formats and, finally, click on “OK”.
- Give an appropriate name to the saved .TXT file and change its extension to .LNG, for example, “Portuguese.lng” if you are creating a new learn set for the Portuguese language or “Medical Greek.lng” if you are creating special language learn set of Greek medical terms.
- Now copy the .LNG file to the “.\LangPool\Source” sub-folder of the currently configured “Learn set location” (see above for more details on possible language classification learn set locations). Your new language file is now ready to be imported into the Oracle Forms Recognition system.

4.8.4.2. Adding New Languages to the Learn Set

Once the new .LNG file is copied to the source learn set location, click on the “Create New Learn Set” button on the general Language Classification engine configuration tab to create a new learn set that supports the desired language.

4.8.4.3. Removing a Language from the Learn Set

To remove a language from the language classification learn set you can either:

- 1) Uncheck the desired language in the “Languages available for this project” list to exclude the language from the list of possible classification results. The language won’t be removed from the ASSA classification learn set. If you would also like to make sure that the ASSA pool does not contain any references to the language, click on “Create New Learn Set” button in order to re-generate the entire language classification pool.
- 2) Remove the desired source language file (with .LNG extension) from the “.\LangPool\Source” sub-folder of the learn set location directory (consider making a back up copy first) and then click on “Create New Learn Set” button. The language will disappear from the list of available languages.

4.8.4.4. Modifying Existing Language Learn Sets

In order to modify the learn set for one (or more) of the existing languages, open the desired language .LNG file in, e.g., Microsoft Word, apply your modification and then use the procedure described in the sections “How to Create Unicode Language Input File” and “Adding New Languages to the Learn Set” to replace the exiting language source file with the adjusted custom one.

4.8.4.5. Classifying Documents with Language Classification Engine

Oracle Forms Recognition uses the standard classification rules when applying the classification process with the Brainware Language Classification engine. For example, in order to check the exact classification results and weights on a per language basis, use the standard “Class Result Matrix” function available in Oracle Forms Recognition Designer.

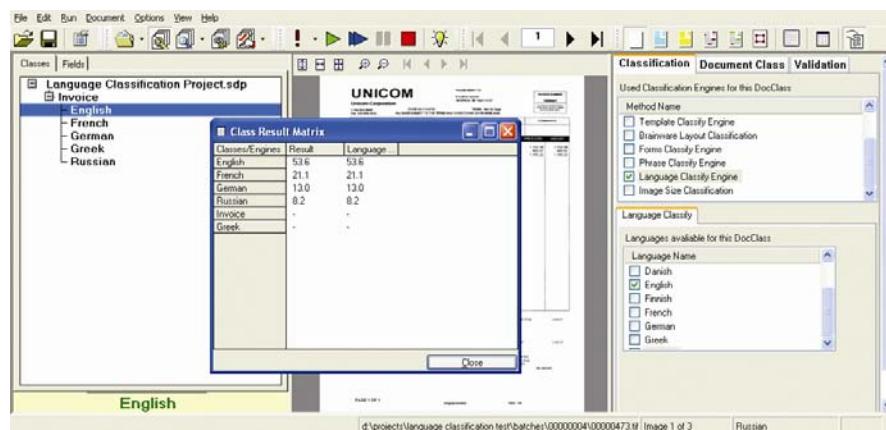


Figure 4-13: Using the classification matrix to review the result of language classification in Oracle Forms Recognition Designer.

4.9 Configuring Template Classification

Setting up template classification is similar to setting up Brainware classification. You just need to provide sample documents for learning.

If there is already a Learn Set for Brainware classification, there is usually no need to create another one for template classification.

If you need to create a separate Learn Set just for template classification, take the following into account:

- You need a separate Learn Set for each class.
- You can combine several templates in one class. In this case, provide examples for each template.
- Templates need at least some common elements in the header and/or footer area. These elements must be detectable by the OCR, i.e. they must consist of text and not of images such as logos.
- For each distinct template, supply one or two examples.

To create the Learn Set for template classification, proceed as described in section **4.6.1**. To carry out the learning, proceed as described in section **4.6.5**.

During learning, the software identifies the common elements of templates and stores them as an internal template. You can determine the number of internal templates.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

Determining the number of Internal Templates

To determine the number of internal templates:

- 1) In the Classes tab on the left side of the window, select a class.
- 2) In the Classification tab on the right side of the window, under Used Engines... select the Template Classify Engine method name.
- 3) Check the Classification engine properties. It displays the number of internal templates which is 0 before learning and greater than 0 after learning.

Template Classification can be used in combination with the Associative Search (Extraction engine) to make new classes semi automatically. (section **5.7**)

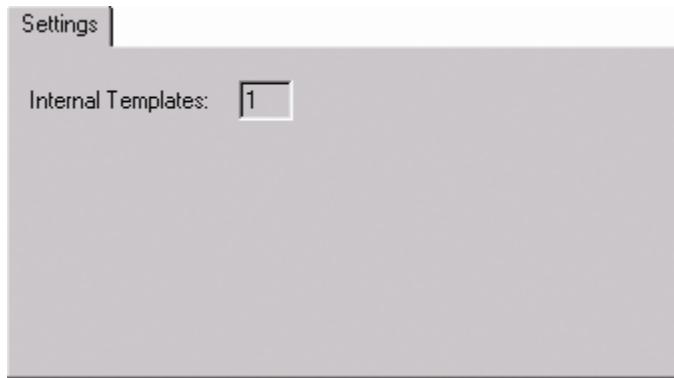


Figure 4-14: Internal templates created for template classification

4.10 Configuring Phrase Classification

To use phrase classification, you must specify certain keywords or phrases that lead to a particular class or exclude a document from a class.

Task Prerequisites

The prerequisites for this task are:

- You must have set up a classification scheme.
- Phrase classification is selected for at least one of the classes.
- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

Entering Phrases

To enter phrases for phrase classification:

- 1) In the Classes tab on the left side of the window, select a class.
- 2) In the Classification tab on the right side of the window, under Used Engines... select the Phrase Classify Engine method name.
- 3) In the Phrase Classify Engine property sheet, under Classification engine properties, type a keyword or a phrase into the New phrase text box. Alternatively, highlight words in the document and click a word to copy it into the New phrase text box. To build phrases, click the next word. The new word is added to the existing entry with a space as separator. Click on Insert to add the new phrase to the list of active phrases that is displayed below. New phrases are added with medium significance.

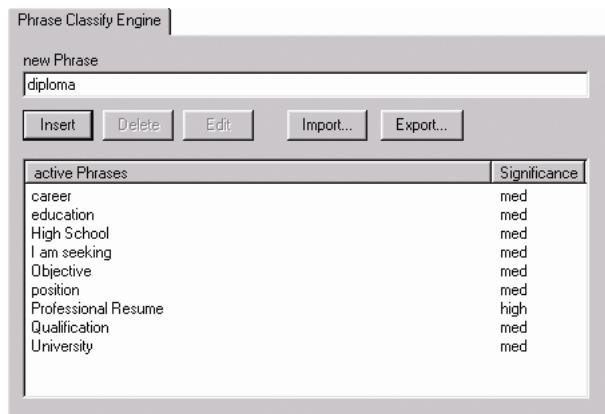


Figure 4-15: Phrase Classification Property Sheet

- 4) To edit the significance, select an active phrase from the list and click Edit. The Phrase Settings dialog box is displayed. This dialog box contains a separate tab for each word in the phrase.

Parameters

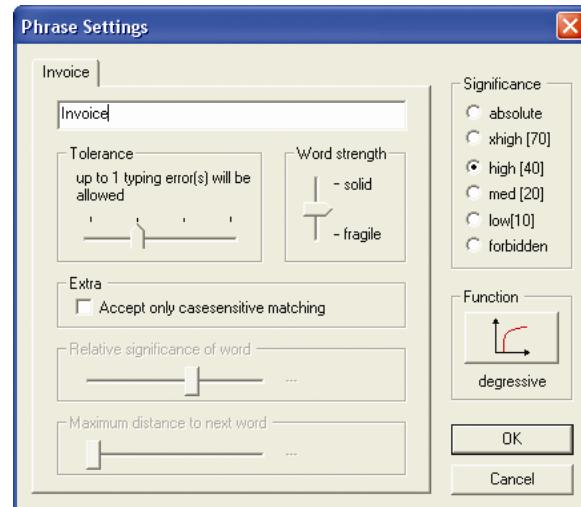


Figure 4-16: The Phrase Settings dialog box

The parameters you can adjust are:

- **Tolerance:** Maximum number of typing errors allowed for this word. If the phrase contains the word "invoice," for example, and the number of error characters has been specified at two for this word, the words "invoke," "involve," and "invite" would also meet the requirements.
- **Word strength:** The stronger the word, the more typing errors can occur until the word loses its meaning. A maximum strength stands for a word that still retains full significance with the maximum number of permissible typing errors. In general, you should keep the default setting for the word strength.
- **Accept only...:** Select this option to enforce case-sensitivity.
- **Relative significance...:** Use this option to set the proportional significance of the current word within the phrase. For example, if your phrase is "with kind regards," you could reduce the

relative significance of the word “with.” As you move the associated slider, the weight will be shown to the right in plain text.

- Maximum distance....: Use this setting to specify whether your phrase will still be recognized if there are additional words between the current one and the next one specified. For example, you could use a single definition for “please pay by” and “please pay this amount by” with a maximum distance of 3. For consecutive words, the distance is 1.
- Significance: This setting affects the entire phrase. The significance may vary between absolute (i.e., a document belongs for sure in this class if the phrase is found) and forbidden (i.e., a document cannot belong in this class if the phrase is found). Be careful when using the extreme values. Use them only on very strong phrases and try to avoid them on single words.
- Function: Specifies the function that applies if a phrase is found more than once in the same document. This setting affects the entire phrase. To change the function, just click the button. You can choose from among:

Button	Description
	Degressive: The significance increases degressively for every further occurrence, i.e. the more often a phrase is found, the less effect a new discovery has. This is the default behavior.
	Linear: The full significance of the phrase is scored with every further occurrence.
	Binary: A multiple occurrence is not scored higher than a single occurrence.

Table 4-1: Function Controls for Phrase Classification

- 5) To delete a phrase, select it from the list of active phrases and click Delete.
- 6) To write phrases and associated settings to an export file, click Export and specify a file name. This generates an *.exp file. To import an existing *.exp file, click Import and select it from the file system.
- 7) To highlight the occurrences of a phrase in the active document, make sure that all other highlighting options are turned off. Then select the phrase from the list of active phrases. Each occurrence is highlighted in green. To view the number of typing errors and the significance, point to the highlighted phrase.

4.11 Multipage Detection

Multipage detection uses phrases to find documents that belong together and makes multiple page TIFF documents from them. The documents are checked during the classification and extraction steps of batch processing. Multipage detection works only within each folder of the batch. You must scan the relevant documents in the correct order to the same folder.



If pages of a document are spread to different folders, multipage detection will not work even when the folders belong to the same batch.

4.11.1. Set Up Multipage Detection

Multipage detection is activated in Oracle Forms Recognition Designer.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- On the left side of the screen, the Classes tab is activated
- On the input tab of the settings the option Save Execution Results to Workdoc is enabled. Otherwise the changes cannot be stored.

Activating Multipage Detection

To activate multipage detection:

- 1) In the Classes tab, right-click the entry representing your project to display a shortcut menu.

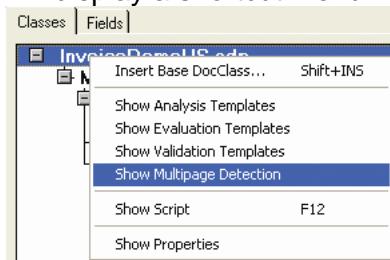


Figure 4-17: Project shortcut menus:

- 2) Select *Show Multipage Detection*. The Multipage Detection dialog box appears.
- 3) Check on the *Activate Multipage Detection*.
- 4) Select a default for the start of detection, either *First Page*, or the following page.
- 5) If you want to keep the page sizes similar, select *Similar Page Size Required* and select the tolerance for the page size.

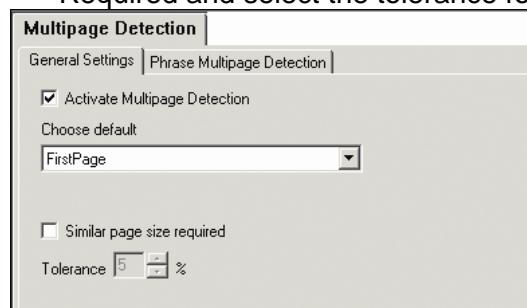


Figure 4-18: The Multipage Detection dialog box, General Settings

- 6) Select the *Phrase Multipage Detection* tab.

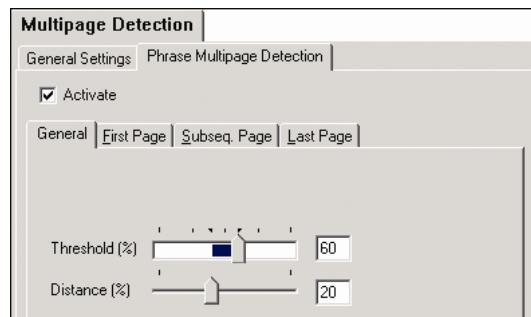


Figure 4-19: The Phrase Multipage Detection tab

- 7) Set thresholds and distances, if desired, for Multipage Detection. The default is 60 percent for Threshold, and 20 percent for Distance.
- 8) Select First Page, Subsequent Page, and Last Page to define phrases for the different pages.
 - To enter a phrase, edit the New Phrase text field. By clicking Ins, you can insert the phrase with a default significance of med and default value of any.
 - To modify settings for a phrase, either double-click a phrase or press Edit. For more information about editing phrases, please see section **4.10**.

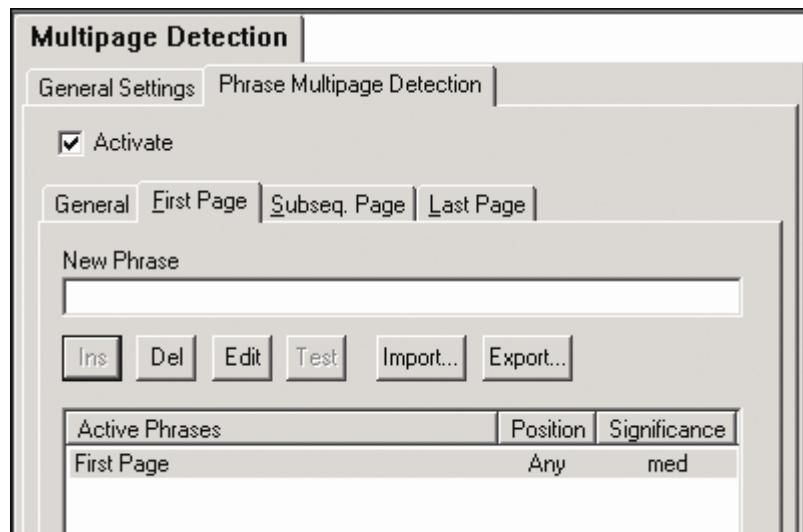


Figure 4-20: First Page in Multipage Detection, defining phrases

4.11.1.1. Other Multipage Detection Settings

To run Multipage Detection, you must configure the following settings in Runtime Server:

Select these settings on the Workflow tab in Runtime Server:

- The classification and extraction step must be performed together.
- Perform folder-based classification and extractions



Note: Do not use the Import option "Document Grouping - 1 folder per document."

For more information about Multipage Detection and Runtime Server settings, please see the *Runtime Server User's Guide*.

4.12 Configuring Image Size Classification

To use image size specification, you must specify the document size for the corresponding class. It is also possible to specify a size range.

Task Prerequisites

The prerequisites for this task are:

- You must have set up a classification scheme.
- Image size classification is selected for at least one of the classes.
- The program runs in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

Specifying Document Size

To specify the document size:

- 1) In the Classes tab on the left side of the window, select a class.
- 2) In the Classification tab on the right side of the window, under Used Engines... select the Image Size Classification method name.

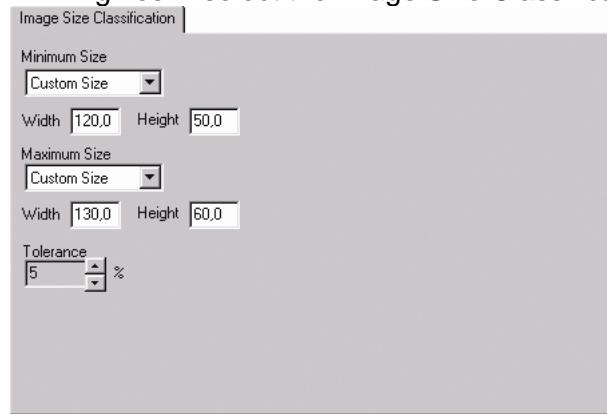


Figure 4-21: Image Size Classification Property Sheet

- 3) In the Image Size Classification property sheet, under Minimum Size, select one of the predefined sizes, or select Custom Size and enter the Height and Width in millimeters into the corresponding text boxes.
- 4) Repeat this for the Maximum Size.
- 5) Under Tolerance, use the spin box to specify the error tolerance in percent that is applied when comparing sizes. This value is particularly important if your Maximum Size and Minimum Size are equal.

4.13 Configuring Forms Classification

To use forms classification, you must create reading zones on documents and compare the recognition results from these zones with known

identifiers of a class of forms. You can also configure a forms classification on the project level if more than one class shares zones.

4.13.1. Creating Reading Zones

Task Prerequisites

The prerequisites for this task are:

- You must have set up a classification scheme.
- Forms classification is selected for at least one of the classes.
- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.
- Reading Zones must be visible. (On the View menu, select Show Page.)

Reading zones are fixed areas on documents that contain information that is to be recognized. Two different types of reading zones can be used in forms classification:

- OCR: The contents of the reading zone are determined using optical character recognition. The textual contents of the zone is the result of this process.
- Barcode: The contents of the reading zone are determined using barcode recognition. The number or strings represented by the barcode is the result of this process.

You may use more than one reading zone on each form.

Creating Reading Zones

To create reading zones:

- 1) In the Classes tab on the left side of the window, select a class.
- 2) Load a document into the viewer that belongs to the selected class.
- 3) From the menu, select View - Show Page. The viewer toolbar displays additional buttons for zone creation:

Button	Description
	Activates the selection tool
	Creates an OCR reading zone
	Creates an OMR reading zone
	Creates a barcode reading zone
	Creates an anchor

Table 4-2: Controls for creating reading zones

- 4) In the viewer pane, click the respective toolbar button to create an OCR zone or a barcode zone.

- 5) Click on the document and drag to create a rectangular reading zone around the form identifier. Obviously, the rectangle needs to be large enough to hold the identifier. It should not be much larger, though. The reading zone is displayed as transparent rectangles with red borders. Each zone has a label that displays the name of the zone. The initial name is created from the word Zone and a consecutive number.

For more information about creating and editing reading zones, please refer to Section **7.6** and **Chapter 9**.

Configuring Form Identifiers

To configure the form identifiers:

- 1) In the Classification tab on the right side of the window, under Used Engines... select the Forms Classify Engine method name.

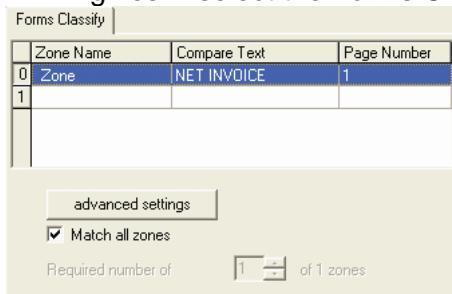


Figure 4-22: Forms Classification Property Sheet

- 2) Click on a cell of the Zone Name column and select a zone from the list of available reading zones.
- 3) In the Compare Text column, type the string that identifies your form. This string will be compared to the recognition result from the reading zone.
- 4) In the Page Number column, click to specify whether the reading zone is on the first or on the last page of the document.
- 5) Repeat Step 2 through Step 4 for all reading zones that should be taken into account.

By default, recognition result and form identifier are compared using an error-tolerant algorithm.

To specify the comparison method in more detail:

- 1) On the Forms Classify tab, click the row number to select a row.
- 2) Click on the Advanced button. The Advanced Settings dialog box is displayed.

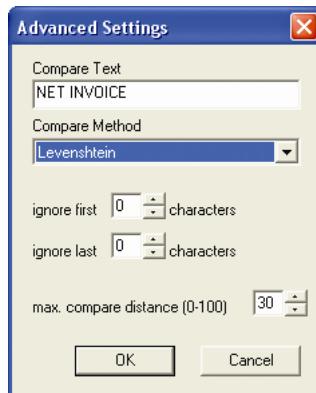


Figure 4-23: Advanced Comparison Settings

- 3) In the Compare Text field, you can edit the comparison string. This may be required, depending on the comparison method you select.
- 4) In the Compare Method list, you can select the following methods:
 - String Compare: A very simple method that returns a match for a literal occurrence of the comparison string.
 - Trigram: An error-tolerant method that returns a match for a literal occurrence of the comparison string, but also for strings that can be derived from the specified one by fragmenting the text into groups of three characters called trigrams. The number of identical groups determines whether there is still a match.
 - Levenshtein: Another error-tolerant method that returns a match for a literal occurrence of the comparison string, but also for strings that can be derived from the specified one by inserting, interchanging or deleting single characters. This is the default method.
 - Regular Expression: A method that returns a match if the recognition result corresponds to a possibly complex format pattern that needs to be entered into the Compare Text field.
 - Simple Expression: A method that returns a match if the recognition result corresponds to a simple format pattern that needs to be entered into the Compare Text field.
- 5) You may be willing to assign several forms with similar identifiers or several versions of the same form to the same class. In this case, it may be useful to ignore leading or trailing characters of the recognition string. You can set the number of characters that are to be neglected using the ignore first... and ignore last... spin boxes.
- 6) The Max. Compare Distance allows you to perform the comparison, neglecting leading or trailing characters of the comparison string. The compare distance is computed as follows:

$$\text{Compare Distance} = 1.00 - \frac{\text{Number of Characters (Recognition String)}}{\text{Number of Characters (Comparison String)}}$$
 A match requires that the actual compare distance is less or equal the maximum compare distance.

For more information about the comparison methods and the syntax of simple expressions, please refer to Section 7.4. The syntax of regular expressions is described in **Chapter 10**.

In the Forms Classify tab, color coding is applied to the comparison string to indicate the selected method.

Swatch	Color	Method
	purple	String Compare
	turquoise	Trigram
	olive	Levenshtein
	gray	Regular Expression
	black	Simple Expression

Table 4-3: Color coding in Forms Classify tab

In some cases, you may need multiple reading zones to obtain a reliable classification. In this case, you need to specify how the classification result is evaluated.

To set the number of zones that must match, do one of the following:

- In the Forms Classify tab, check Match all zones. This is the default.
- In the Forms Classify tab, clear Match all zones and set the number of required zones in the Required number... spin box.

4.13.2. Global OCR Zones in Forms Classification

It is possible to share OCR zones from the project page between different document classes. If there are several document classes that have to read the forms ID from the same place in the document, you can set it up in the project page to read the zone globally.

Before you share OCR zones, be sure to have at least one class set up with forms analysis.

Setting Up a Shared OCR Zone

To set up a shared OCR zone, do the following:

- 1) Select the Project name.
- 2) Set up a zone by following instructions for Creating a Reading Zone, Section [4.13.1](#). When setting up the zone, minimize the *All* zone first.

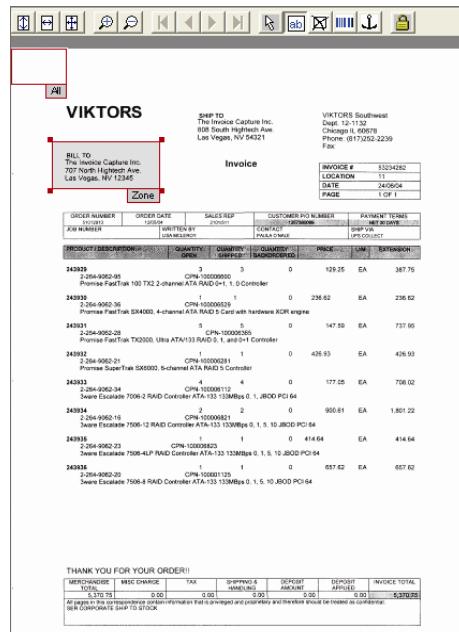


Figure 4-24: A project zone set up at the project level. Establishing OCR Zones

The global project zone will appear in the Zone Name dropdown box for all classes that have forms classification.

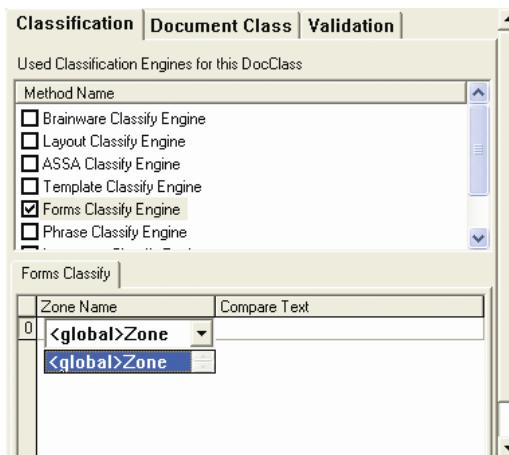


Figure 4-25: Dropdown box showing shared OCR zone from the project level

4.14 Choosing Classification Method

4.14.1. The ASSA Classify Engine

Like the Brainware Classify Engine, the ASSA Classify Engine needs a Learn Set of documents for classification. The difference between the Oracle Engine and the ASSA Engine lies in the different search pools that are generated out of the documents of the Learn Set when the documents are learned.

For its search pool, Oracle generates a dictionary of words. The documents for the search pool are coded with words from this dictionary.

The ASSA engine uses the trigram method to code the search pool. The classification of documents is based on the block text search, which involves retrieving the text from the document block-by-block and generating a query string out of the block text. The ASSA engine then searches for that query within the search pool.

The prerequisites for this task are:

- You must have a loaded project.
- The program is in Definition Mode.
- ASSA classification is selected for at least one of the classes.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

4.14.2. ASSA Configuration

The ASSA engine has three tabs for configuring project-level settings:

- ASSA classify: Sets the confidence parameters.
- Regions: Restricts the area of document to be classified.
- Tuning: Defines stretching and calibration that is relevant when the engine is combined with other classification engines, as well as aspects concerning the search speed versus quality.
 - Stretching

Stretching improves the results of Brainware Classification when combined with other Classification Engines. Stretching means to increase the distance between results given by the classification engine.

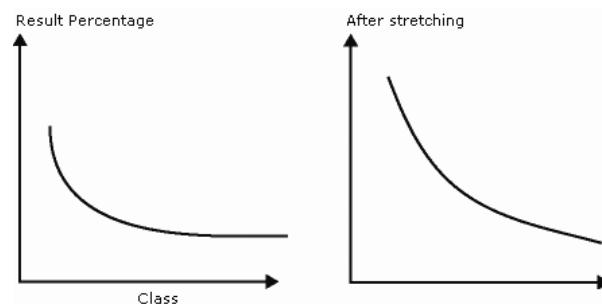


Figure 4-26: Stretching the results in ASSA

You can change the Stretching factor with the slide bar. The stretching factor, which increases the distance, can vary from 1.0 to 5.0.

For example if the stretching factor is 2.0 and Brainware classification result is:

CLASSID	Before Stretching	After Stretching
	Percentage	Percentage
Class1	70	70
Class2	66	62
Class3	56	46
Class4	32	8

Table 4-4: ASSA Stretching results

- Calibration
Calibration fine-tunes the various classification engines. Calibration is based on the Calibration factor, which can vary from 0.1 to 1.5. For example, by multiplying the results of Brainware Classification engine with a calibration factor of 0.6, we can get tuned results with Template Classification engine results.
- Max Quality / Min Speed ...
Max Quality/Min Speed offers the option to select a rapid classification, which sacrifices quality, or a slower classification, which offers greater accuracy. To elect rapid classification, you can set a percentage of the full block text. Or you can elect greater accuracy by creating a query based on the full block text, which takes additional time to compute.

4.15 Testing the Classification

When a classification scheme has been set up and the classification methods have been defined and configured, the classification can be tested.

Task Prerequisites

The prerequisites for this task are:

- There is an active document set.
- There is a trained classification scheme.
- To test the classification only, your project settings should exclude data extraction from runtime functionality.

There are several ways to test the classification.

4.15.1. In Definition Mode

Use one of the following buttons to determine target classes and confidence values:

Button	Description
	Processes the current document. The button's drop-down menu enables/disables the debug mode.
	Processes the next document.
	Processes all documents in the current set starting with the current one.

Table 4-5: Buttons for document analysis available in Definition Mode

For unprocessed documents, the software displays Not Classified in the bottom-left edge of the window. After processing, the proposed class is displayed. If Oracle Forms Recognition cannot assign the document, it displays Uncertain Classification.



To display an array of classification results for the previously processed document, click the Show/Hide Classification Results Matrix button.

Classes/Engines	Result	Brainware ...
Invoices	100.0	100.0
Misc	62.5	62.5
Agreements of Sale	35.9	35.9
License Agreements	35.5	35.5
Maintenance Agreements	16.1	16.1
Contracts	-	-
SalesDocuments	-	-

Close

Figure 4-27: Classification results for a given document

For more information about how the confidence levels are obtained, please refer to [Chapter 11](#).

If debug mode is enabled, a dialog box is displayed every time a document is being processed. It shows a tree view of possible target classes and confidence levels. In addition, the parameters for classification evaluation are displayed. For more information about evaluation parameters, please refer to [Chapter 11](#).

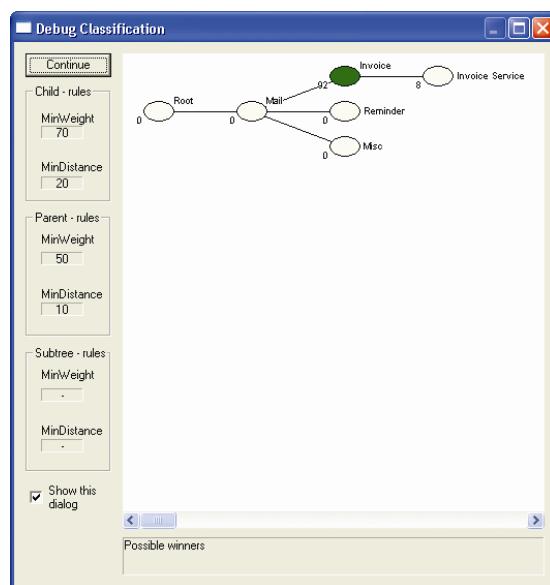


Figure 4-28: Testing classification in debug mode

- To close the dialog box, click Continue.
- To quit debug mode, clear the Show this dialog check box.

4.15.2. In Train Mode

Use the following button to determine target classes:

Button	Description
	Processes the current document. The button's drop-down menu enables/disables the debug mode.

Table 4-6: Button for classification available in Train Mode

Just as in Definition Mode, for unprocessed documents, the software displays Not Classified in the bottom-left edge of the window. After processing, the proposed class is displayed. If Oracle Forms Recognition cannot assign the document, it displays Uncertain Classification.

Debug mode options in Train Mode are the same as in Definition Mode.

4.15.3. In Runtime Mode

Use one of the following buttons to determine target classes and confidence values:

Button	Description
	Processes the next document.
	Processes all documents in the current set starting with the current one.
	Stops the processing of documents. Clears any results from previous runs.

Table 4-7: Buttons for document processing in Runtime Mode

The results are presented as follows: The pane on the upper left side displays summary results for all classes within the current project. It contains two separate tabs, one for a statistic view of mean classification and extraction results, the other one for a tree view of the classification distribution. Both views are continuously updated at runtime.

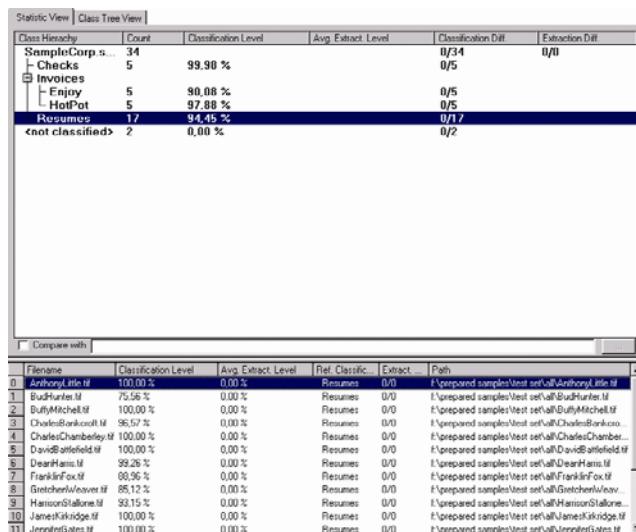


Figure 4-29: Runtime mode classification results

The classification-related columns in the *Statistic View* tab have the following meaning:

Column	Description
Class Hierarchy	Class name and position within the classification scheme
Count	Number of documents assigned to a class or total number of processed documents. Numbers are accumulated until you stop processing.
Classification Level	Mean confidence for assignments to a class.
Classification Difference	Comparison of actual classification results with results from a reference file. The first number represents the number of different classifications in this run, the second one represents the total number of classifications in this run. If there is a difference between test results and reference results, this is indicated by the red color.

Table 4-8: Columns of Classification results in Runtime Mode

The Statistic View tab lets you compare your classification results with results stored as reference files. This feature is valuable for example for benchmark tests.

To create a reference file:

- Enable creation of the default export file in the project settings (Please see also section [4.6.6.3](#)).
- Right-click any class entry within the Statistic View tab and select Save As Reference to write the current results to a reference file.
- You can edit reference files as well as the default export file with a text editor, or you can use text editors to create a reference files from scratch. Each line in the file represents the results of one document. The line structure is as follows:

<file name><TAB><class><TAB><field 1><TAB>...<TAB><field n>

Example:

HotPot2.tifHotPot\$5.489,9810324

To select a reference file:

- Right-click any class entry within the Statistic View tab and select Load Reference, then select a *.ref file or the default export file.
- Click on  at the bottom of the pane, then select a reference file.

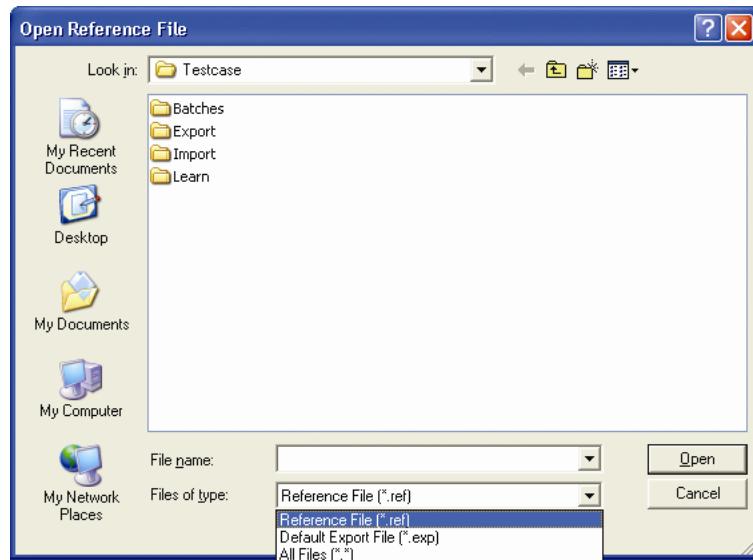


Figure 4-30: Loading reference files

To use a selected reference file for comparison with the subsequent runs:

- Right-click any class entry within the Statistic View tab and select Compare with Reference, then confirm.
- Check the Compare with check box at the bottom of the pane.

The Class Tree View tab displays the distribution of class assignments:

- To hide a branch, double-click the corresponding root node.
- To show a hidden branch, double-click again.

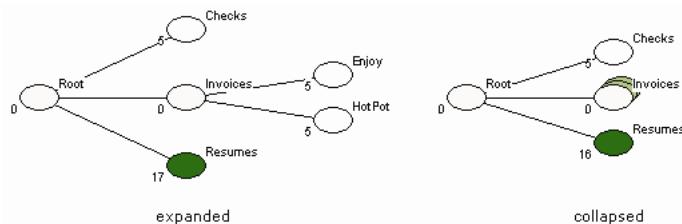


Figure 4-31: Classification distribution with expanded and with partially collapsed branches

If you click a class in either the Statistic View tab or in the Class Tree View tab, the pane below will show which documents have been assigned to the current class. The classification-related columns in this pane have the following meaning:

Column	Description
Classification Level	Confidence for assignments to a class.
Ref. Classification	Target class for this document as given in the reference file

Table 4-9: Document-Related Classification Results

4.16 Configuring the Associative Search Engine for Classification in Automatic Supervised Learning

To configure classification with the Associative Search Engine:

- 1) In Definition mode, click on the Class tab on the left side of your screen.
- 2) On the Class tab, select a class.
- 3) On the Classification Editor on the right side of your screen, under Method Name, select ASSA Classify Engine.

4.17 Optimizing the Classification

Most classification problems are due to either:

- 1) Insufficient OCR quality.
- 2) Insufficient Learn Set quality.
- 3) Inappropriate selection of classification methods.

4.17.1. Resolving Problems with the OCR

Use the highlighting options to identify whether there are problems with the OCR. If this is the case, proceed as follows:

- The problem may be caused by the quality of your images. Make sure that your document input is properly prepared. For example, check scanner settings or fax export settings.
- The default OCR settings may not be suitable to process your document input. For instructions on how to change these settings, please refer to [Chapter 9](#).

Changing the OCR settings at the project level is a severe intervention. Make sure that other reasons are excluded before you do this.

4.17.2. Resolving Problems with the Classification Methods

In Definition Mode, check the classification results of problematic documents. Identify the method that causes the problem. Determine whether classification fails because the confidence is too low or whether the distance is too low. Also, watch for large fluctuations.

- If documents are classified to the wrong class, you need to change the Learn Set or the parameters for the method that returns the wrong result. Result fluctuations often indicate an inappropriate set of rules.
- If too many documents are not classified at all, consider adding another classification method, or providing more samples for the Learn Set.
- If this doesn't help either, you may have to change the settings for classification evaluation. Please refer to [Chapter 11](#).

4.17.3. Resolving Problems with the Learn Set

Check the contents of unclassified or wrongly classified documents and compare them with the documents in your Learn Set. Often, you just need to add unclassified documents to the Learn Set of the target class to

improve your results. When changing the Learn Set, consider the following general rules:

- Add documents with a confidence below the threshold if their content fits into the selected class.
- Add documents that were previously not classified correctly due to the initially insufficient Learn Set.
- Use documents with an almost identical confidence for two or more classes. These documents are suitable to differentiate the classes.
- Avoid documents with a high confidence. These documents do not improve the Learn Set, because they would already be classified correctly.

Chapter 5 Planning Applications

In Oracle Forms Recognition, every document is processed in a sequence of operations:

- 1) Import
- 2) OCR
- 3) Layout analysis
- 4) Classification with optional verification
- 5) Data extraction with optional verification
- 6) Planning Supervised Learning (optional)
- 7) Export

Generally, each step requires a careful analysis of the current document input, the associated business processes, and some planning.

5.1 Identifying the Document Import Formats

You can process scanned paper documents, faxes, e-mails, files, or documents from mixed sources.

Paper documents are forwarded as *.tif images to Oracle Forms Recognition. You need to ensure that the image quality is good enough to obtain reasonable OCR results. Black-and-white images with a resolution of 300 dpi work best. You may need to optimize your scanner's settings to attain the resolution.

Although OCR optimization can be done in Oracle Forms Recognition, there is no way to regain information that was lost during scanning.

Faxes are also forwarded as *.tif images. The quality requirements are the same as for scanned paper documents. If required, use fax enhancement.

To process files, a suitable filter for text extraction must be available. Oracle Forms Recognition's built-in filter can process:

- ASCII documents
- Word documents
- Excel documents
- PowerPoint documents
- HTML pages
- AmiPro documents, up to Version 3.1
- WordPerfect documents, up to Version 8

Other file formats require individual testing. Before importing the document into Oracle Forms Recognition, first convert it to a supported format.

To process e-mails, first save the messages to the file system.

5.2 Identifying the Document Classes

Review your documents and look for:

- Similar textual content
- Reoccurring phrases
- Reoccurring forms or letterhead paper

- Characteristic document dimensions.

These document properties can be employed in classification. Use them to define an initial classification hierarchy.

You cannot define a classification hierarchy based on document dimensions alone.

5.3 Planning the Classification Methods

Oracle Forms Recognition offers several classification methods that can be used alone or in combination with each other.

Classification methods are specified at the class level. You can apply one or several classification methods to each class, and an evaluation algorithm will combine the results and decide whether a given document belongs to a particular class.

At this stage, you need only a rough idea of classification methods. To improve the initial classification results, you can easily add classification methods later.

5.3.1. Content Classification with Oracle

Content classification is based on Oracle neural network technology. To use this method, you yourself must be able to distinguish the documents by their content. The formal structure of the document is unimportant. The same is true for syntax or phrases, since only words are used as input.

For example, the following classification problems can be solved with Brainware classification:

- E-mails classified by project
- Business correspondence by type (such as orders, invoices, or resumes)
- Essays classified by author
- Customer requests classified by topic
- Movie descriptions classified by genre.

Brainware classification can be used as the only classification method.

5.3.2. Phrase Classification

Phrase classification uses words and phrases to identify the document class. Within certain error limits, the phrases or words must literally occur within the documents.

Phrase classification can be used as a very powerful complement to content classification since you can define certain keywords that must lead to a specific class. You do not have to define every possible phrase, since Oracle does that job.

Phrase classification can be used as the only classification method. However, this is not generally recommended, because it may require setting up and maintaining a potentially complex set of rules. Typically,

phrase classification is used in conjunction with Brainware Classification. Phrase classification should not be used to train base classes.

5.3.3. Template Classification

Template classification can be used to identify forms and documents with characteristic pre-printed headers and footers. Character strings such as addresses, telephone numbers, and bank account numbers are stored along with their position on the document. You can combine several templates into one class. This type of classification can be used to identify a document's sender or to sort correspondence from business partners. Up to 1,000 classes are supported.

Template classification needs no definition and can be trained by providing samples for each class. In the classification step, the templates of each class are matched against the document to determine the similarity. Since this information is so specific, template classification is very fast and reliable.

Template classification can be used as the only classification method.

5.3.4. Image Size Classification

Image size classification uses the physical size of documents to distinguish classes. This method will not be able to positively prove that a document is in a specific class. Instead, image size classification is used to rule out classes and whole branches by excluding documents that do not match. This method is very fast. Use it to reduce a classification problem and to shorten the computing time at the same time.

5.3.5. Forms Classification

Forms classification can be used to identify forms or other structured documents that have an identifier of the document class printed on them. If the identifier is placed at a fixed position on the document, reading this zone can quickly provide a classification result. Forms classification is well suited to assigning structured documents to a class and combining several forms in one class. However, the document input is usually too heterogeneous to use forms classification as a stand-alone method.

5.3.6. Brainware Layout Classification

The Brainware Classification engine is used for content or type classification. The Brainware Layout Classification (BLC) engine provides a more precise classification between documents with similar templates. For example, considering invoices from different vendors it would be possible to reach a better result by taking into account the positional information of the documents' content as well as the textual content of the documents. Generally, this engine addresses the same problems as the Template Classification engine but with the help of powerful Oracle technology.

The document is divided into a number of zones. Each piece of text is tagged to indicate which zone it appears in. This means that if for the

learned layout class X the word "VAT" was mostly located in region the top left-hand corner and for the another class Y it was usually in the bottom right-hand corner, the system would prefer one classification over the other while for normal Brainware Classification such a difference between X and Y would have been irrelevant.

5.4 Identifying the Fields for Data Extraction

Extraction means that selected data from a document is automatically written to an extraction file. In general, classification is a precondition for extraction because the fields that need to be extracted are usually different for each class. If it is not necessary to distinguish different document classes and only extraction has to be performed, you can carry out a dummy classification with only one class that needs to be defined as the default. (Please see Section [11.1.4](#)).

For each class, identify the business processes that use the documents. Identify the data that is required by subsequent systems. Then define the set of fields that are to be filled per class.

5.5 Planning the Extraction Methods

Extraction of information from the document into a field occurs in two distinct steps:

- Analysis: In this step, the document content is analyzed and a set of possible values for a field is generated. These values are called candidates.
- Evaluation: In this step, the correct candidate is selected from the set of candidates.

Oracle Forms Recognition supports several analysis methods. The best choice for the evaluation method depends on the selected analysis method. Analysis and evaluation methods are defined at the field level.

Although it is possible to combine several classification methods for each class, you can use only one analysis method and one evaluation method per field.

Evaluation is normally only necessary for the Format Analysis engine (section [5.5.3](#)) It can also be used for Zone Analysis (section [5.5.4](#)) or Address Analysis (section [5.5.5](#)) if various zones are defined. Other engines do not need an evaluation engine.

5.5.1. Brainware Table Extraction

Use this method to interactively train table extraction line-by-line (row-by-row.) This engine can learn which lines to extract, which lines not to extract, and which lines to use for learning — and which lines not to use. It can also learn line types and assign color coding to them. This engine also "knows" when the Learn Set has changed. Further, the engine can extract columns and cell data. For details, please see Section [7.4](#).

5.5.2. Table Analysis



This rules-based method is only supported for projects that were created prior to Version 3.0. All projects created in Version 3.0 or later should use Brainware Table Extraction.

Prior to Version 3.0, this method was used to extract a series of records that were organized in columns. As with Brainware Table Extraction, traditional Table analysis yielded several candidates, but the one with the highest confidence is used automatically. Therefore, no evaluation step is required. To access the remaining candidates, you used custom evaluation methods implemented as Sax Basic or WinWrap Basic scripts. For details, please see Section [7.8](#).

5.5.3. Format Analysis

Use this method to extract data that might be located at arbitrary positions in the documents. Format analysis uses a formal description of the character string you are looking for. For each field, a set of search patterns can be defined. All strings within the document text that match at least one of the specified patterns are candidates. Typically, there are several candidates.

Format analysis is usually combined with Oracle evaluation. That is, the user can take a couple of examples and select the correct candidate from the possible ones. The software can then learn to select automatically. Alternatively, format analysis can be combined with custom evaluation methods implemented as Sax Basic or WinWrap Basic scripts. For details, please see Section [7.4](#).

5.5.4. Zone Analysis

Use this method to extract data located at fixed positions in a document. This requirement is usually met with classical forms. For each field, a reading zone or a set of reading zones on the document is defined. The recognition methods available for zone reading include OCR engines, barcode recognition, and optical mark detection (OMR). Typically, zone analysis yields a single candidate, but with multiple reading zones per field, a set of candidates can be obtained.

Zone analysis only requires the evaluation step if there are multiple candidates. You can then either use Oracle evaluation or custom evaluation methods implemented as Sax Basic or WinWrap Basic scripts.

For details, please see Section [7.6](#).

5.5.5. Address Analysis

Use the Address Analysis2 Engine to identify addresses on documents and to validate the analysis result against entries in a database. Addresses can be located at arbitrary positions within the documents. Address analysis yields one or several candidates.

Address analysis always requires the evaluation step, even if there is only one candidate. You can either use Oracle evaluation or custom evaluation methods implemented as Sax Basic or WinWrap scripts.



Address analysis is currently supported for German, Austrian, Swiss, and U.S. address formats only. For details, please see Section 7.7.

5.5.6. Associative Search Engine

Use this method to extract addresses, or as a classification engine in combination with template classification. (Please see Section 5.7 and Section 4.9).

5.6 Planning the Verification

The Oracle Forms Recognition suite features a dedicated application for quality assurance: Oracle Forms Recognition Verifier. This application provides the means to check and correct uncertain or invalid results of automatic document classification and data extraction. In addition, it permits manual classification and indexing of documents.

For each class, decide which steps are to be carried out automatically, which steps are to be carried out manually, and which verification steps will be involved (classification and extraction verification separately, or both procedures in one step.) If manual indexing is involved, decide whether this should be done with or without database support (smart indexing.)



Verification can also be carried out in stages, and exception handling mechanisms can be implemented to account for special error situations.

Plan the verification forms that will be required and the validation rules that will be imposed on user input.

5.7 Planning Supervised Learning

The Supervised Learning Workflow (SLW) is used to automatically create and learn new document classes. This automatic process creates the new derived documents classes for a generic – base – document class (level 0.) This document class is not inherited from any other document class. The derived document classes (level 1) cannot have further derived document classes.

SLW must be enabled in both Oracle Forms Recognition Designer and Oracle Forms Recognition Verifier.

5.8 Planning the Document Export

By default, Oracle Forms Recognition uses a specified export directory where documents and their associated Workdocs are saved after processing. To change this behavior, use one of the available export connectors or custom export methods implemented as Sax Basic or WinWrap scripts.

5.9 Planning the Page Separation

5.9.1. Batch Properties

To create a batch for the “page separation” feature, configure a RTS instance for Import and OCR.

- The documents to import must consist of single-sided documents.
- The import creates batches with one folder per document.
- The workflow states should be different to the default workflow states. Otherwise, there will be conflicts with the other instances using RTS that have their own state numbers.

5.9.2. Page Separation Learnset

The “page separation” needs its own learnset.

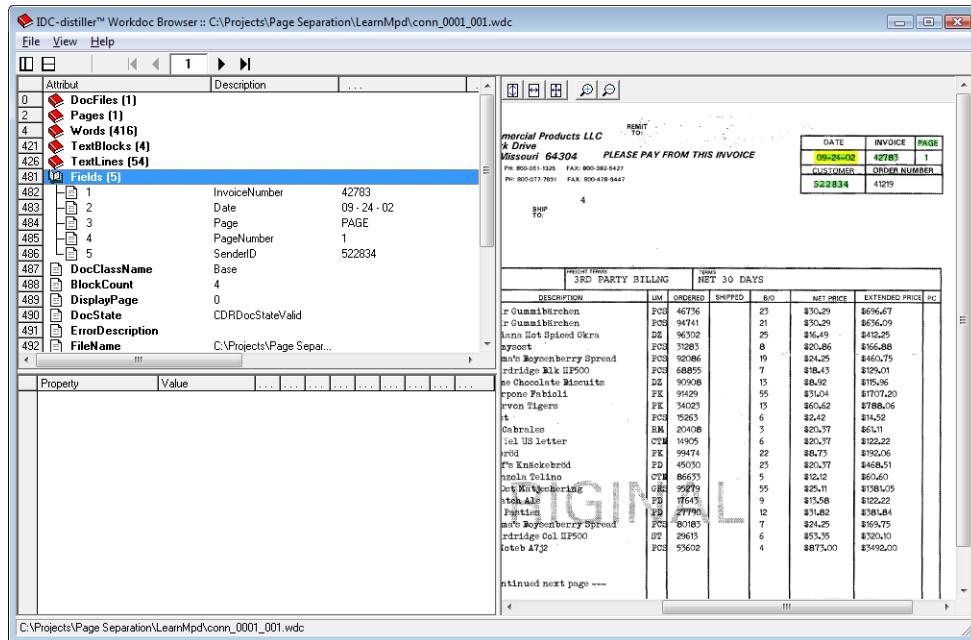
To prepare a learnset for “page separation”, a directory, which contains at least 50 documents fully extracted and validated, single-sided images with work document files (*.wdc), is needed. To prepare these documents use a verifier project containing a single base class and five defined fields given exactly in the following order:

- InvoiceNumber
- Date
- Page
- PageNumber
- SenderID.

Name	Änderungsdatum	Größe
conn_0001_001.tif	16.05.2008 11:26	75 KB
conn_0001_001.wdc	26.05.2008 11:37	30 KB
conn_0001_002.tif	16.05.2008 11:26	60 KB
conn_0001_002.wdc	26.05.2008 11:39	23 KB
conn_0002_001.tif	16.05.2008 11:26	72 KB
conn_0002_001.wdc	26.05.2008 11:39	29 KB
conn_0002_002.tif	16.05.2008 11:26	79 KB
conn_0002_002.wdc	26.05.2008 11:40	31 KB
conn_0002_003.tif	16.05.2008 11:26	80 KB
conn_0002_003.wdc	26.05.2008 11:40	31 KB
conn_0002_004.tif	16.05.2008 11:26	55 KB
conn_0002_004.wdc	26.05.2008 11:40	20 KB
conn_0006_000.tif	16.05.2008 11:26	73 KB
conn_0006_000.wdc	26.05.2008 11:41	29 KB

The names and the order of these fields are binding!

5.9.2.1. Background of “Page Separation Learnset”



InvoiceNumber – A principle identifier of a multi-page document. If the Invoice number changes between two pages, a new document will start.

Date – Another criterion that can strengthen the determination of a multi-page document.

Page – This field has to contain the page keyword to strengthen the page number extraction. For example, the Page keyword can be “Page” or “Pg.Nr.” or something similar – whatever is present on the document.

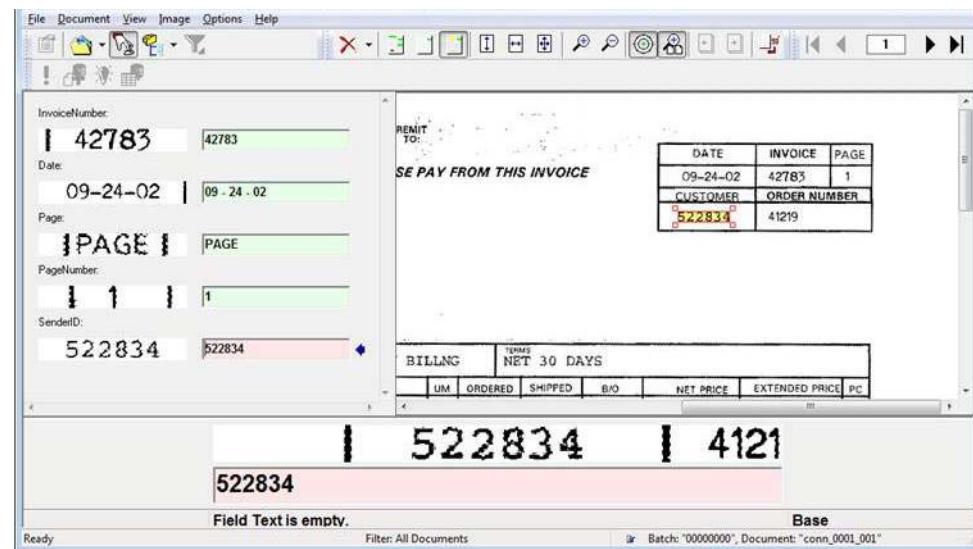
PageNumber – If the document has pagination, a new document can be recognized when the pagination starts over.

SenderId – The identifier of an invoice type. For example, the tax number of the vendor can be used to identify a unique invoice of multiple pages from the same vendor. If the SenderID changes between two pages, this signals that a new document has started.

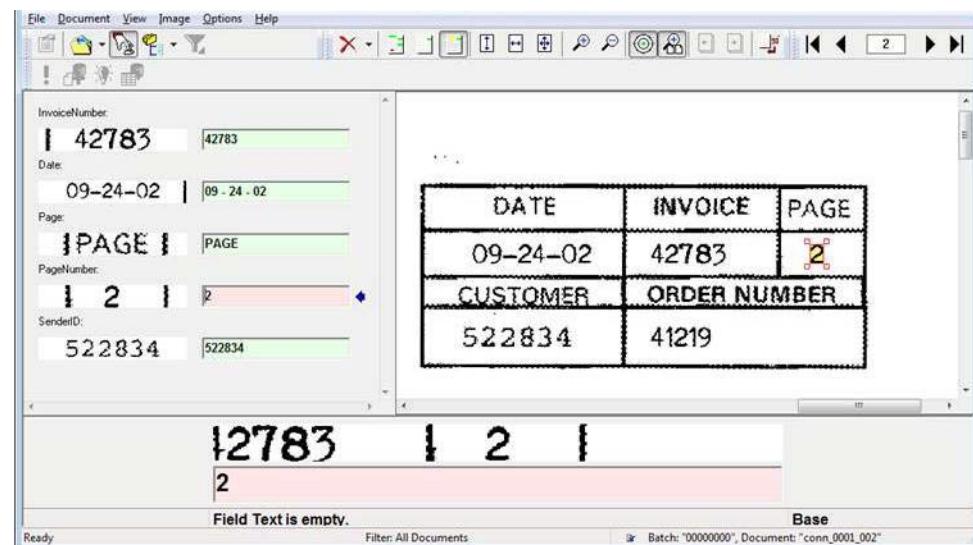
If some fields are not present on the trained document, simply leave these fields empty.

5.9.3. How to Train the Engine

Here is an example as to how the Page Separation engine can be trained. The example shows how one document that consists of two pages is supposed to be prepared to be added to the learnset using Oracle Forms Recognition Verifier application. Each page of the document has to be represented as a separate document. Open the first document (first page) in Oracle Forms Recognition Verifier and enter the fields using selection tool feature (position of the entered fields is essential in terms of further learning):



The next page has to be trained in the same way, as a separate document:



5.9.4. Project Properties for Page Separation

To prepare a new project for the “Page Separation” feature, only a few steps are necessary.

5.9.4.1. Step 1: Insert Base class

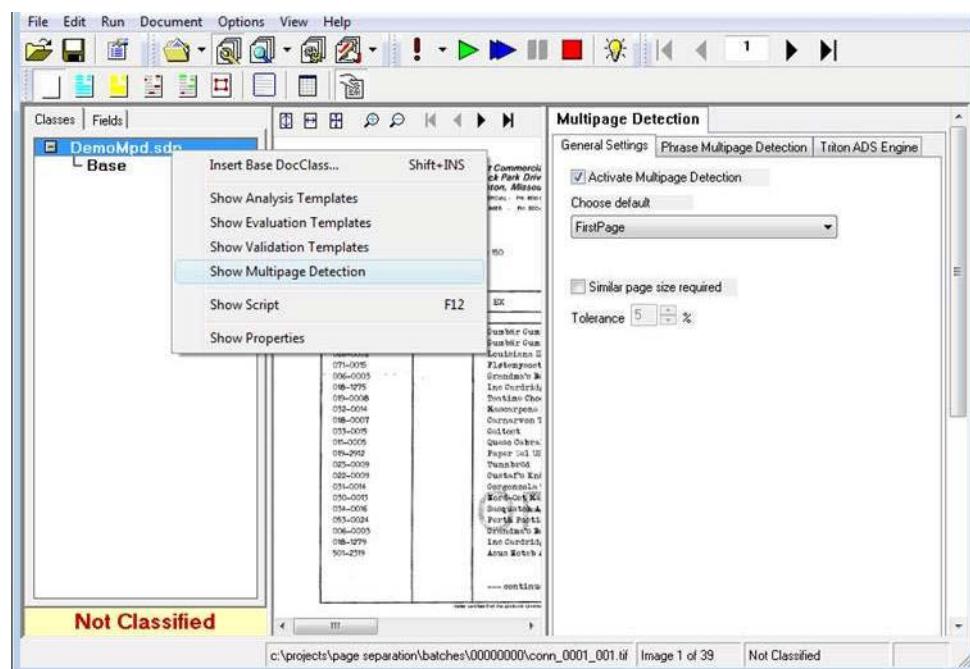
In definition mode (Tab classes), insert a single base class. This base class needs no definitions for classification. It will be defined as the default class in the project properties:

- Right click on the project name in classes tab
- Select Properties
- Select Classification tab on the right side of the Designer window.
- Select the name of the new base class as “default classification result”.

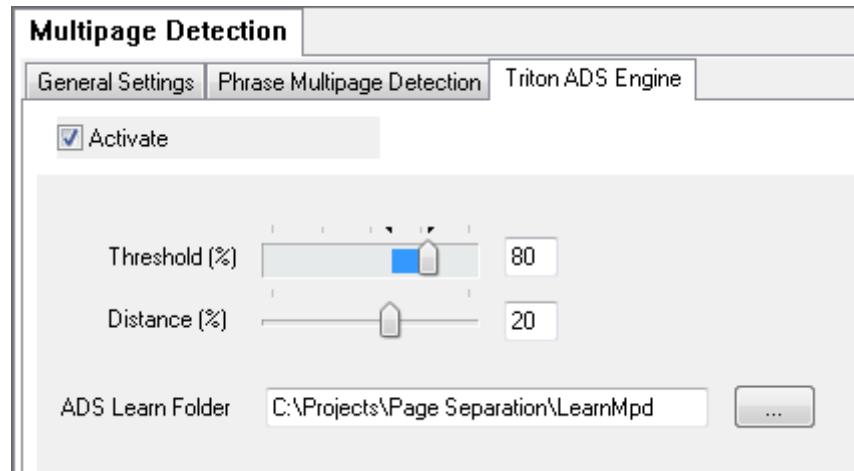
This default setting is necessary, because the “page separation” feature will be executed in the extraction step. No special extraction settings are necessary.

5.9.4.2. Step 2: Activate Multi-Page Detection

For the activation of the multi-page detection, right-click on the project name in the classes list of the definition mode. Select “Multi page detection” from the context menu. On the right side of the window you will now see the “Multi page detection” properties. In tab “General”, select this feature by checking the “Activate multi page detection” checkbox.



Ignore the “multi page detection by phrase”. For purposes herein, the “Triton ADS engine” is being used. Activate the “Triton ADS engine” by checking the “Activate” checkbox on “Triton ADS engine” tab.



5.9.4.3. Step 3: Define Path to ADS Learnset

To complete the projects configuration for automatic document separation, enter the path to the ADS Learnset (see [Page Separation Learnset](#)). Save the project file.

Chapter 6 Setting Up the Validation

6.1 Basic Validation Concepts

Validation is a quality assurance task that involves confirming whether a field extraction is correct or incorrect. Validation is configured in Designer's Validation Editor, but the actual work is done in Runtime Server, Verifier, and Advanced Verifier.

Runtime Server loads the project at runtime and executes validation after extraction but before exporting the project. Documents that fail validation in Runtime Server are forwarded to Verifier for quality assurance. Verifier loads the settings and uses property sheets to display the validation settings. Validation is done with the Standard Validation Engine – currently the only engine available for validation.



All Validation settings are established with respect to the Validation engine. This means that the Standard Validation Engine must be enabled for validation settings to be made or used.

Validation uses Oracle Forms Recognition's hierarchical organization of relationships between parent and child elements. These hierarchies make Oracle Forms Recognition customizable and useful, but they also make the software more complex.

While Runtime Server is processing a batch or list of batches, each containing several documents, it first tries to classify the processed document. After classification, the extraction is performed for each field defined for this document class. The validation rules for a field can either be defined for this document class but can also be inherited from the parent class.

A document will be valid when all fields on the document are valid. If one field is invalid according to standard validation or script validation rules, the whole document is invalid. The script validation for a field is performed only when the standard validation is valid. If one document of a batch is invalid, the whole batch is passed to the Verifier for QA.

If you're familiar with previous versions of Oracle Forms Recognition, you probably know about how templates can be used for Analysis and Verification. Templates can now also be used for Validation. This chapter shows you how to reuse settings for Validation that were established in your current project or in another project within your enterprise.

To learn more about Analysis and Evaluation templates, please see
Reusing projects Settings with Templates

Reusing projects Settings with Templates

Standard validation and output formatting is intended to standardize the development and maintenance cycles for each implementation of Oracle Forms Recognition. However, standard validation has not replaced scripted validation. For a brief introduction to script validation, please refer to Section [6.4](#). For detailed information about scripting, please refer to the ***Oracle Forms Recognition Scripting Documentation***.

Script validation can override standard validation settings.



Basic Validation Concepts, the section you are reading now, introduces you to the concepts you need to understand to effectively use the Standard Validation Engine and the Validation Editor. Section 6.2 and Section 6.3 show you how to use validation. Section 6.4 is a brief introduction to Oracle Forms Recognition's scripting language, *Sax Basic* and *WinWrap Basic*.

6.1.1. Levels of Validation

Generally, validation properties are inherited along the parent-child hierarchy. Children automatically inherit their parent's validation settings. You can accept inherited settings or override them. Inherited settings in the project, class, or document are homogenous, whereas overrides are useful for heterogeneous constructs.

There are three levels of validation:

- Project (For projects, the only validation setting you can make is whether or not to permit forced validation. You also store global settings using validation templates at this level.)
- Class and Document.
- Field (includes text fields and table fields.)

6.1.2. Terms and Commands You Should Know

Standard Validation Engine:

The Standard Validation Engine enables you to use a GUI to establish robust validation rules for documents or classes, and fields. The engine must be enabled in order for any validation to occur, or for you to establish validation settings.

Force Validation – permitted, forbidden, default:

Force validation allows you to force a field to be valid, even if it is invalid by definition. If force validation is permitted, the entity being validated is always valid, regardless of its content or specific settings. Default force validation means that the validation settings are taken from the parent.

Derived Validation:

Tells a child field, document, or class to inherit all validation settings from its parent. Derived validation can be used only on trained classes.

General (tab):

The General tab is available for all validation levels, although its contents differ depending on the entity to be validated.

Character Filtering:

The Character Filtering tab is available for all types of validation. This tab enables you to indicate which characters are valid and which are not, which characters should be removed during validation, and which should be replaced during validation. This tab also enables you to establish OCR settings and case conversion.

By default, all special characters are indicated for removal for date and amount fields, but you can modify character filtering to add other characters to the list. If the Remove Characters field is blank, every character is acceptable.

Characters that can be replaced are those that are usually misinterpreted during OCR. The default values are shown in **Table 6-1**:

Character to be replaced	Replacement character
O	0
B	8
i (lower case i)	1
I (lower case L)	1
I (upper case I)	1

Table 6-1: Default characters to be replaced during OCR

You can add new characters to the list or change the way the characters are interpreted.

The final character filtering settings govern how the characters are handled by the OCR engine.

Output formatting.

Output formatting enables you to standardize how data output from Oracle Forms Recognition will appear when it is exported. This is useful for adding homogeneity to the appearance of output results, or to conform with your enterprise's requirements for data storage. Output formatting is available only for date and amount fields. Output formatting must be specifically enabled at the field level.

Output formatting for dates:

After you enable output formatting, select a region. This selection enables a list of standard date formats used in that region. You can add to the list by typing a value in the Format combo box.

Input Conversion	No Conversion: Characters are not changed. Upper Case: All characters in the field are converted to upper case. Lower Case: All characters in the field are converted to lower case.
No Rejects	Accepts all OCR results, regardless of quality.
OCR confidence level	Determines how good the OCR must be in order for the content of the document to be validated. A low confidence level mandates excellent OCR quality.
Valid characters	Enables you to set which characters will be accepted as valid. By clicking the All Numbers button, you can accept all numbers as valid. By clicking the All Characters button, you can accept all non-numeric characters; by clicking All, you accept all characters as valid. You can also select or unselect individual characters or groups of characters by clicking on them.

Output formatting for amounts:

After you enable output formatting, select a region. You can then set values for currency, positive and negative formats, decimal symbols, number of digits after the decimal, digit grouping symbol and digit grouping.

6.1.3. Available Validation Settings

Available validation settings vary based on whether you are establishing settings at the project level, the class level or document level, or the field level. Basically, the more specific the level, the more specific and complex the validation rules are.

6.1.4. Types of Field Validations

Five types of fields can be validated: Text, Amount, Date, Checkbox, and List.

Each of these types of fields can be validated for certain general characteristics, although the types of validation varies from field to field.

Character filtering is available for all types of fields.

Output formats can be set for amount and date fields, but not for others.

Setting	Description	Default value
Force Validation	Default: Accepts the parent-level settings. Permitted: Allows force validation, regardless of the validation settings on the parent. Forbidden: Prevents force validation, regardless of the settings on the parent.	At project level: Forbidden. At child level: Default.
Available Templates	This selection box allows you to choose a template to validate the field with.	At project level: Blank if no templates exist for project; otherwise all templates available for the specific field type are shown.
Available Validation Engines	Only Standard Validation can be selected.	
Copy	Click this button to copy global settings to create local settings from global settings.	NA
Save	Click this button to save global settings to create local settings from global settings.	NA
Use derived validation	Select this checkbox to use validation settings from the parent.	At project level: NA At child level: Not checked; only available for trained classes
Always Valid	Select this checkbox to make the field always valid regardless of its contents or validation settings. No validation takes place.	Not checked.

The types of validation you can perform vary with the type of field validation you selected. (*Table 6-2*).

Validation Type	General Validation	Character Filtering	Output Formatting
Text	Yes	Yes	No
Table	Yes	No	No
Amount	Yes	Yes	Yes
Date	Yes	Yes	Yes
Checkbox	Yes	Yes	No
List	Yes	Yes	No

Table 6-2: Validation Types and Available Validation Settings

6.1.4.1. General Settings Available for All Validation Types

6.1.4.2. Text

General Settings for Text

General settings specific to amounts are shown in **Table 6-3**:

Setting	Description	Default value
Multi-line	Converts multi-line data to a single, non-delimited line.	Not checked.
Allow empty field	Field text can be empty.	Not checked.

Table 6-3: Settings for Text fields

Character Filtering for Text

The only setting enabled by default is No Rejects.

Output Formatting for Text

Output formatting is not applicable for text.

6.1.4.3. Amount

General Settings for Amount

General settings specific to amounts are shown in **Table 6-4**:

Setting	Description	Default value
Amount Range	Establishes setting for validating a range of values.	Unchecked.
Minimum Value	Fields with values below this range will not be validated.	0.00
Maximum Value	Fields with values below this range will not be validated.	0.00
Region	Oracle Forms Recognition supports 27 regional settings, derived from default written languages.	U.S. English
Currency Symbol	Selections vary based on the region setting. For example, if you chose U.S. English for region, the symbols for U.S. currency are available. If you chose Canadian English, the symbols for Canadian currency are used. All currency formats for the region are accepted as valid.	Depends on regional settings.
Positive Format	Uses the currency settings for the region you selected and standard currency formats for depicting positive numbers.	(currency symbol)n.n Example: 1.1
Negative Format	Uses the currency settings for the region you selected and standard currency formats for depicting negative numbers.	[(currency symbol)n.n] Example: (1.1)
Decimal Symbol	By default, the decimal symbol is a point, but you can type in another symbol and have it available in the list for later use. The character used for decimal symbol cannot be the same character used for digit grouping symbol.	
Number of Digits after decimal	You can specify the number of digits that may appear after the decimal symbol. This is useful for truncating decimal characters.	two
Digit grouping symbol	The default setting is a comma, but you can also type in your own setting. This symbol cannot be the same as the Decimal Symbol.	,
Digit grouping	You can elect to have two or three characters per group, or not to group digits at all.	none

Table 6-4: General Settings for Amount fields

Character Filtering for Amounts

The following characters will be removed by default:

: ; " ' & ? ~ ! @ # % ^ *.

You can add to this list or delete from it.

Output Formatting for Amounts

Setting	Description	Default value
Region	Oracle Forms Recognition supports 27 regional settings, derived from default written languages.	U.S. English
Currency Symbol	Selections vary based on the region setting. For example, if you chose U.S. English for region, the symbols for U.S. currency are available. If you chose Canadian English, the symbols for Canadian currency are used. All currency formats for the region are accepted as valid.	Depends on regional settings.
Positive Format	Uses the currency settings for the region you selected and standard currency formats for depicting positive numbers.	(currency symbol)n.n Example: 1.1
Negative Format	Uses the currency settings for the region you selected and standard currency formats for depicting negative numbers.	[(currency symbol)n.n] Example: (1.1)
Decimal Symbol	By default, the decimal symbol is a point, but you can type in another symbol and have it available in the list for later use. The character used for decimal symbol cannot be the same character used for digit grouping symbol.	

Table 6-5: Output Formatting for Dates

6.1.4.4. Checkboxes

Setting	Description	Default value
Checkbox Caption	Enables you to indicate whether a checkbox should be captioned Yes/No, Accept/ Decline, True/False, or some other value.	Yes/No
Checked Value	Enables you to indicate whether a checkbox equals Yes, True, Accept, or some other value when it is selected. This setting should not conflict with Checkbox Caption.	Yes
Unchecked Value	Enables you to indicate whether a checkbox equals No, False, Decline, or some other value when it is cleared. This setting should not conflict with Checkbox Caption.	No
Default (Checked/ Unchecked)	Enables you to indicate whether a checkbox should be selected or cleared by default.	Checked

Table 6-6: Settings Available for Validating Checkboxes

Character Filtering for Checkboxes

Character filtering is available for checkboxes. The only setting that is enabled by default is for No Rejects.

Output Formatting for Checkboxes

Output formatting is not applicable for checkboxes.

6.1.4.5. Lists

Setting	Description	Default value
Min Len	Establishes a minimum valid field length	Not enabled/0
Max Len	Establishes a maximum valid field length	Not enabled.
Insert/delete list items	Create or remove list rows.	NA
Allow list values only	Only values that appear on the list will be interpreted as valid.	Enabled
Fill list of suppliers		Not enabled.
Sort list items	Arranges items on the list in alphanumeric order.	Not enabled.

Table 6-7: Validation Settings Available for Lists

Character Filtering For Lists

The only setting enabled by default is for No Rejects.

Output Formatting for Lists

Output formatting is not applicable for lists.

6.1.4.6. Dates

General Settings for Dates

Table 6-8 shows the general validation settings available for Dates

Setting	Description	Default value
Enable Date Range	Dates within the range are interpreted as valid.	Enabled
From Date	Earliest valid date	Today's date
To Date	Latest valid date	Today's date
No future date permitted	Dates in the future are not valid.	Enabled
Sample	Uneditable field showing how the date will be displayed based on regional and format settings.	Depends on regional and format settings
Region	Oracle Forms Recognition supports 27 regional settings, derived from default written languages.	Derived from system settings
Formats	Formats dates using a list of valid formats that are acceptable for that field.	Most common format for selected region.

Table 6-8: Validation Settings Available for Dates

Output Formatting for Dates

Table 6-9 shows the output formatting settings that are available for dates.

Setting	Description	Default value
Enable Output Formatting	Select this checkbox to customize the field text using output formatting.	Not Checked.
Region	One of the 27 regional settings derived from the languages that Oracle Forms Recognition supports.	U.S. English
Format	Sets output formats for date strings.	Most common format for the selected region.
Sample	Uneditable field showing how the settings for format will actually appear.	NA

Table 6-9: Output formatting for dates

Character Formatting for Dates

For dates, the following characters are removed by default:

: ; " ' & ? ~ ! @ # % ^ *

You can add or delete characters for this setting.

6.1.4.7. Table

General Settings for Tables

Table validation is another type of field validation. **Table 6-10** shows the Validation settings available for table fields.

Setting	Description	Default value
Type	Indicates whether the table column should be validated as text, amount, checkbox, list, or date.	Text
Template	Assigns a template to the field.	Not Set
Read Only	Determines whether data in the table row can be modified.	Not Set

Table 6-10: Validation Settings Available for Tables

Character Filtering for Tables

Character filtering is not applicable for tables.

Output Formatting for Tables

Output formatting is not applicable for tables.

6.2 Working with Validation Levels

6.2.1. Working with Project-Level Settings

The only validation settings available at the project level are whether to permit or forbid forced validation.

6.2.1.1. Settings Available at the Project Level

At the project level, you can:

- Indicate whether force validation should be permitted or forbidden as a default for documents and fields. You can also assign Validation templates.

Prerequisites for Project-Level Validation

The prerequisites for this task are:

- The program is in Definition Mode.
- In the pane on the left side of the window, the Class tab is active.
- On the right side of the window, the Project/Classification/Validation property sheet is visible.
- The Validation tab (the Validation Editor) is active.

To set project-level validation

- On the Validation Editor, select whether to permit or forbid force validation for the project. This setting can be overridden for specific entities at lower levels of the parent/child hierarchy.

6.2.2. Working with Document- Level or Class-Level Validation

6.2.2.1. Settings Available at the Document or Class Level

At the document or class level, you can:

- Override or accept the parent-level settings for force validation.
- Turn on the Standard Validation Engine. Validation will not be done on the document or class unless the Standard Validation Engine is on.
- Accept all validation settings derived from a parent or from the child class
- Establish general validation rules for the document.



At this level, you can establish validation rules using amount fields, date fields, and table fields. You cannot establish validation settings for any other type of fields.

6.2.2.2. Prerequisites for Document- Level or Class-Level Validation

Task Prerequisites

The prerequisites for this task are:

- A document is selected and visible in the viewer in the middle of the window. (Note: The document doesn't actually have to be visible for the

functionality to work, but having document in the viewer will make it easier to visualize this task.)

- The program is in Definition Mode.
- In the pane on the left side of the window, the Class tab is active.
- On the right side of the window, the Document/ClassValidation property sheet is visible.
- The Validation Editor is active.

You can also save your settings as a template by clicking the Save As Template button.

6.2.2.3. Managing Document-Level or Class-Level Validation

To set document-level or class-level validation:

- 1) On the left side of the screen, select a document or class.
- 2) On the Validation Editor, select Standard Validation Engine. If you do not select Standard Validation, no validation will be done on the document or class.
- 3) For Force Validation, select either Default, Permitted, or Forbidden.
 - If you select Default, the setting for Force Validation for document is inherited from the parent or project.
 - If you select Permitted, Force Validation is permitted for the document or class as a whole, regardless of whether or not you permitted it on the parent.
 - If you select Forbidden, Force Validation is prevented for the document or class, regardless of whether you permitted or forbade it on the parent.
- 4) Select a document-level template. You can also copy a template or create a template by saving your settings as a template. For more information about working with Validation templates, please see section [6.3](#).
- 5) If you selected Standard Validation Engine in Step 1, the General Validation Rules tab was enabled.

6.2.2.4. Establishing Validation Rules at the Document Level or Class Level



This functionality works only on Amount fields, Date fields, and Table fields.

On the Classes tab on the left side of the screen, select a Class.

On the Validation Editor, make sure the Standard Validation Engine is selected. When it is selected, the General secondary tab is enabled. This is the tab you will use to create validation rules at the Document/Class level. These rules enable you to compare one field to another, establish data criteria, and perform certain mathematical and logical functions.

The correct syntax for an expression is illustrated in [Figure 6-1](#)

To build an expression, select a field, click one of the Function buttons (Sum, Max, Min, Count, Avg, or Date), click an operator, and then

parameters. Click Add to move the expression to the list of Validation Rules.

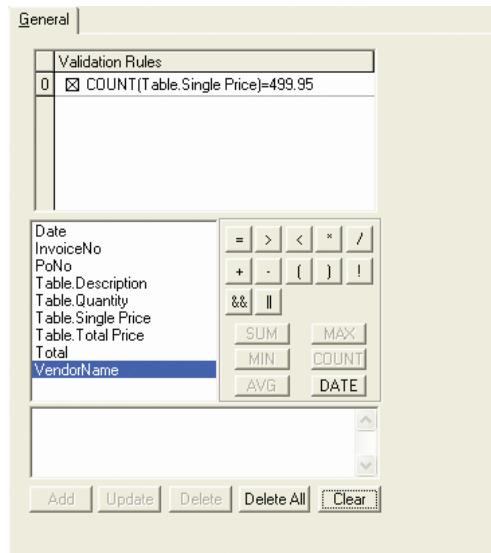


Figure 6-1: Establishing General Validation Rules

Button	Description
=	Equals
>	Greater than
<	Less than
*	Multiplication
/	Division
+	Plus
-	Minus
(Open grouping for expression
)	Close grouping for expression
!	Not equal (must always be followed by an equal sign)
&&	AND
	OR
SUM	Sums all table rules for a column
MAX	Sets the maximum value for a column
MIN	Sets the minimum value for a column
COUNT	Counts the number of rows in a column
AVG	Averages table rows
DATE	Date function

Table 6-11: Controls for validation rules

6.2.3. Working with Field-Level Validation for Text

Field-Level Validation allows you to accept the parent-level settings for forced validation, turn on the Standard Validation Engine, and set general validation rules for the selected field.

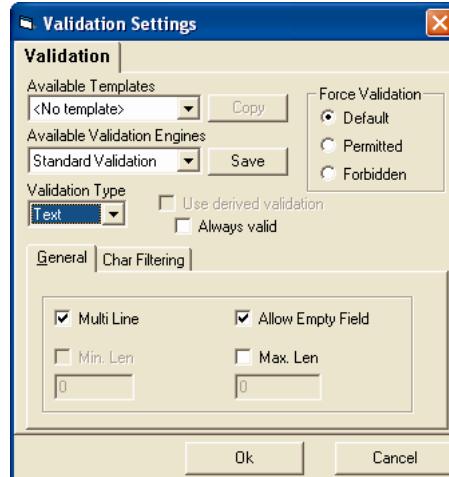


Figure 6-2: Text Field Properties dialog box

6.2.3.1. Settings Available at the Field Level for Text Validation

At the field level for text fields, you can:

- Override or accept the document-level settings for forced validation
- Turn on the Standard Validation Engine. Validation will not be done on the selected field unless the Standard Validation Engine is on.
- Establish general validation settings and character filtering for the selected field.

At the field level for table fields, you can:

- Accept the parent-level settings for forced validation
- Turn on the Standard Validation Engine. Validation will not be done on the selected field unless the Standard Validation Engine is on.
- Set general validation rules for the selected field.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- In the pane on the left side of the window, the Fields tab is active.
- On the right side of the window, the Analysis/Evaluation/Field/Validation editors are visible.
- The Validation tab is active.

Setting Validation for Text Fields

To set field-level validation on text fields:

- 1) On the left side of the screen, make sure the Field tab is active.
- 2) Select a text box.

- 3) On the Validation Editor, select either the General tab or the Character Filtering tab.

6.2.3.2. Setting Validation for Table Fields

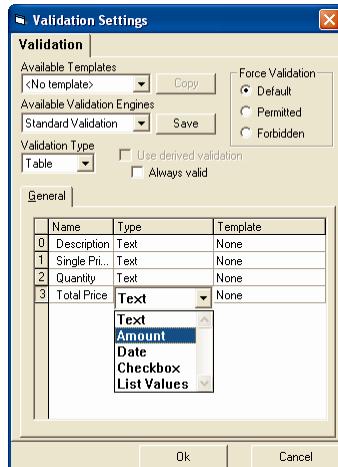


Figure 6-3: Table Field Properties

To set field-level validation on table fields:

- 1) On the Fields tab on the left side of the screen, right-click on a field.
- 2) Click Table to change the field from a text field to a table field.
- 3) On the Validation Editor, establish the validation rules for the field.
 - Make sure that the Validation Type is set to Table.
 - For Force Validation, select either Default, Permitted, or Forbidden.
 - Decide whether to check Use Derived Validation (available only for trained classes.)
 - Decide whether to check Always Valid. This forces Oracle Forms Recognition to interpret all columns in the table as valid, regardless of their contents or any inherited settings. It also prevents you from establishing specific settings for each row.
 - On the General Tab, notice that the columns of your table are available. Select a validation type for each row, and if available, select a template.

6.3 Working with Validation Templates

Templates can be used for analysis and evaluation. Validation templates are based on a similar concept.



As with analysis and evaluation templates, you can and should reuse validation templates within a project or globally across projects.

Before you can use validation templates, they must be available in your project. If none is available, you'll need to either import them or create them.

6.3.1. Creating Templates

You create templates for specific kinds of validation at the field level and then apply them at various parent or child levels throughout the project.

You can apply templates at the field level, the document/class level, or the project level.

Task Prerequisites

The prerequisites for creating templates are:

- A document is selected and visible in the Viewer. (The document doesn't have to be visible for the functionality to work, but being able to see the document will help you visualize how the validation templates should be created.)
- The program is in Definition Mode.
- On the left side of the screen, the Fields tab is active.
- On the right side of the screen, the Validation Editor is active.

Creating Validation Templates for Fields

To create validation templates for fields:

- On the Field tab on the left side of the screen, select a field.
- On the Validation tab, establish validation settings for the field.
- Click the Save button.
- Give the template a descriptive name and click OK.

Creating Validation Templates for Classes



Template names are case-sensitive.

To create validation templates for fields:

- On the Class tab on the left side of the screen, select a class.
- On the Validation tab, establish validation settings for the class.
- Click the Save button.
- Give the template a descriptive name and click OK.

6.3.2. Working with Validation Templates at the Field Level

You can apply a field validation template created in another document in your project to any field in any document within the same project.

To do this, first select a document and then select a field on the document. Make sure you have the Validation Type set correctly for the field; the templates available depend on the Validation Type. That is, Amount templates are not available for Text fields, for example.

Select a Validation Type for that field and click Copy. This turns the template into validation settings for the specific field you are working on.

Any changes you make to the validation settings at this point will apply only to the field at hand, and not to the template. However, you can save the settings into a new template or overwrite the existing template.

Your template is now saved in the project file and can be used for validation of similar classes throughout the project, but only at the field level.

6.3.3. Working with Validation Fields at the Class Level

The templates you create at the class level are stored as custom templates.

6.3.4. Working with Validation Templates at the Project Level

To manage Validation templates at the project level, either:

- Right-click on the project and select Show Validation Templates from the shortcut menu, or,
- On the Edit menu, select Project, and then select Show Validation Templates.

On the Validation Templates property sheet on the right side of the window, you can:

- Import templates from other projects
- Export templates for use in other projects
- Delete templates
- Rename templates.

Assigning Templates

To assign a template, first select a validation type. Next, select the template you want to assign for that field type. Any changes you make apply only to the project and not to the template itself. You must use Template Manager to actually change a template itself.

Importing Templates

To import a template, select a validation type and click the Import button. Browse to a template and click OK. Clear the checkboxes for the templates you don't want to import and click OK.



Any changes you make to an imported template apply only to the project.

Exporting Templates

To export a template, click Export. Clear the checkboxes for the templates you don't want to export and click OK. Browse to the root folder of the target project and click Save. All the selected templates are exported in bulk and saved as an *.exp file.

Deleting Templates

To delete a template, select a Validation Type and a template to delete. Click Delete.



You cannot delete a template that is in use.

Renaming Templates

To rename a template, select a Validation Type and a template to rename. Click Rename.

You cannot rename a template that is in use.

6.4 Introduction to Validation Scripts

You may need to customize Validation beyond what you can do with the Standard Validation Engine. Oracle Forms Recognition Designer includes two scripting languages, Sax Basic and WinWrap Basic that can be used for validation, analysis, and Evaluation tasks. To use Sax Basic and WinWrap Basic effectively, you must have a programming background. Experience in VB Script or VBA is helpful. Sax Basic and WinWrap are VBA-compatible.

This section serves only as a brief introduction to script validation and its availability. For a complete discussion of this topic, including code samples, please see the ***Oracle Forms Recognition Scripting Documentation***.



Script validation overrides standard, GUI-based validation.

To open the script editor, switch to Definition Mode. Click the button for script editing in the toolbar or use the menu Edit/Show DocClass/Edit Script.



Script validation can be accomplished for projects, documents, fields, table cells, table rows, and entire tables.

Scripting can be used to write warnings and informational messages to the Runtime Server log files.

Oracle Forms Recognition supports two scripting engines: Sax Basic and WinWrap Basic. The two engines are generally compatible. WinWrap Basic is better optimized, quicker and more robust. It supports Unicode strings in both internal and external functions.

Only one script engine can be active in a project at a time. WinWrap Basic is the default scripting engine for new projects and Sax Basic for existing ones. To change the active script engine, select Settings then the Definition Mode tab and choose the required scripting engine.

The system immediately prompts you to restart the Designer application as the project file and all project scripts must be reloaded when switching from one version of the scripting engine to another.

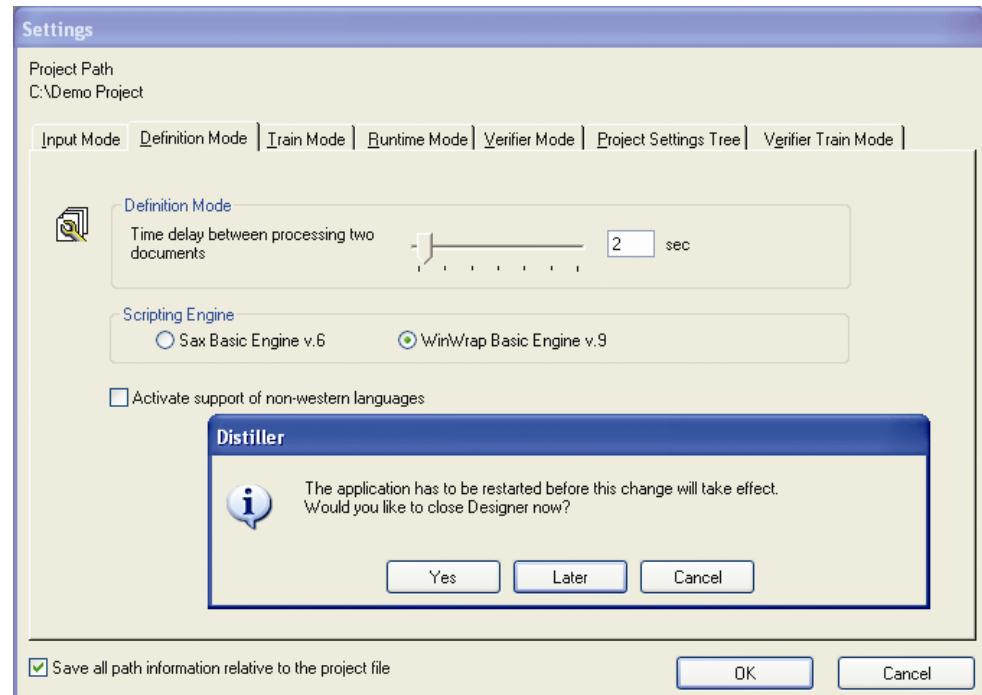


Figure 6-4: Activation of WinWrap Basic Engine



SAX Basic engine cannot support Unicode strings and you will be warned that they may be lost when you switch from WinWrap Basic.

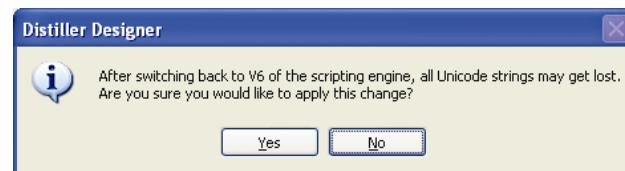


Figure 6-5: WinWrap - Lost Unicode strings – warning

Chapter 7 Setting Up the Data Extraction

Setting up the data extraction involves:

- Creating data fields
- Defining analysis methods to obtain candidates
- Defining evaluation methods to select the correct candidate
- Setting parameters for these methods
- Testing
- Optimizing

A candidate can only be assigned to a field if its weight exceeds a certain predefined threshold. You can influence the threshold values and the evaluation algorithms, but in most cases, the default settings should be fine.

For now, the following background knowledge is sufficient:

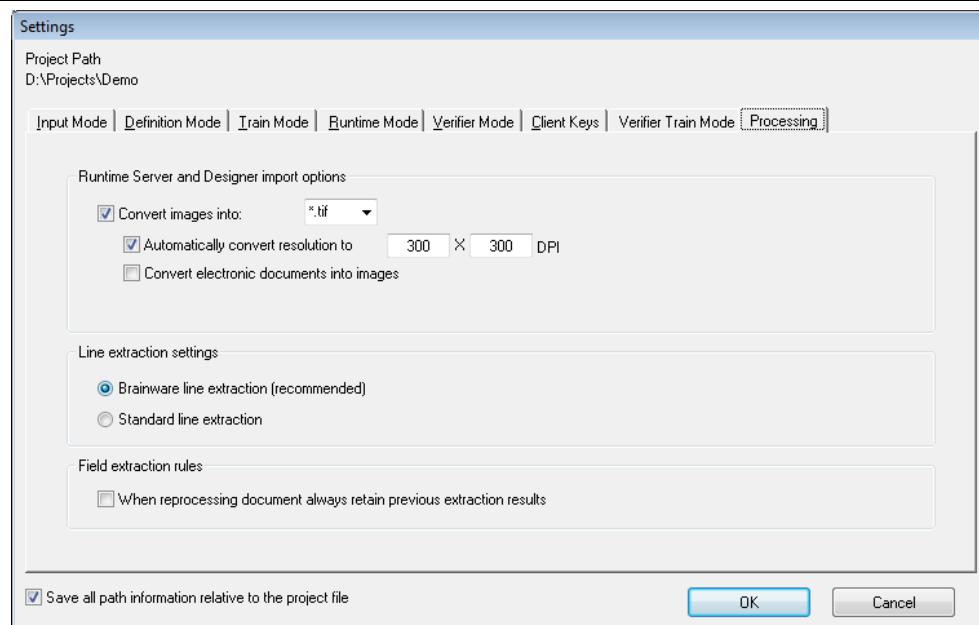
- The weight indicates the degree of similarity between the properties of a candidate and the properties of user-selected candidates.
- Data can be extracted if the weight of the best candidate with respect to a given field exceeds a predefined threshold. By default, this threshold is 50 percent.
- In general, there is only one successful candidate per field and document. If several candidates have a high weight with respect to a field and document, it must be possible to distinguish reliably. Therefore, a certain difference in weight between the winning candidate and the second-best competitor is required as well. By default, this so-called distance is 10 percent.

For more information about candidate evaluation, please see Section [11.4](#).

7.1 Brainware Line Extraction Method

7.1.1. Description

The method can be switched on in the Oracle Forms Recognition Designer application's setting dialog, "Processing" tab by selecting the "Brainware line extraction" radio button in "Line extraction settings" group box:



When selected the option affects all Oracle Forms Recognition applications that invoke OCR processing or relaunch internal post-processing via the script statement:

`pWorkdoc.RebuildBasicObjects`

Same as the “Standard line extraction” method, the Brainware line extraction is invoked automatically right after applying OCR recognition and detection of word objects. If the Brainware line extraction method is activated, the standard method is not going to be applied at all as the Brainware method completely replaces it and delivers the results in the same way as the standard method of extracting the results as a collection of SCBCdrTextBlock objects accessible via WorkDoc’s interface from within the Oracle Forms Recognition custom script as:

`pWorkdoc.Textline 1LineIndex`

The Brainware method is activated by default for all newly created Oracle Forms Recognition projects.

7.1.2. Usage

The Brainware method takes an advantage of the powerful Brainware Table Extraction engine and provides significantly better quality of lines recognition as compared with the standard lines extraction method. It is generally recommended to use the Brainware method instead of the standard method. Moreover, in some cases, this may appear to be a mandatory setting (i.e., if for some project’s document samples the defined Format Analysis extraction delivers incorrect results due to low-quality lines extraction). Note that the Format Analysis engine uses internal line objects for formats recognition.

7.2 Setting up the Fields

7.2.1. Creating Fields

Fields are structures that hold the data extracted from the documents. They are set up on the class level. Fields and their properties are inherited along branches in the classification tree; that is, all classes derived from a parent will use the parent's field definitions.

At the child level, you can override field properties or add more fields, but you cannot delete inherited fields. Take this into account when defining your fields.

There are two types of fields:

- Text fields: They can be used with Format Analysis, Zone Analysis, and Address Analysis.
- Table fields: They can only be used with Table Analysis.

For each class, you can define one table field at most.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- The class you want to create fields for already exists.

Creating Fields for a Class

To create fields for a class:

- 1) In the Classes tab, double-click the class you want to create a field for. The Fields tab is displayed in the foreground. If you create your first field, the tab is empty. Otherwise, previously defined fields will be displayed.
- 2) Right-click within the tab's background.
- 3) From the shortcut menu, select Insert Field Definition. The Add Field dialog box is displayed.
- 4) Enter a field name. Valid names consist of alphanumeric characters without spaces or special characters. Later you can define a different display name in the Field properties (Please see also Section [7.2.1.1](#)).
- 5) Click OK to confirm. New fields are inserted below existing ones in the order in which they were created.
- 6) To create additional fields, repeat Step 2 to Step 5.

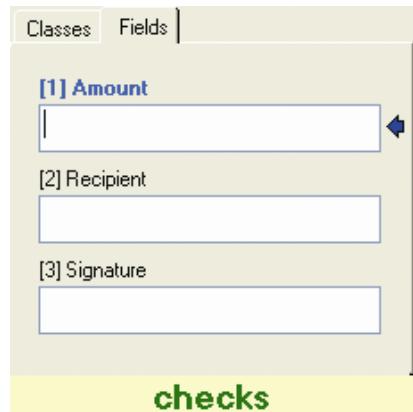


Figure 7-1: Fields created for the Checks class

Table Fields

By default, the created fields are text fields.

To add a table to a form:

- 1) In the Fields tab on the left side of the window, right-click to bring up the shortcut menu.
- 2) Select insert field. When a dialog box appears to name the field, enter a field name that signifies a table. A new field appears in the Fields tab.
- 3) Right-click the new field and select Table from the shortcut menu. The field now turns into a button with the table icon in the center.

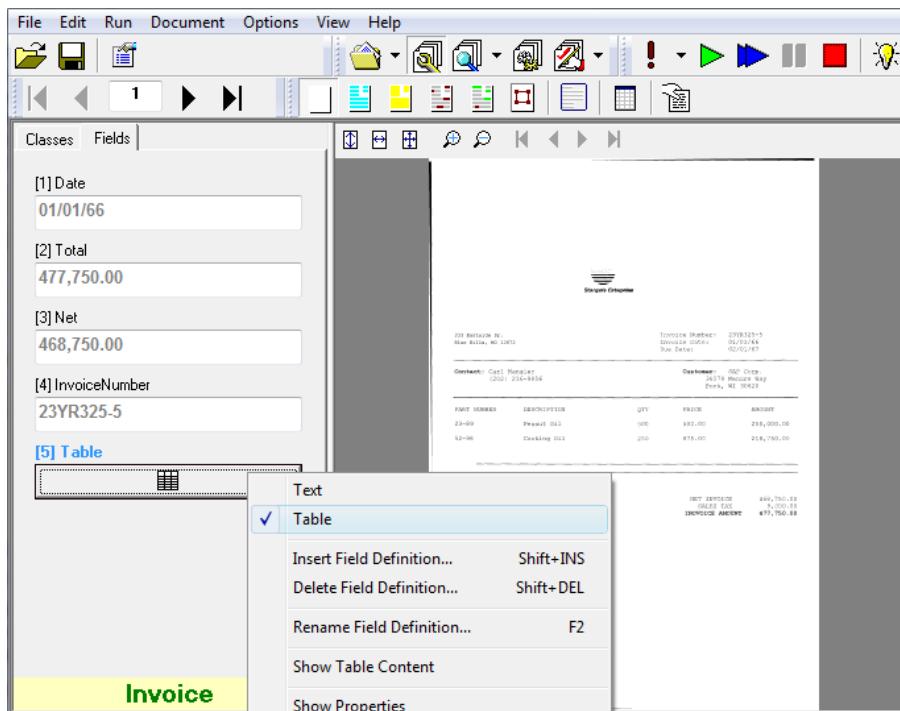


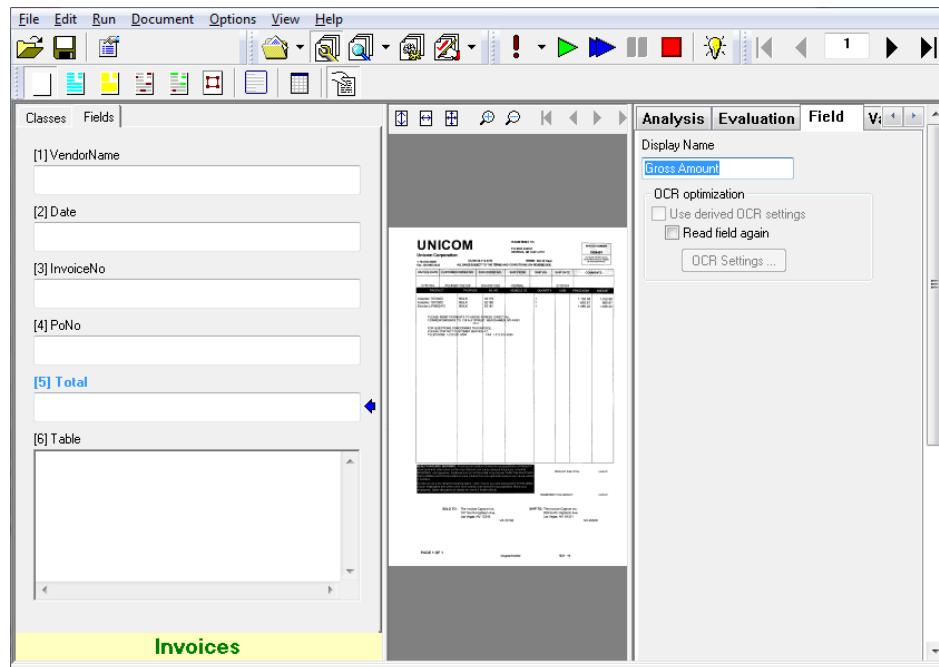
Figure 7-2: Selecting a Table Field.

- 4) Click the Table button.
- 5) In Analysis Engines, select the Table Analysis Engine.

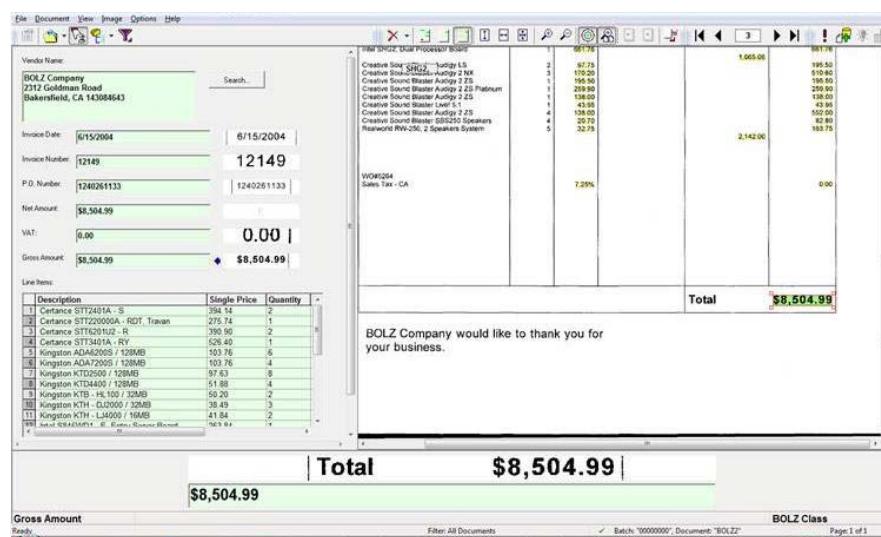
6) Please see Section **7.8** for information about defining table settings.

7.2.1.1. Custom Field Names

The custom field names can be defined for each individual field definition of any desired Oracle Forms Recognition document classes in Designer application using “Display Name” edit box available on “Field” property page of selected field definition’s settings:



The defined “Display Names” primarily affect verification mode of Oracle Forms Recognition Verifier application, showing the configured custom name (for the currently selected field element) in the left bottom area of the status bar instead of the original system name (on the screenshot below the Verifier application shows configured “Gross Amount” name instead of the default system “Total” – see also the screenshot above, field “[5] Total”):



Additionally, this feature affects some minor features of Oracle Forms Recognition, for example, the forms' printing function. For an instance, in the case of the document sample above, the Form Print function would generate the following printing output:

In other words, use the configured "display names" instead of the system names (compare the bold names on this screenshot with the system names configured in).

Note that "Display Names" settings defined for a parent class are supposed to be inherited for all its sub-classes.

File name: d:\projects\demo\ batches\00000000\ BOLZ2.wdc Document class name: BOLZ Company 1234561			
DOCUMENT FIELDS:			
Vendor Name:	BOLZ Company		
	2312 Goldman Road		
	Bakersfield, CA 143084643		
Invoice Date:	6/15/2004		
Invoice Number:	12149		
P.O. Number:	1240261133		
Net Amount:	\$8,504.99		
VAT:	0.00		
Line Items:			
		SP	Qty
1	Certance STT2401A - S	394.14	2
2	Certance STT220000A - RDT, Travant	275.74	1
3	Certance STT6201U2 - R	390.90	2
4	Certance STT3401A - RY	526.40	1
5	Kingston ADA6200S / 128MB	103.76	6
6	Kingston ADA7200S / 128MB	103.76	4
7	Kingston KTD2500 / 128MB	97.63	8
8	Kingston KTD4400 / 128MB	51.88	4
9	Kingston KTB - HL100 / 32MB	50.20	2
10	Kingston KTB - DJ2000 / 32MB	38.49	3
11	Kingston KTH - LJ4000 / 16MB	41.84	2
12	Intel S845WD1 - E, Entry Server Board	263.84	1
13	Intel S875WP1 - E, Entry Server Board	309.49	1
14	Intel SE7500CW2, Dual Processor	429.97	1
15	Intel SHG2, Dual Processor Board	661.76	1
16	Creative Sound Blaster Audigy LS	97.75	2
17	Creative Sound Blaster Audigy 2 NX	170.20	3
18	Creative Sound Blaster Audigy 2 ZS	195.50	1
19	Creative Sound Blaster Audigy 2 ZS Platinum	259.90	1
20	Creative Sound Blaster Audigy 2 ZS	138.00	1
21	Creative Sound Blaster Live! 5.1	43.95	1
22	Creative Sound Blaster Audigy 2 ZS	138.00	4
23	Creative Sound Blaster SBS250 Speakers	20.70	4
24	Realworld RW - 250.2 Speakers System	32.75	5
			TP

7.2.2. Editing Fields

Oracle Forms Recognition Designer provides commands for editing fields. Be careful when using them since you might lose some of the settings you have already made.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- There must be fields to edit.

Selecting a Field to Edit

To select the field you want to edit:

- Click the Option button associated with the field. The Option button appears filled.

For the selected field, the following operations are supported:



- The Delete Field Definition command from the shortcut menu deletes the field including all associated settings. In this case, you lose all trained knowledge for the data extraction. Repeat the training.
- The Rename Field Definition command from the shortcut menu renames the field. In this case, you lose an existing extraction Learn Set for the field and all trained knowledge for the project. If required, create a new Learn Set for the field and repeat the training.
- The Text and Table commands from the shortcut menu allow you to change the field type.
- To check for analyzed table content, press Shift and click the mouse button on the table icon in the field.



7.3 Selecting the Analysis Method

Once you have created fields and assigned a language, specify the analysis method for each of them.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.
- The Analysis tab is displayed in the foreground.

Selecting an Analysis Method

To select the analysis method for all fields of a class:

- 1) In the Fields tab on the left side of the window, select a field.
- 2) In the Analysis tab on the right side of the window, select the method that you want to use from the Available Analysis Engines list box.

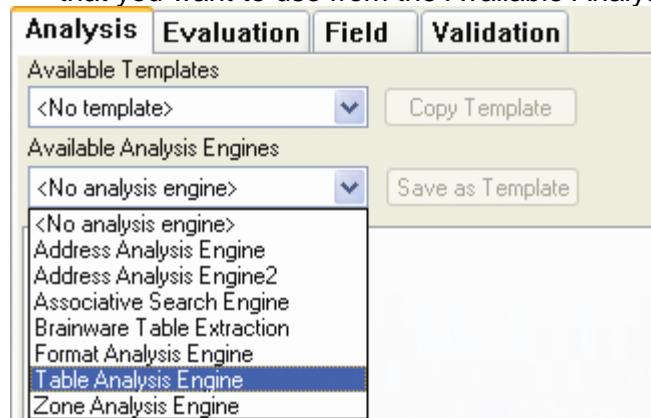


Figure 7-3: Analysis tab with analysis methods per field

- 3) Repeat Step 1 and Step 2 until all fields have analysis methods assigned.

7.4 Setting Up Brainware Table Extraction

7.4.1. About BrainwareTable Extraction

The learning process for the BrainwareTable Extraction (BTE) engine consists of two phases:

- Learning lines
- Learning mappings of columns



Note: that in order to use Brainware Table Extraction all documents must have been scanned to a resolution of 300 dpi.



Note: The Brainware Table Extraction (BTE) and Brainware Extraction (BFE) engines' external learnsets are now stored in a secure encrypted form (this effects "bte.ptb" / "bte.xtr" and "bfe.ptb" / "bfe.xtr" learnset files stored per class's learnset directory, in case an external BTE / BFE learnset is available for a class).

7.4.1.1. Learning Lines

The engine considers the following main types of the lines:

- **Primary line:** A line that defines table structure. The BTE engine applies advanced and precise similarity analysis for all primary lines. All primary lines must be well-structured and similar to each other in many of the rows to be extracted. However, the engine easily supports an unlimited number of different types of primary lines for one table definition. The primary line must be the first line in the table row and must contain at least four words.
- **Secondary line:** A line between primary lines. The engine applies smooth similarity analysis for these types of lines, which is possible because BTE searches only between two neighboring primary lines. This allows BTE to extract data that varies widely, which often happens with multi-line descriptions. There is no limitation on the number of words in secondary lines, and no limitation on the number of secondary lines. However, a document's page must have at least one primary line; otherwise, secondary lines on this page will not be extracted.
- **Wrong line:** A primary line that is learned as a negative line sample. In other words, all lines classified by the engine as a member of one particular "wrong" line class will not be extracted. In principle, it is possible to learn an unlimited number of the wrong lines, though this will take effect only during in-document learning. Cross-document learning (that is, learning the whole document after all the fields are completely valid) may not automatically train the wrong lines.

After learning any type of line, the BTE engine automatically creates and manages a new line class (cluster). Afterwards, all lines in the document considered by the engine as members of the line class (as similar to the learned line sample) will be extracted, or not extracted in the case of "wrong" lines.

It is possible to learn an unlimited number of different line classes. However, the overall quality of the extraction may suffer if too many lines are learned.

Learning lines can be applied in lines learning (or lines highlighting) mode. Likewise, mapping of the column data in the lines can be done in column mapping learning (or columns highlighting) mode. The user can switch between learning (highlighting) modes via the Switch Table Highlighting (CTRL + Q) menu option in Verifier or via pop-up menu options Show Lines and Show Columns of the document viewer in Verifier or Designer.

The minimal primary lines threshold can be adjusted, if for example the correct primary line is not being extracted, by changing the Minimal Threshold on the Advanced property page of the BTE engine's setting. The default value is 40%.

7.4.1.2. Learning Mappings of Columns

When learning column mapping, the user trains the engine on how the data from the extracted lines must be mapped to the user's table data. For primary lines, this mapping can be defined differently for different line classes. For example, if a user learned two different line samples that went to two different lines classes internally in one document, the user can then map "Unit Price" in the document to the "Unit Price" data column and the "Total Price" to the "Total Price" for the first line sample. For all lines of the second line type, the user can map "Unit Price" to "Total Price" and "Total Price" to "Unit Price" and the engine will perfectly solve this task. Next time the BTE engine will always use mapping rules #1 for the lines classified to the first line type and mapping rules #2 for the lines classified as the second line type.

If you have several BTE tables in one Oracle Forms Recognition class, the Learn Set is shared between these tables. In other words, if you used interactive learning for one BTE table, the cross-document learning (which happens if the system added the document to the Learn Set after document validation) will be applied for all BTE tables in the document.

7.4.1.3. Pre-train Brainware Table Extraction

To extract a table before training:

- 1) Switch to Definition Mode
- 2) Under Options select Pre-train Brainware Table Extraction.

7.4.1.4. Configuring Brainware Table Extraction

To configure Brainware Table Extraction:

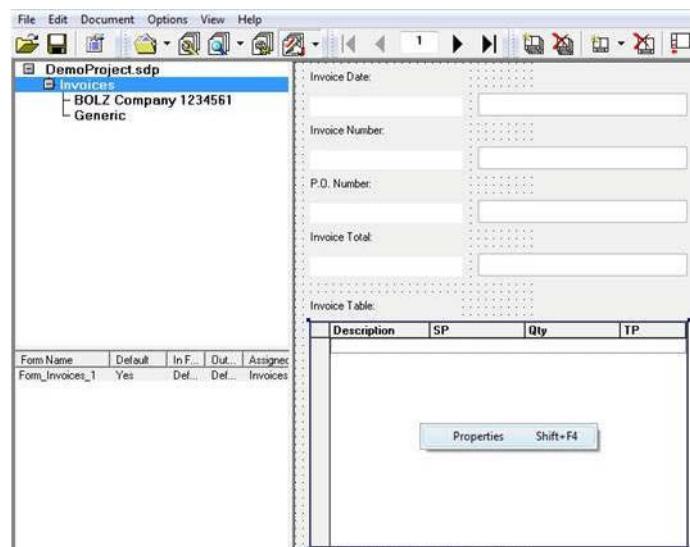
- 1) Switch to Definition Mode
- 2) On the Class tab on the left side of the screen, select a parent class.
- 3) On the Classification tab on the right side of the screen, select Brainware Classify Engine for Method. This setting will be inherited by all child classes of this class.
- 4) On the left side of the screen, click the Fields tab.

- 5) Insert a new field. (Right-click anywhere on the tab, select Add Field Definition and give the new field a name. Right-click on the field and change it from a Text field to a Table field.)
- 6) On Analysis tab on the right side of the screen, select Brainware Table Extraction for the analysis engine.
- 7) On the secondary tab, Columns, begin inserting the columns to include in the extracted table. To do this, click the button shown at right. Type a name for the column. Select Column Required if the column cannot contain Null values. Select Multiline Cells if the engine should not convert multiline text to a single line. Clear the selection for Column Visible if you want to hide the column.
- 8) Click the button again to add more columns. Use the button with the red X to delete columns and the twisted arrow buttons to move columns up or down.
- 9) Switch to the secondary tab, Fields and Formats. Next to Column Name, select a column (You can use the arrow buttons to scroll through the lists of columns you created.)
- 10) Add column labels in the Label property box.
- 11) Under Column Formats, insert your formats (Please see Section [7.5](#) and [Chapter 10](#) to learn how to write expressions) and select a Format Comparison from the second column.)
- 12) On the Evaluation tab, select Brainware Extraction as your evaluation engine. If necessary, establish your settings for Validation Conditions (Threshold and Distance) and for microlayout on the secondary tabs.

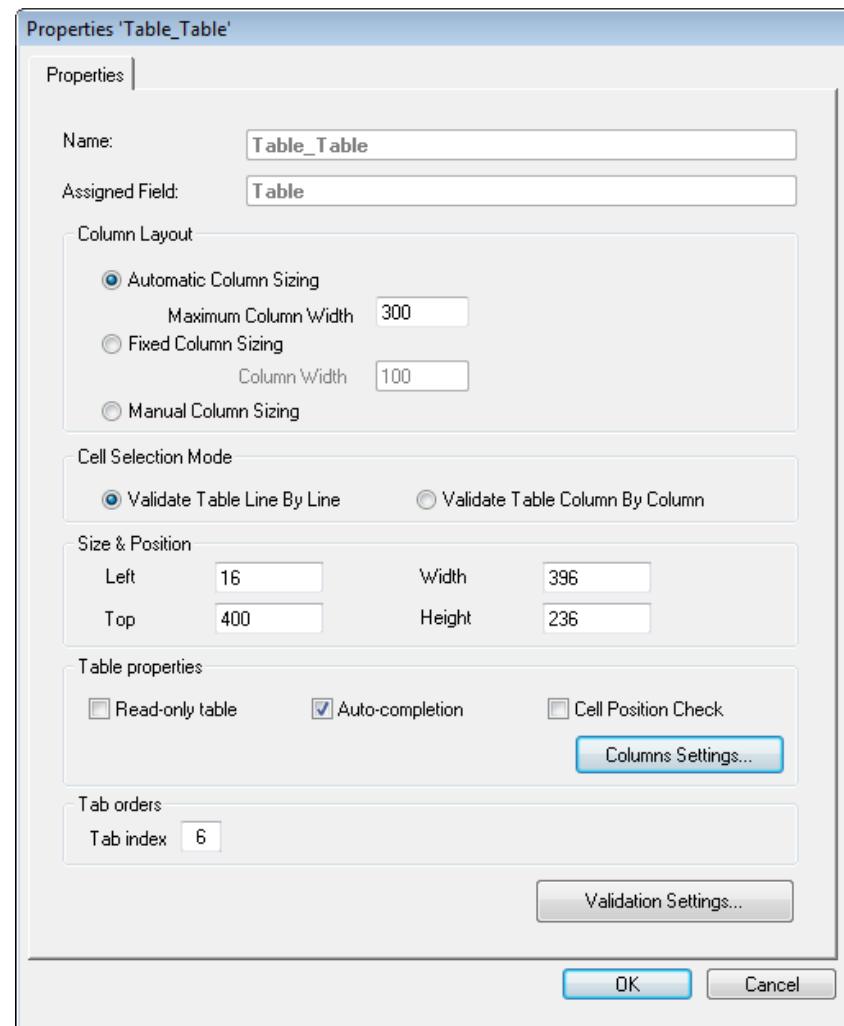
7.4.1.5. Custom Column Names

Oracle Forms Recognition Designer application provides GUI settings to setup custom column names for verification table objects.

To set the desired table column display names, open your project in Oracle Forms Recognition Designer application, select required class in Definition mode, switch to the Design mode and select the desired table object with left mouse button click. Now show the table object's pop-up menu via right mouse click and select the "Properties" menu item:



The Forms Designer should display the table object's properties. Click on "Column Settings..." button:



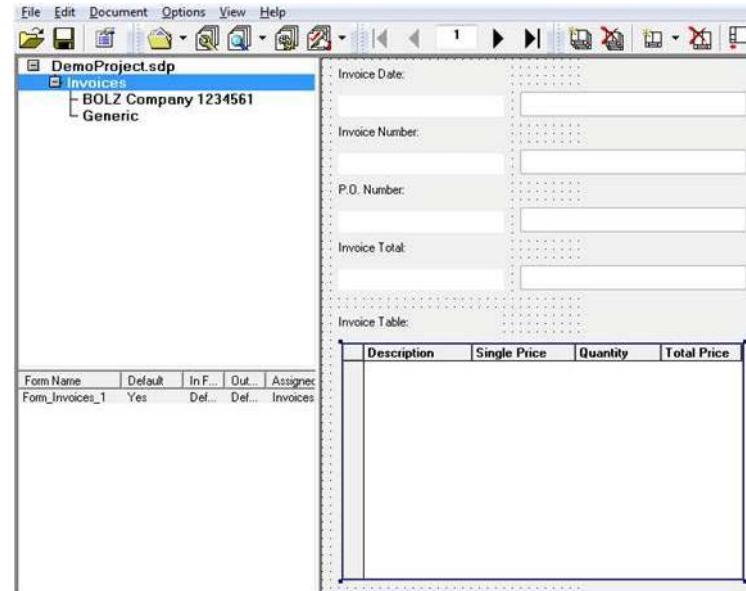
Modify the desired column names by selecting the column row, clicking with left mouse button in the "Display Name" area of the row, and then typing the required text:



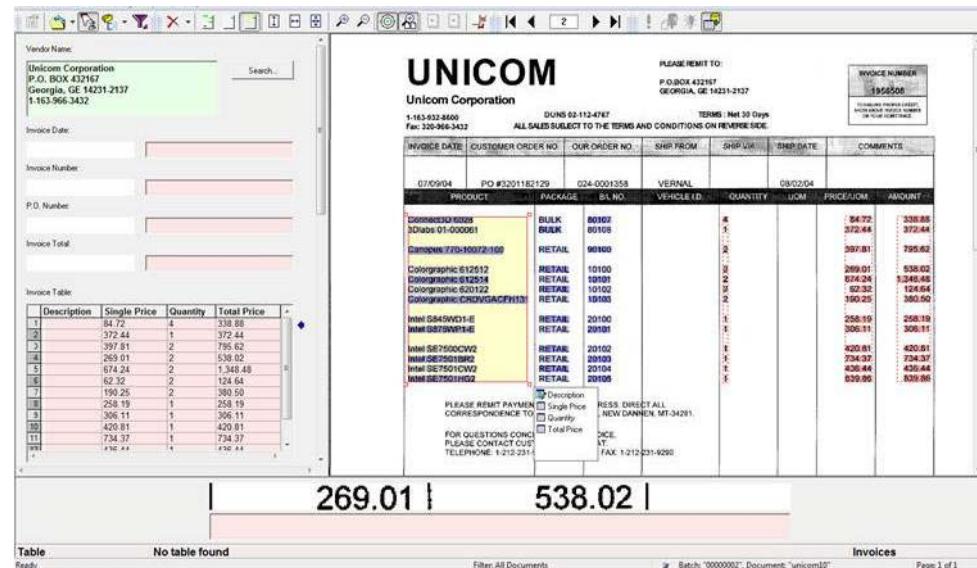
Click on "OK" button when you finished configuring.

Note the display column name will remain the same as the standard “system” name in case you leave the “Display Name” field empty.

When the new “Display Name” fields have been configured, the Forms Designer of Oracle Forms Recognition Designer will update the controls’ names immediately:



The configured display column names affect the Oracle Forms Recognition Verifier application and Verifier Test / Verifier Train modes of Oracle Forms Recognition Designer application, when representing the table’s column header:



It also shows “display” names when using column mapping control in context of Brainware Table Extraction interactive learning:



And provides with “display” names when using normal column mapping and swapping operations:

PR#	PO #	B/L NO.	VERNAL	QUANTITY	UOM	PRICE/UOM	AMOUNT
Connect3D 603Dlabs 01-00	PO #3201182129	024-0001358	VERNAL	4		84.72	338.88
Canopus 770				1		372.44	372.44
Colorgraphic				30		397.81	795.62
Colorgraphic				2		269.01	538.02
Colorgraphic 620122		10101		2		574.24	1,348.48
Colorgraphic CRDVGACFH131		10102		2		62.32	124.64
Intel S845WD1-E		10103		2		190.25	380.50
Intel S875WP1-E							
Intel SE7500CW2		20100				258.19	258.19
Intel SE7501BR2		20101				306.11	306.11
Intel SE7501CW2		20102				420.81	420.81
Intel SE7501HG2		20103				734.37	734.37
		20104				436.44	436.44
		20105				839.86	839.86

Usage

The table column names configured in settings of Brainware Table Extraction and Table Analysis engine have internal meaning (as a property of the engines’ interfaces) and cannot be easily adjusted or modified dynamically from within the Oracle Forms Recognition custom script. The GUI settings in Designer allow assigning of user-readable column names for the corresponding system column names to be shown to a Verifier user.

Particularly, this feature can be used for dynamic translation of verification forms into different languages, when it is desired to be supplied with a multilingual Verifier installation in context of a single shared project file.

7.5 Setting up Format Analysis

Format analysis is suitable for extracting data that is located at arbitrary positions on the documents. It is the primary analysis method and can be used with unstructured documents and with structured documents such as forms.

Format analysis is a search within the document text for strings that match certain pre-defined patterns. Configuring this method requires that you

define the patterns, i.e. the format strings. The following methods to find strings are supported:

- **String Compare:** String Compare is a very simple search method that finds each literal occurrence of the specified format string.
- **Levenshtein:** Levenshtein search is an error-tolerant search method that finds each literal occurrence of the specified format string, but also strings that can be derived from the specified one by inserting, interchanging or deleting single characters. The number of key operations required to derive the erroneous string determines whether there is still a match.



Example:

0 errors	1 error	2 errors
invoice	invoike	invoke
	involce	involve

Table 7-1: Example for Levenshtein error-tolerant search

Use this method to account for typical typographical errors like character interchange.

- **Trigram:** Trigram search is another error-tolerant search method. To compare two words they are fragmented into groups of three characters called trigrams. The number of identical groups determines whether there is still a match.



Example:

	1st trigram	2nd trigram	3rd trigram
brain	bra	rai	ain
train	tra	rai	ain

Table 7-2: example for Trigram error-tolerant search

Use this method to account for OCR errors in your document.

- **Simple Expression:** Simple expressions can be used to specify simple format patterns. This is the default method. In simple expressions, some characters have a special meaning (see **Table 7-3: Special characters in simple expressions**). All other characters have no special meaning and represent themselves.

Character	Description
#	Represents any number. Example: ### matches 123.
@	Represents any upper-case or lower-case letter. Examples: @ @@ @ matches Love. @# matches U2.
?	Represents any alphanumeric character. Example: ?rain matches brain and train.
''	Indicates a word start or end. Example: 'ABC' matches ABC, but not ABCD
[]	Indicates a number or a range of repetitions of the previous character. Examples: #[3] matches any three numbers like 123. a[1,2] matches a and aa. me[1,2]t matches met and meet.

Table 7-3: Special characters in simple expressions

- **Regular expressions:** Regular expressions can be used to precisely specify complex format patterns. Oracle Forms Recognition Designer supports a subset of regular expressions described in [Chapter 10](#).

The string you are looking for may consist of only one word only or several words. Whether the string is finally found in the document also depends on rules as to how it is constructed from words. Default rules are set for this and should work in most cases. If your format string looks fine, but you don't find candidates anyway, you may have to adjust them. (Please see Section [7.5.2](#))

7.5.1. Defining the Format Strings

For each field, a set of format strings can be defined. Before you begin, consider the following:

- You should review your documents and, for each field, create a list of the strings that are to be extracted. This way, it is easier to identify the patterns to search for.
- Do not try to find precisely one candidate; try to generate a set. Learning works better if there are both correct and false examples.
- Try to anticipate other likely formats. If the correct candidate has no chance to be identified, the need for manual correction will increase.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected for which format analysis has been defined.
- The viewer displays a document from the class.

- On the right side of the window, the tabs with class/field properties are visible.
- The Analysis tab is displayed in the foreground.

Defining Format Strings

To define format strings:

- 1) On the Analysis tab, select the Format Analysis tab at the bottom.
- 2) Initially, most of the controls in this tab are disabled. You need to specify the format string before you can adjust the search method.
- 3) In the Format Strings table, the last row is always empty. Click on the row number and type a search string. Press ENTER. This adds a new row. The string remains selected. You can now make further adjustments.

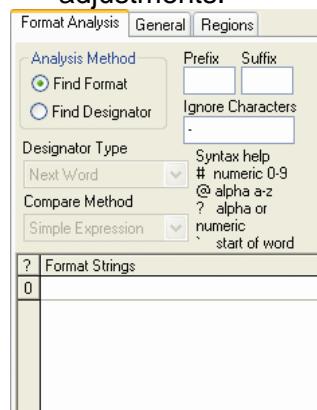


Figure 7-4: Initial state of the Format Analysis tab

- 4) If required, select a different search method from the Compare Method list box. By default, Simple Expression is set.
- 5) If required, select the Find Designator option. In this case, the format analysis will look for your search string, but the candidate will be a different string that has a well-defined geometrical relationship to the search string.

For example, you can search for the string "Phone" to extract the subsequent information, which typically is a phone number.

In the Designator Type list box, you can select from among the following options:



Type	Sample Format Strings	Sample Candidates
Word below	Customer	<p>Customer ID: U-2345-234 email: budhunter@yahoo.com Fax 868-327-1279</p> <p>DeWitt University London UK</p> <p>Billing: Hungry Owl All-Night Grocers Address: 8 Johnstown Road Cork Co. Cork Ireland</p>

Word Above	UK	<p>Customer ID: U-2345-234 email: budhunter@yahoo.com Fax 868-327-1279</p> <p>DeWitt University London UK</p> <p>Billing: Hungry Owl All-Night Grocers Address: 8 Johnstown Road Cork Co. Cork Ireland</p>
This Block	Billing	<p>Customer ID: U-2345-234 email: budhunter@yahoo.com Fax 868-327-1279</p> <p>DeWitt University London UK</p> <p>Billing: Hungry Owl All-Night Grocers Address: 8 Johnstown Road Cork Co. Cork Ireland</p>
Previous Word	University	<p>Customer ID: U-2345-234 email: budhunter@yahoo.com Fax 868-327-1279</p> <p>DeWitt University London UK</p> <p>Billing: Hungry Owl All-Night Grocers Address: 8 Johnstown Road Cork Co. Cork Ireland</p>
Next Word	email	<p>Customer ID: U-2345-234 email: budhunter@yahoo.com Fax 868-327-1279</p> <p>DeWitt University London UK</p> <p>Billing: Hungry Owl All-Night Grocers Address: 8 Johnstown Road Cork Co. Cork Ireland</p>
End of Line	Fax	<p>Customer ID: U-2345-234 email: budhunter@yahoo.com Fax 868-327-1279</p> <p>DeWitt University London UK</p> <p>Billing: Hungry Owl All-Night Grocers Address: 8 Johnstown Road Cork Co. Cork Ireland</p>
Next Line	Format	<p>Format Strings</p> <p>On the Analysis tab, select the Format Analysis tab at the bottom. Initially, most of the controls in this tab are disabled.</p> <p>You need to specify the format string before you can adjust the search method. In the Format Strings table, the last row is always empty. Click on the row number and type a search string. Press ENTER. This adds a new row. The string remains selected. You can now make further adjustments.</p>
Next Paragraph	Format	<p>Format Strings</p> <p>On the Analysis tab, select the Format Analysis tab at the bottom. Initially, most of the controls in this tab are disabled.</p> <p>You need to specify the format string before you can adjust the search method. In the Format Strings table, the last row is always empty. Click on the row number and type a search string. Press ENTER. This adds a new row. The string remains selected. You can now make further adjustments.</p>
Next Block	Format	<p>Format Strings</p> <p>On the Analysis tab, select the Format Analysis tab at the bottom. Initially, most of the controls in this tab are disabled.</p> <p>You need to specify the format string before you can adjust the search method. In the Format Strings table, the last row is always empty. Click on the row number and type a search string. Press ENTER. This adds a new row. The string remains selected. You can now make further adjustments.</p>

Table 7-4: Examples for Designator Type



- 6) Under Prefix and Suffix, you can enter characters or syllables that are part of a word, but will be ignored when found at the beginning or the end of the word.



For example, you can look for 22,99, and \$22,99 will match.

- 7) Under Ignore Characters, you can enter characters that are part of a word, but will be ignored when found anywhere within the word.

For example, you can look for 213-4789, and 2134789 will match.

- 8) To define additional strings for the current field, repeat Step 3 to Step 7. Note that you can combine search methods freely. However, a word can only be member of one candidate. The format strings will be evaluated in the same order as listed in the Format Strings table. To change the order, click a row number and drag the corresponding string to its new position. To delete a string, click the row number and press the DELETE key.



Test the analysis step with candidate highlighting to check early whether you have defined the suitable format strings. But be careful if you use field inheritance. The extraction test always involves a classification step. You can easily end up changing the child class settings by mistake. Always check the class name that is displayed in the bottom-left edge of the window.

This is the class you are currently editing.



Format analysis normally yields several candidates. Therefore, a candidate evaluation must take place.

7.5.2. Defining the Rules for String Construction from Words

Mainly due to the OCR, a candidate may be fragmented into several words, or several words may have been concatenated. Therefore the string search also covers combinations and subsets of words. The corresponding rules are valid for all format strings assigned to a given field.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected for which format analysis has been defined.
- The viewer displays a document from the respective class.
- On the right side of the window, the tabs with class/field properties are visible.
- The Analysis tab is displayed in the foreground.

Defining Rules for Words

To define rules for string construction from words:

- 1) Within the Analysis tab, select the General tab at the bottom.

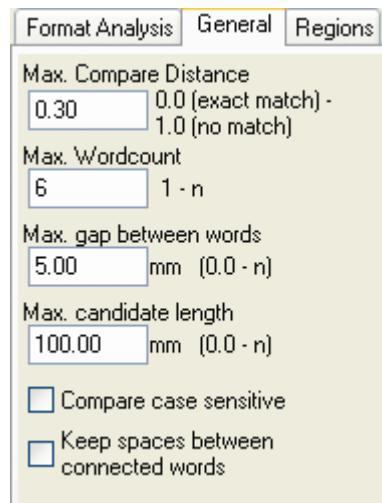


Figure 7-5: String construction rules



- 2) The Max. Compare Distance allows you to extract a search string from a word, neglecting a certain number of characters at the beginning and / or at the end. The compare distance is computed as follows:

$$\text{Compare Distance} = 1.00 - \frac{\text{Number of Characters (Search String)}}{\text{Number of Characters (Word)}}$$
A match requires that the actual compare distance is less or equal the maximum compare distance.

Example:

Search String: 1234 (4 characters)

Max. Compare Distance: 0.30

Word 1: \$1234 (5 characters)

Compare Distance 1: $1.00 - 4/5 = 1.00 - 0.80 = 0.20 < 0.30 \rightarrow \text{match}$

Word 2: \$1234.00 (8 characters)

Compare Distance 2: $1.00 - 4/8 = 1.00 - 0.50 = 0.50 > 0.30 \rightarrow \text{no match}$



- 3) The Max. Wordcount allows you to extract strings that consists of multiple words.

Example:

By default, the hyphen (-) is a word separator. Therefore, the phone number 123-456-7890 consists of three words. To get a match in the format analysis, a maximum word count of three or more is required.

- 4) The Max. Gap Between Words specifies the maximum distance in mm that permits word concatenation during the search. Note that the requirements strongly depend on font size.
- 5) The Max Candidate Length specifies the maximum length in mm a candidate is allowed to have. If the candidate is longer it will not be accepted.
- 6) Check Compare case sensitive to make the candidate search case-sensitive
- 7) By default, spaces between concatenated words are deleted.

Example:

The search string 123 456 7890 will be extracted as 1234567890.



Check Keep spaces between connected words if you want to keep the spaces. In this case, enter the spaces in your format string as well.

7.5.3. Restricting the Analysis to Certain Areas Within the Document

You can restrict the text that is analyzed to certain areas of the document. This may increase processing speed and accuracy.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected for which format analysis has been defined.
- The viewer displays a document from the respective class.
- On the right side of the window, the tabs with class/field properties are visible.
- The Analysis tab is displayed in the foreground.

Restricting Analysis Areas

To restrict the analysis to certain areas within the documents:

- 1) On the Analysis tab, select the Regions tab at the bottom.

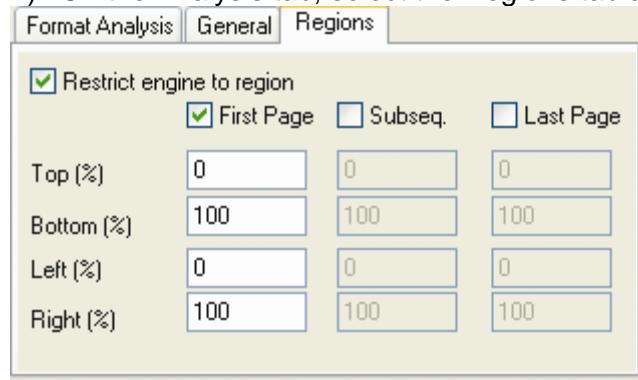


Figure 7-6: Regions tab for Oracle view

- 2) Check the Restrict engine to region check box.
- 3) Select the pages that are affected by the restriction.
- 4) For each selected page, enter the regions that are to be taken into account.

7.5.4. Support of Character Encoding Tables ISO/IEC 8859-2, -5, and -9

Oracle Forms Recognition document processing extends the previously introduced non-western languages processing approach with selective support of character encoding tables ISO/IEC 8859-2, -5 and -9, particularly implementing full phonetic translation support of Polish, Czech and Turkish languages.

7.5.5. Ability to Create Associate Search Engine Pool Imported from an ODBC Source with Entries in “Non-Western” Languages

The Associative Search engine supports non-western languages extension also when importing from an ODBC data source.

7.5.5.1. Usage

This extension to the non-western languages support makes it possible to import the ADS pools for non-western languages directly from a database in addition to importing the native data via an intermediate CSV file.

7.6 Setting up Zone Analysis

Zone analysis is suitable for extracting data located at fixed positions within the documents, such as with classical forms.

7.6.1. Creating Reading Zones

Reading zones are fixed areas on documents that contain information that is to be extracted. Three types of reading zones can be used:

- **OCR:** The contents of the reading zone are determined using optical character recognition. The textual content of the zone is the result of this process.
- **Barcode:** The contents of the reading zone are determined using barcode recognition. The number or strings represented by the barcode is the result of this process.
- **OMR:** The contents of the reading zone are determined using optical mark recognition. The degree of blackness within the zone is used as indicator. A Boolean value is the result of this process.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected for which zone analysis has been defined.
- The viewer displays a document from the respective class.

If zone analysis has been defined for the active field, the viewer displays the page representation of the active document rather than the Workdoc representation. In this case, the viewer toolbar contains additional buttons for zone creation:

Button	Description
	Activates the selection tool
	Creates an OCR reading zone
	Creates an OMR reading zone
	Creates a barcode reading zone

Button	Description
	Creates an anchor

Table 7-5: Additional buttons in the viewer toolbar for zone creation

Creating Reading Zones

To create reading zones:

- 1) In the viewer pane, click the respective toolbar button to create an OCR zone, an OMR zone or a barcode zone.
- 2) Click on the document and drag to create a rectangular reading zone. Obviously, the rectangle needs to be large enough to hold the prospective contents. It should not be much larger, though. The reading zones are displayed as transparent rectangles with red borders. Each zone has a label that displays the name of the zone. The initial name is created from the word Field and a consecutive number. The currently selected reading zone is displayed with a gray background and solid red handles at each corner.



Figure 7-7: Appearance of reading zones

7.6.2. Editing Reading Zones

Oracle Forms Recognition Designer provides some commands for editing reading zones.

Task Prerequisites

The prerequisites for this task are:

- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected for which zone analysis has been defined.
- The viewer displays a document from the respective class.
- Obviously, there must be zones on the document to edit.

Supported Operations

The following operations are supported:

- You can move the currently selected zone using the mouse.
- You can resize the currently selected zone using one of the following methods:
 - You can drag the handles at each corner.
 - You can adjust the size of the reading zone to the size of the entire page using the shortcut menu and the Fit to image size command.

- You can call the zone's property sheet using the shortcut menu and the Properties command. On the General tab, the following parameters are available for resizing:

Group	Parameter	Description
General	Units	Specifies the units used for geometric parameters (pixel, inch, or mm).
Size	Fit to image height	Adjusts the height of the zone to the height of the page.
	Fit to image width	Adjusts the width of the zone to the width of the page.
Position/Size	Left	Sets the distance of the reading zone to the left edge of the page.
	Top	Sets the distance of the reading zone to the top edge of the page.
	Width	Sets the width of the reading zone
	Height	Sets the height of the reading zone

Table 7-6: Parameters to resize reading zones

- You can rename the currently selected zone via the zone's property sheet. Use the shortcut menu and the Properties command. On the General tab, type a new name into the Name field.
- You can delete the currently selected zone by pressing the DELETE key.



If multiple reading zones are mapped to a single data field, a candidate evaluation must take place. This usually involves learning. If you change the properties of your reading zones after the learning, you lose all trained knowledge for the extraction. Repeat the training.

7.6.3. Fixing the Coordinate System for the Reading Zones

It is quite common that paper documents are scanned at an angle. From page to page, there will be fluctuations of the page position. However, zone analysis can only be successful if the relative position of reading zones on documents is constant over the entire document set. So-called anchors can be used to look for prominent geometric features on the document, such as the page corners. Once they are found, anchors can provide a fixed coordinate system for the reading zones, i.e. reading zone positions are determined relatively to anchor positions. This can balance fluctuations of several mm.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected for which zone analysis has been defined.
- The viewer displays a document from the respective class.

Creating and Using Anchors

To create and use anchors:

- 1) In the Viewer pane, click the toolbar button that creates anchors.

- 2) Click into the image and drag to create a rectangular zone. This zone should have a size proportional to the geometric feature that you want to look for. For example, if all the documents in your class contain a 50 mm line in the footer area, your anchor should not have a side length of 5 or 250 mm. The anchor position should be close to the geometric feature you want to use. Anchors are displayed as transparent rectangles with blue borders. Each anchor has a label that displays its name. The initial name is created from the word Anchor and a consecutive number.

The currently selected anchor is displayed with a gray background and solid blue handles at each corner.

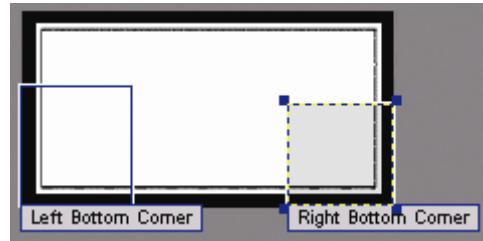


Figure 7-8: Appearance of anchors

- 3) To specify the anchor type, right-click the anchor to display its shortcut menu and select Properties. The anchor's property sheet is displayed. The following parameters can be adjusted:

Group	Parameter	Description
General	Name	Set the anchor's label
Position/Size	Left	Sets the distance of the reading zone to the left edge of the page.
	Top	Sets the distance anchor to the top edge of the page.
	Width	Sets the width of the anchor
	Height	Sets the height of the anchor
Anchor Type	(List box)	Sets the basic anchor type, i. e. the shape the anchor is looking for. Available are - image corners, - lines, - box corners, - T shapes, - crosses.
	Properties	Specifies the relevant edges for the selected anchor type. Each basic anchor type has its own set of properties. For example, if the basic shape is a line, it can be a horizontal or a vertical line. If the basic shape is a corner, there are four to choose from.

Table 7-7: Parameters to customize anchors

- 4) When everything is set, click Learn and close the property sheet.
- 5) To create more anchors, repeat Step 2 to Step 4.
- 6) Call the property sheet of a reading zone using the shortcut menu and the Properties command.
- 7) Select the Anchor tab.
- 8) Move one or more anchors from the Available Anchors list box to the Used Anchors list box using the buttons between the lists. Only explicitly used anchors provide a geometrical reference for the current reading zone.
- 9) To fix more reading zones, repeat Step 6 to Step 8.

7.6.4. Mapping Reading Zones to Document Fields

To actually extract data from your reading zones, you need to assign them to data fields.

Task Prerequisites

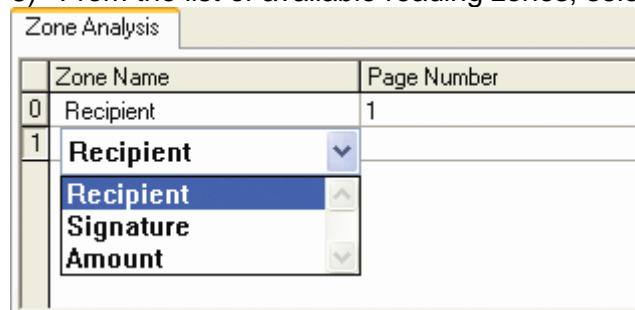
The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- For the field, zone analysis has been selected.
- The viewer displays a document from the respective class.
- On the document, the reading zones have been defined.
- On the right side of the window, the tabs with class/field properties are visible.
- The Analysis tab is displayed in the foreground.

Mapping Data Fields and Reading Zones

To map data fields and reading zones:

- 1) In the Fields tab on the left side of the window, select the field.
- 2) In the Zone Analysis tab on the right side of the window, click a cell of the Zone Name column.
- 3) From the list of available reading zones, select a zone.



The screenshot shows a table titled 'Zone Analysis' with two columns: 'Zone Name' and 'Page Number'. The first row contains the header. The second row (index 0) has 'Recipient' in the Zone Name column and '1' in the Page Number column. The third row (index 1) has 'Recipient' in the Zone Name column and a dropdown menu in the Page Number column. A scroll bar is visible on the right side of the table. Below the table, a list of reading zones is shown: 'Recipient', 'Signature', and 'Amount'.

	Zone Name	Page Number
0	Recipient	1
1	Recipient	<input type="button" value="▼"/> <input type="button" value="▲"/>

Recipient
Signature
Amount

Figure 7-9: Mapping of data fields and reading zones

- 4) In the *Page Number* column, click to specify whether the reading zone is on the first or on the last page of the document.
- 5) To create multiple candidates from zone analysis, repeat step 2 to step 4 using the next table rows.



If multiple reading zones are mapped to a single data field, a candidate evaluation must take place.

7.7 Setting up Address Analysis



Address analysis is a specialized method for searching addresses on a document. To extract addresses from a document, you would use ASSA search. To use the address analysis, an address pool has to be created

first. You can build your own address pool starting with a plain text file that lists names and addresses. You can use one address pool for different document classes.



Figure 7-10: The Address Analysis Engine

7.7.1. Creating the Address Pool

If you already have an address pool, you can skip this procedure.

To create an address pool:

- 1) Select the General tab of the Address Analysis Engine.
- 2) Create new directories for the text file and the pool.
- 3) Generate an address text file containing the addresses, as follows:
Lastname; Firstname; Street; Zipcode; Town; Customer ID- (ID-
Number can be customer number or something similar)

Example:

Mustermann;Max;Musterstr. 1;12345;Musterstadt;0001

Quantum;Gesellschaft;Hauert 1;44227;Dortmund;123456

- 4) Insert the path information in the Address Analysis Engine2 General tab.
- 5) Select Generate/Update Pool to create or update the search pool.
- 6) Select Preview to view the data of the text file in the General tab.
- 7) Select the checkbox Replace with Database Entries on the General tab to replace the address by the information saved in the address text file. This information may be somewhat different from the information in the zone.

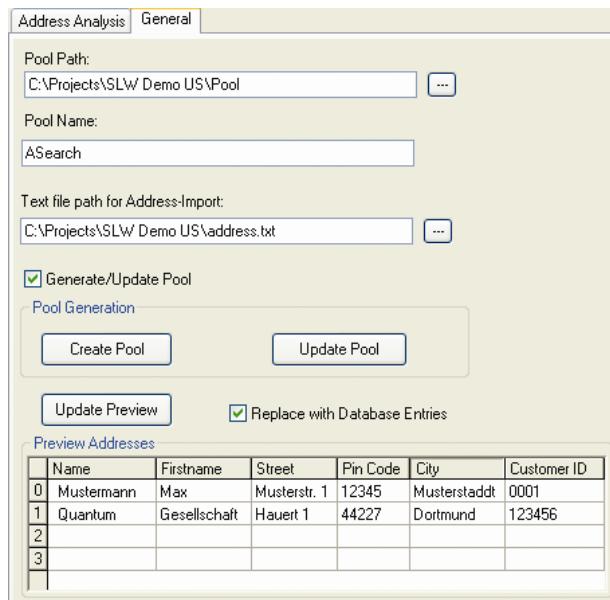


Figure 7-11: General tab for Address Analysis

7.7.2. Configuring Address Analysis

Task Prerequisites

The prerequisites for this task are:

- An address pool has been created and stored on your system's hard drive, preferably in your projects directory.
- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected for which address analysis (Address Analysis Engine2) has been defined.
- The viewer displays a document from the respective class. Note that the viewer displays the document page with recognition zones instead of the Workdoc.
- On the right side of the window, the tabs with class/field properties are visible.
- The Analysis tab is displayed in the foreground.

Configuring Address Analysis

To configure address analysis:

- 1) Select the Address Analysis tab of the Address Analysis Engine.
- 2) Select the address type from the combo box. Your choices are Austria, Germany, Switzerland, or USA.

By default, the entire document is searched for addresses.

7.7.2.1. Designing Address Reading Zones

You can also create reading zones on the document and restrict the address search area to these zones, or exclude certain areas from the search. Create an OCR reading zone as described in Section [7.6.1](#). It is a good idea to give the zone a descriptive name.

To select a zone for address analysis, click an empty cell in the first column of the Included/Excluded Zones table. From the list box, select the reading zone. In the second column, select the first or the last page. In the third column, double-click the cell to include or exclude the zone.



Figure 7-12: Defining the search zone.

If you then classify a document, the search engine tries to find the address within the zone, using the ASSA engine. When the search engine finds an address, it extracts the information from the zone.

When the checkbox Replace With Database Entries on the General tab is selected, the address will be replaced by the information saved in the address text file. If you disable the Replace With Database Entries selection, the information appears as in the zone.



Normally, you will have one address pool with all your addresses and this address pool can be used for several document classes. You can set up templates once you configure an address pool to use with other document classes. (Please [Chapter 14](#).)

If you already have an address pool, you do not need to make any changes on the General tab, but you might want to change a setting in the Address Analysis tab. For example, you can change the zones that you want to include if you have multiple address zones. This might be useful when your document contains two similar addresses and you are only interested in one of them. In this case, you would exclude the zone of the unwanted address. For example, if you are scanning invoices for addresses, you may have zones for both a customer address and a billing address. In this case, you could exclude the billing addresses and only extract the customer addresses.



Address analysis may yield only one or several candidates. In any case, a candidate evaluation must take place.

7.8 Setting Up Table Analysis



All new projects should be created with Brainware Table Extraction.

This section provides information about table analysis for project administrators working with legacy projects.

Table analysis was used to extract data from document tables. In principal, there are two approaches to traditional table analysis:

- Fixed layout: If the position of table elements is constant, you can use their coordinates to locate the table and its elements. This resembles the zone analysis of text fields.
- Variable Layout: If the position of table elements varies, or to analyze different table layouts with a single set of settings, you can use column labels and formats to locate a set of table candidates. This resembles the format analysis of text fields.

It is also possible to mix both approaches.

Oracle Forms Recognition allows you to extract a single table from each document. This table can span multiple pages, provided that the table layout does not change over the entire range. In order to be accessible by table analysis, tables must consist of the following elements:

- Columns,
- Rows,
- and Cells

A table presents data in a structured layout. The basic elements of tables are columns and rows of data. Each row and column is made up of one or more cells. The cell is the most basic table element.

Most tables represent an enumeration of records, with each record listing a number of properties. The most common table layout organizes the listing of different properties in columns, while individual records are represented by table rows.

In some cases, one line is not sufficient to fit all the text that belongs into a table cell. In that case, a line feed occurs within the cell. This happens, however, only in particular columns. It is, for example, frequently encountered in columns containing the description of an item.



Some tables have too many columns to place them all on one page side by side. In this case, some manufacturers create layouts where they actually interleave the columns in the table rows. Reading tables with interleaved columns is currently not supported.



Some tables have empty rows. Reading tables with empty rows is currently only supported, if the table bottom is clearly indicated by a footer line.

Label 1	Label 2	Label 3	Label 4	Label line
Cell	Cell	Cell	Cell	
Cell	Cell	Cell	Cell	
Cell	Cell	Cell	Cell	

Cell	Cell	Cell	Cell	Row 4
Cell	Cell	Cell	Cell	
Cell	Cell	Cell	Cell	

Figure 7-13: Main elements of tables

Labels

It is good practice to equip each table column with a label to indicate the corresponding property. In most cases, all column labels are positioned at about the same horizontal position, i.e. they belong to one text line. This line is called label line. In some cases, the labels extend over more than one text line. This is, for example, frequently encountered in industry invoices.

The label line plays a central role for the automatic table analysis, providing

- the start position of the table,
 - the preliminary table layout, and
 - the preliminary mapping of the table columns.

Oracle Forms Recognition can process single-line as well as multi-line labels.



To properly assign a cell to a column, some degree of overlap with the label must exist. If a label overlaps with cells of different columns, the column is created using the cells with more overlap.



Since the label detection is vital for table recognition, the OCR quality is very important to obtain good results. Normally, light labels on a dark background are more difficult to read than vice versa.

Label 1	Label 2		Label 3
Cell	Cell	Cell	Cell
Cell	Cell	Cell	Cell
Cell	Cell	Cell	Cell
Column 1	Column 2	Column 3	

Figure 7-14: Overlapping labels - in this example, one column will not be recognized

Header and Footer Lines

Frequently, tables contain a header line above the label line. If available, the header line may be used for detection of the table start position (alternatively or in addition to the label line).

Footer lines are located below a table. An example of a footer line is a row that contains the sum of all column cell entries. If available, footer lines can be used to detect the end of a table (instead of or in addition to further criteria).

Header			
Label 1	Label 2	Label 3	Label 4
Cell	Cell	Cell	Cell
Cell	Cell	Cell	Cell

Figure 7-15: Table header and footer

Comments

Comments, such as free text in tables, are automatically ignored if two requirements are met:

- There are at least two lines with cells above the comment.
- There is at least one line with cells below the comment.

Otherwise, comment lines will interfere with the table analysis.

Label 1	Label 2	Label 3	Label 4
Cell	Cell	Cell	Cell
Cell	Cell	Cell	Cell
This is a comment			
Cell	Cell	Cell	Cell

Figure 7-16: Comments in tables

Graphical Lines

In some cases tables contain vertical or horizontal graphical lines. Horizontal lines can be used to detect the end of a table (instead of or in addition to further criteria). Vertical lines can indicate the segmentation of columns, but are currently not evaluated.

To configure the table analysis, you need to define a settings table: a table containing the columns you want to retrieve from the document along with a number of properties for each column. The tables within the document are called the document tables.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- On the left side of the window, the Fields tab is activated.
- A field is selected for which table analysis has been defined.
- The viewer displays a document from the respective class.
- On the right side of the window, the tabs with class/field properties are visible, and the Analysis tab is in the foreground.

During table analysis, Oracle Forms Recognition:

- 1) Identifies the document table that best matches the settings table,
- 2) Analyzes the rows and columns of the document table,
- 3) Maps the columns of the document table to those of the settings table, and
- 4) Extracts the content of the document table.

Each part of the analysis can create its own set of candidates. In the user interface, only the table candidate with maximum confidence is returned so that learning is not required. However, the Workdoc contains a list of all table candidates, sorted by confidence. These can be accessed from scripts.

7.8.1. Defining Table Columns

The first step in defining new table settings is to specify the columns to be searched for. Each column has to be assigned a name, which can be used to access the column data from script (alternatively to using the column

index), and a set of properties. Defining tables for a derived class enables the checkboxes (Please see **Section 7.7.8** for more information.)



Column names and column labels can be different from each other.

Defining Columns

To define the table columns:

- 1) In the Analysis tab, select the Columns tab.

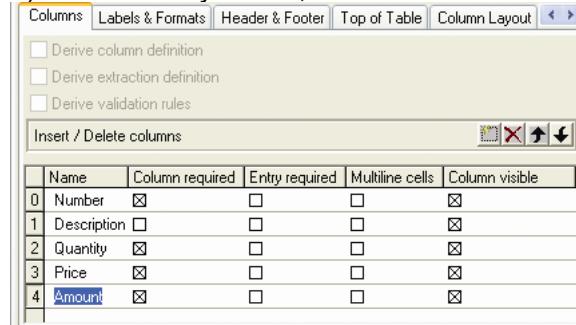


Figure 7-17: Tab for column definition

- 2) In the *Insert / Delete columns* list, create and sort columns using the following buttons:

Button	Description
	Adds a new entry at the bottom of the list. At the insertion point, type a name for the entry.
	Deletes the selected entry without displaying a confirmation message.
	Moves the selected entry one position up in the list.
	Moves the selected entry one position down in the list.

Table 7-8: Controls for list entries

- 3) For each column, specify the properties by marking the corresponding checkbox. There are three principal properties of each column:
 - Column Required: The column is required in all document tables, in contrast to optional.
 - Entry required: Entries are required for each cell of the column.
 - Multiline cells: The cell content can extend over more than one text line.
 - Column Visible: Column visible means that the column will be displayed on the Verifier form when this check box is selected. If not, you will not see this table column. You can set the visible property also in script in order to display this table column only when it contains a special content.



During verification of tables, the user navigates from invalid cell to invalid cell by pressing ENTER. If no entries are required in a column, empty cells are valid, even though the document table contains corresponding input. To avoid losing information while keeping the ability to accept empty cells, you can make input mandatory for a column, but permit forced validation in the verification step.

This is a kind of pre-validation option. If it is selected for a table cell, it returns an invalid table cell when no entry is found. The result of the pre-validation will be discarded when the table cell is set to valid within the script.

7.8.2. Defining Column Labels and Formats

For each column, you can specify:

- A set of labels that will be used to identify the column. Labels are required.
- A set of format strings that will be used to determine whether the column cells have a valid content. Format strings are optional.

Defining Labels and Formats

To define column labels and formats:

- 1) In the Analysis tab, select the *Labels & Formats* tab.



Figure 7-18: Tab for column labels and format definition



- 2) Select a column using the arrow buttons next to the Column Name field.
- 3) In the Insert / Delete labels list, define a set of labels using the following buttons:

Button	Description
	Adds a new entry at the bottom of the list. At the insertion point, type a name for the entry.
	Deletes the selected entry without displaying a confirmation message.

Table 7-9: Insert and delete list entries

For multi-line labels, no special settings are required as they are automatically combined to one label during table analysis.

- 4) In the Insert / Delete format list, you can define a set of format strings. Enter the format string in the Format column. When the format is inserted you can change the compare type by clicking with the mouse into the corresponding compare type field and selecting the type from the combo box list.



Formats have to be inserted first before you change the compare type. Otherwise, the field will be deleted.

- 5) Select a comparison type in the Compare Type column.

Syntax and comparison algorithms have already been described in Section [7.4](#). If you use regular expressions, please refer [Chapter 10](#) for details.

- 6) Repeat Step 2 – Step 4 until labels and format strings are defined for all table columns.

7.8.3. Defining Header and Footer Lines

You can specify a set of headers and footers for the table. Headers and footers can be used to determine table top and bottom. Normally, defining them is optional, but might make the task of table recognition easier. If your tables contain empty rows, you need a footer. Otherwise, there is no way to determine the table bottom.

To define table headers and footers:

- 1) In the Analysis tab, select the Header & Footer tab.



Table 7-10: Tab for the definition of header and footer lines

- 2) In the Insert / Delete headers list, define a set of labels using the buttons from [Table 7-9: Insert and delete list entries](#).
- 3) In the Insert / Delete footers list, define a set of labels using the same buttons.

7.8.4. Determining Table Tops

For each table, you need to specify the algorithms used to search the top. There are three options:

- Searching the label line (based on the labels defined for each column, please see Section [7.8.2](#)).
- Searching the header (based on the list of header strings defined, please see Section [7.8.3](#)).
- Specifying a fixed position as distance from the top of page.

These methods can also be combined.

Determining the Table Top

To determine the table top:

- 1) In the Analysis tab, select the Top of Table tab.

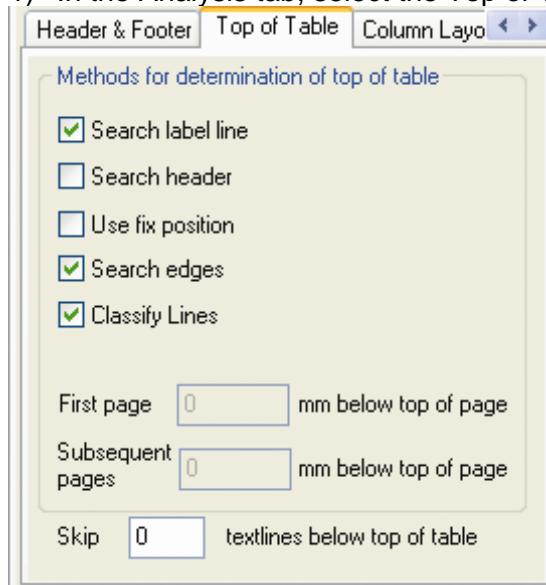


Figure 7-19: Tab for determining table tops

- 2) Select one or more of the following options:

- Check Search label line.
 - Check Search header. This setting is only recommended in combination with a fixed column layout. Use with the Header & Footer tab to determine table top and bottom.
 - Check Use fix position and specify the distance from the top of page in millimeters both for the first and for all subsequent pages. If you analyze the document, the specified position will be highlighted in the document area. This setting is only recommended in combination with a fixed column layout.
 - Check Search edges. This setting when checked enables Table Analysis to find table columns by searching for edges. As it finds columns, you would select the columns that you defined for the table on the Column tab. To make this mapping, use either script, or for invoices, the tab "column mapping" that has mapping with fields that are predefined. Within the script, you can navigate through the cells of the columns to check the content. The combo box on this tab contains the column names that are defined on the column tab. You can select the column name that corresponds to the Description, Price, and so on.
- You can define the table columns that you want to write to the workdoc in the Column tab. (Please see Section 7.8.1). With multiple options, the analysis stops when the first criterion is met.
- 3) Optionally, you can specify to skip a number of text lines below the table top by typing a number into the Skip... text box. This should only be applied to tables with a fixed layout.

7.8.5. Defining Column Layouts

For each table, specify the algorithms used to determine the column layout. There are two options:

- Layout analysis, based on the labels of the label line and the entries of the individual rows.
- Fixed layout, using positions for the left and right border of each column.

Defining the Layout

To define the column layout:

- 1) In the Analysis tab, select the Column Layout tab.

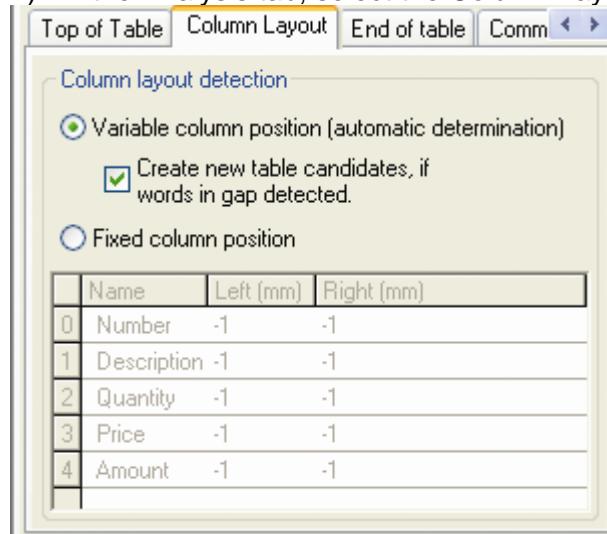


Figure 7-20: Tab for the definition of column layouts (initial state)

- 2) Do one of the following:

- For variable layout: Select the Variable column position option. Optionally, you can check Create new table candidates. This is useful in cases where a column is not represented by a label. However, it implies the creation of a large number of candidates, thus effecting the time required for the table analysis.
- For fixed layout: Select the Fixed column position option. In the table at the bottom of the tab, specify the distance of the left and right column borders from the left border of the page in millimeters. These ranges will be highlighted in the document area.

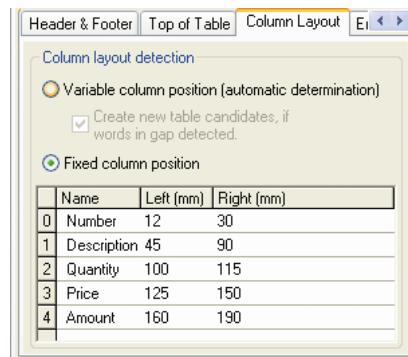


Figure 7-21: Tab for the definition of column layouts (sample fixed layout)

7.8.6. Determining Table Bottoms

For each table, you need to specify the algorithms used to search the bottom. The available options are:

- Searching for variations in the text line distance.
 - Searching a graphical line.
 - Searching the footer (based on the list of footer strings defined, please see Section [7.8.3](#)).
 - Searching for empty cells in a control column.

These methods can also be combined.

Determining the Table Bottom

To determine the table bottom:

- 1) In the Analysis tab, select the End of Table tab.

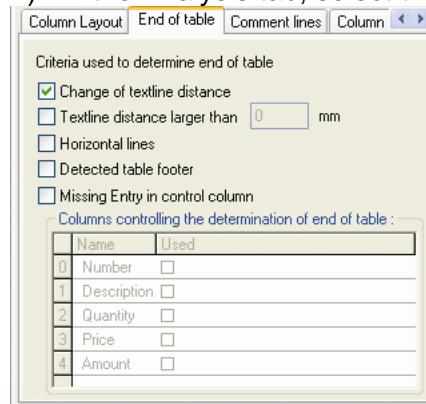


Figure 7-22: Tab for determining table bottoms

- 2) Select one or more of the following options:

 - Check Change of textline distance if the table ends when the text line distance changes by more than 50%.
 - Check Textline distance larger... and enter a value into the associated text box if the table ends when the text line distance exceeds a predefined threshold.
 - Check Horizontal lines if a horizontal line indicates the end of the table.

- Check Detected table footer if one of the footers defined previously indicates the end of the table. This option must be checked if your tables contain empty rows.
- Check Missing entry in control column if an empty cell in specified columns indicates the end of the table. In the table at the bottom of the tab, mark the Used checkbox for at least one column.

With multiple options, the analysis stops when the first criterion is met.

7.8.7. Managing Comment Lines

Comment lines are automatically ignored if two requirements are met.

- There are at least two lines with cells above the comment.
- There is at least one line with cells below the comment.

Detecting Comment Lines

To detect comment lines:

- 1) In the Analysis tab, select the Comment lines tab.

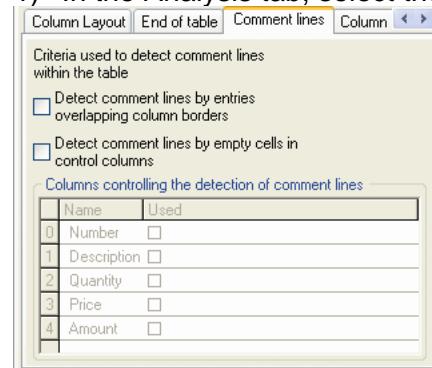


Figure 7-23: Tab for handling comment lines

- 2) Select one or both of the following options:
 - Check.... overlapping column borders if entries spanning multiple columns indicate a comment. In the table at the bottom of the tab, mark the Used checkbox for at least one column.
 - Check ... empty cells in control columns if empty cells in specified columns indicate a comment. In the table at the bottom of the tab, mark the Used checkbox for at least one column.

With multiple options, the analysis stops when the first criterion is met.

7.8.8. Using Field Inheritance

Field inheritance allows a coupling between parent and child settings. Simply stated, child classes inherit all fields from their parents. If the Table Analysis engine is selected for the table field in the child class, a copy of the parent settings is created, which may be further modified. For this purpose, the table settings have been subdivided into three groups:

- **Column settings** – the definition of the number of columns and their names.

- **Extraction settings** – all parameters controlling the extraction algorithms.
- **Validation settings** – the definitions of formats for the individual columns.

Depending on the inheritance settings, the corresponding controls in the table settings tabs will be disabled.

Using Field Inheritance with Tables

To use field inheritance with tables:

- 1) In the Analysis tab, select the Columns tab.

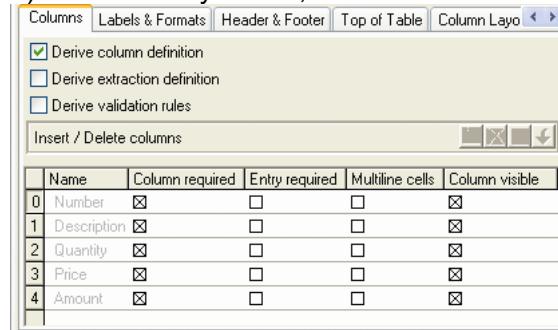


Figure 7-24: Tab for inheritance settings

- 2) Check Derive column definition to use the same set of columns as the parent class. All controls related to adding, deleting, renaming and sorting columns will now be disabled. The Derive extraction definition and Derive validation rules checkboxes will be enabled.
- 3) Optionally, check Derive extraction definition to inherit extraction settings. This disables the remaining controls with the exception of the column format definitions.
- 4) Optionally, check Derive validation rules to inherit validation settings. This disables the column format definitions.

7.8.9. Column Mapping

After you select the columns from which you would extract information for the Workdoc in the column tab, you can search for certain table columns in a batch. This is most commonly used if you are working with invoices. To search for columns, you would select Search Edges in the Top of Table tab (Please see Section 7.8.4) and then use the Column Mapping feature in Table Analysis.

Mapping Table Columns

To map table columns:

- 1) On the Analysis tab, select the Column Mapping tab.

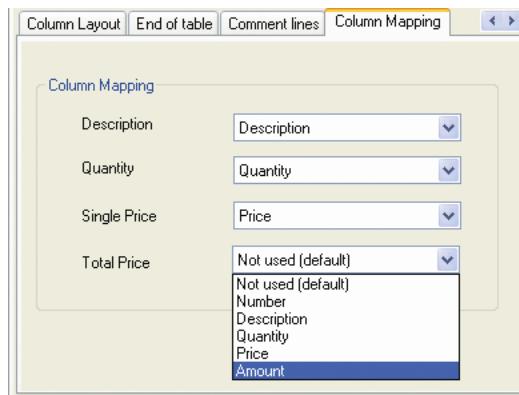


Figure 7-25: Tab for table column mapping

- 2) Select the drop-down arrows to choose the item that best describes your column. When mapping columns for invoices, usually the table columns “description,” “quantity,” “single price,” and “total price” are the most relevant. In this case, you can use the default mapping methods that are defined on the tab “column mapping.” Special mapping methods are used to identify the correct table columns (Please see Section 7.8.1).
- 3) Click OK.

Another possibility for defining table columns is to define the mapping within the script.

If the mapping is incorrect, it must be corrected for the verification (Please see Section 12.1.17).

7.9 Configuring Associative Search Analysis

The Associative Search Engine uses a data source – typically either a semi-colon delimited spreadsheet or a database – to search on. This data source, which is also sometimes referred to as a search pool, is used to match data in the search pool to Workdoc data used in classification. In many applications, this will be a vendor name. The Classname Format and Field Content Format are defined after the data from the data source has been imported.

The data source can be created in any spreadsheet application, word processing program, or text editor like WordPad or Notepad.

In the secondary tab (Analysis) the four columns are filled in with default column names or those names found in the first (header) row of the imported file.

In the ID column, set the ID for the Supplier’s ID to establish this field as the primary key for your associative search.

Leave the default settings for the fields to search on (square checkboxes).

7.9.1. Creating Data Sources

Configuring data sources for Automatic Supervised Learning is a long process that requires steps in both Windows Explorer and Designer.

7.9.1.1. Windows Explorer Steps

Creating a Project Structure

- 1) In Windows Explorer, create a project folder
- 2) Under that, create the following folders:
 - Batches
 - Common Learn Set
 - Export
 - Global Project
 - Input
 - Miscellaneous
 - Vendor Pool
- 3) These folder names are suggestions; you can use whatever schema fits your project best.
- 4) Under Global Project and Common Learn Set, create folders for each of the derived classes that will be created by Oracle Forms Recognition based on the name of the first field.

Create a Reference File from a Spreadsheet or Text Editor

- 1) In Excel, WordPad, or Notepad, create a semi-colon delimited file with the following fields:

Vendor_ID;Internal_ID;Vendor_Name;Vendor;Vendor_Type;Vendor_Address;Vendor_City;Vendor_State;Vendor_ZIP.

The **Vendor ID** is required. It must be a unique numerical designation for the vendor name.

Internal_ID is also required. It is a unique sequential designation for each record in the file.



Vendor_Name, another required field, is a short form of the Vendor's full name.

Vendor, the final required field, is the full name of the vendor.

Vendor_Type is an optional field. Vendor Type is used to influence a Supervised Learning setting that indicates the threshold for invalid fields, that, if exceeded, will force a document, or, by extension, members of a DocClass, to be learned. In most cases, this value is set to 40 percent. The value for Vendor_Type can either be 0, 1 or 2, with 0 being the default value and the value that is assumed if there is no Vendor_Type field in the *.csv file. A value of 0 for Vendor_Type forces all documents classified by that vendor name to be added to the local Learn Set. A value of 2 indicates that no document in the class can be added to the Learn Set. A value of 1 indicates that only the first document in the class can be added to the Learn Set.

You can always designate another field as Vendor Type, as long as the values are correct.

The rest of the fields are conditional – required if you plan to use Address Analysis.



The actual name of the columns in the header of the *.csv file can be different, but the content must match the data that

would be expected for columns that have the names shown in the example.



If you use Excel, place all fields in the first column (do not place your data individually in Column A, Column B, Column C, etc.) and use semi-colons to delimit your data, as shown in Step 1. Also, please note that field names cannot contain periods or other special characters.

You can choose to have header rows or not; this will affect an Oracle Forms Recognition setting later.

- 2) Save the file with a *.csv extension in the Project Root folder. This file is the lookup table that Oracle Forms Recognition will use for Associative Learning.



*An address must be on the document that matches the address in the *.csv file.*

Creating a Reference File Using a Database Connection

An alternative to creating the *.csv file is to use data from a similarly constructed database and establishing an ODBC connection to it.

7.9.1.2. Oracle Forms Recognition Designer Steps

In Oracle Forms Recognition, create and save a new project as you normally would. Use the following settings:

Project Input Settings

- 1) Set File Options as Other, with the default file extension of *.tif.
- 2) Enable Save Execution Results to Workdoc.
- 3) Set the batch root directory and the image root directory to the folder you created for batches.

Project Definition Mode Settings

Accept all defaults.

Train Mode Settings

- 1) Select Add documents to Learn Set.
- 2) Set the Learn Set Base Directory to the folder you created for Local Project

Runtime Mode Settings

Enable Execute Classification and Execute Extraction, and keep all other defaults.

Verifier Mode Settings

Keep all defaults.

Project Tree Settings

Do nothing.

Verify Train Mode Settings

- 1) Switch to the Verify Train Mode Settings tab.
- 2) Select Enable Automatic Supervised Learning.

- 3) Select Apply local Classification and Extraction automatically.
- 4) Select Save all path information relative to project file

7.9.1.3. Defining the Project

- 1) Switch to Definition Mode.
- 2) Right-click on the project name and select Show Properties from the shortcut menu.
- 3) On the Project Tab, leave all default settings for Classification Interpretation, Parent Classification, and Word Segmentation Characters.

7.9.1.4. Setting OCR Options

- 1) Still on the Project tab, click the OCR Settings button in the middle of the tab.
- 2) On the Pre-processing Options tab, select the following recommended settings:
 - Box and Comb Removal
 - Clean Border
 - Despeckled
 - Lines Manager

To make the selections, chose the items above from the Available Methods column and click the arrow pointing to the right for each.



A word on despeckling: This process, which removes dots and visual dust from your documents, sometimes detects decimal points and removes them. This, of course, can be undesirable. If your documents are generally light, do your first preprocessing on them without despeckling to test the results. If the quality is still poor, enable Despeckling and preprocess them again.

If applicable to your environment, you can also select **binarisation** (to convert grayscale images to black-and-white) and **invert** (for reversing white-on-black pages to black-on-white pages.)

7.9.1.5. Setting Specific OCR Tolerances

Still on the Pre-processing Options tab, now set the specific tolerances for each of the OCR settings you chose. To do this, double click on a method in the Available Methods column:

- 1) For Box and Comb removal, select Box Removal and Automatic.
- 2) For Clean Border, do nothing. No additional options are available.
- 3) For Despeckle, do nothing. No additional options are available.
- 4) For Lines Manager, select Remove Horizontal Lines, Remove Vertical Lines, and Repair Characters. Accept all defaults.

7.9.1.6. Establishing Recognition Settings

- 1) Click on the Recognition tab.
- 2) For Recognition Type, select OCR.
- 3) Select Fine Reader Normal Mode for Available Engines.

On the Recognition tab, there are two tabs, one called General and one called Languages

On the General Tab:

- 1) For Recognition, choose Automatic, unless all your documents come from typewriters or dot-matrix printers.
- 2) For Preprocessing, accept the defaults of auto-deskew and auto-orientation and select Despeckle if you have previously tested this option and were satisfied with its affect on your documents.
- 3) For Miscellaneous, accept the default of Remove Lines.

On the Languages tab, select Digits and English.

7.9.1.7. Setting Your Base Document Class

- 1) Returning to the tabs on the left side of your screen, click on the Classes tab.
- 2) Right-click on your project name. From the shortcut menu, select Insert Base DocClass.
- 3) Type a name for the class and click OK.

7.9.1.8. Defining Your Reference Field

- 1) Click the Field tab.
- 2) Right-click anywhere on the Field tab. On the shortcut menu, select Insert Field Definition. Assign a field definition (field name) to the first field and click OK. Right-click in the field and select Show Properties.
- 3) On the Analysis Editor on the right side of your screen, select Associative Search Engine from the Available Analysis Engines selection box.

7.9.1.9. Importing Your Reference Data from a *.CSV File

- 1) On the Analysis Editor, click the tab, File Import.

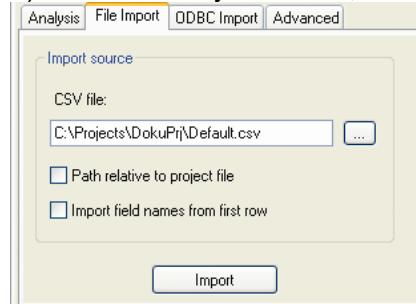


Figure 7-26: File import tab

- 2) For Import Source, browse to the *.csv file you created.
- 3) Deactivate Path Relative to Project File.
- 4) If your *.csv file has header rows, select Import field names from first row. If your file doesn't have header rows, leave this checkbox empty.
- 5) Click Import.

7.9.1.10. Importing Your Reference Data via ODBC

To establish an ODBC connection for your reference data:

Still in the Analysis Editor, click the secondary tab, ODBC Import.

Supply the source, login information and SQL statement to access the data for reference.

7.9.1.11. Using your Reference File for Analysis

- 1) Still in the Analysis Editor, click the tab, Analysis.

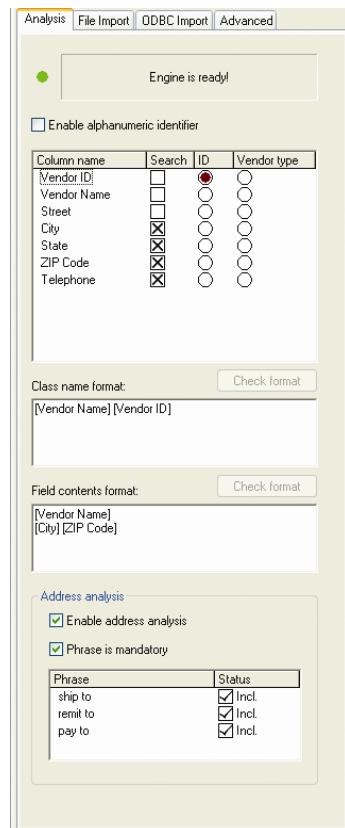


Figure 7-27: Establishing Analysis criteria

- 2) Notice the table with the fields from your *.csv file.
- 3) On this table, set ID for Vendor ID to establish this field as the primary key for your associative search by selecting the round radio button. Leave the default settings for the fields to search on.
- 4) Type a format for ClassName Format.
- 5) Type a format for Field Contents Format.
- 6) If desired, enable Address Analysis and determine which address fields should be included or excluded.

7.9.1.12. Advanced Settings

Advanced Settings enable you to establish settings for Candidate Detection, Validation Threshold, Import Destination, and Automatic Import.

To establish these settings:

- 1) Click the secondary tab, Advanced.

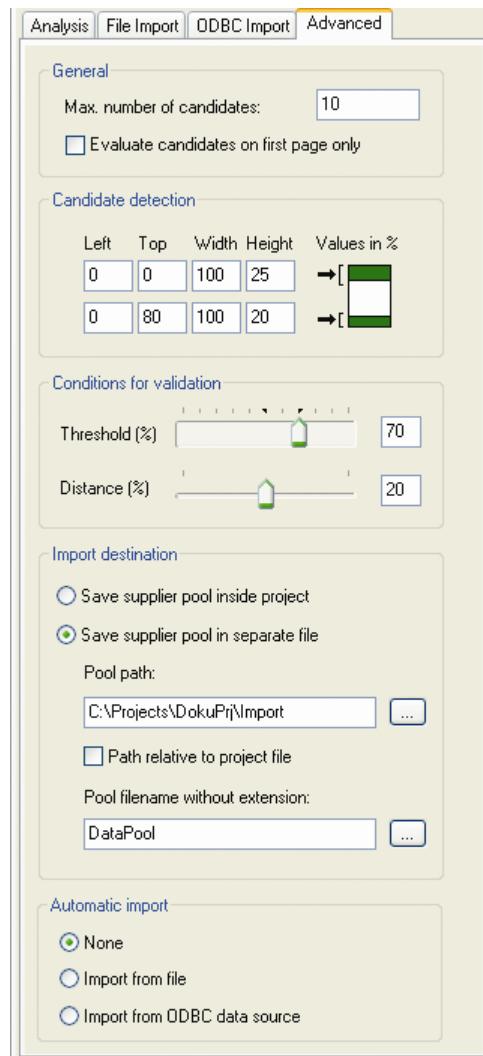


Figure 7-28: Establishing Advanced Settings

- 2) Change the default settings for Height and Width and Threshold and Distance if the address and vendor name are not in the default Viewer area. If they are not, the following settings are recommended:
 - For Candidate Detection, set Height and Width to 100 percent
 - For Conditions for Validation, set threshold to 30 percent and distance to 10 percent.
- 3) Import Destination determines where your reference file will be saved. The recommended setting is Save Supplier Pool Inside Project.
- 4) Automatic Import determines whether data from the supplier pool (reference file) should be imported manually or automatically. None signifies that the file and its data should be imported manually.

7.9.1.13. Establish Settings for ClassName Format and Field Contents Format

- 1) Return to the Field tab on the left side of your screen and insert any additional fields that need to be learned.
- 2) Still on the left side of your screen, click on the project name. On the Classification tab on the right side of your screen, select your Base DocClass as the default classification result. This setting tells Oracle Forms Recognition to assign all documents to this class if Associative Learning fails to classify them.
- 3) For now, leave the settings on the Validation Tab as is. You will establish Validation Settings at the document and field levels later.
- 4) On the right side of the screen, click the Supervised Learning Tab. Select Do Smart Decision.

7.9.1.14. Input your Documents

- 1) View Document Input Mode.
- 2) Select your documents from the directory they are in.
- 3) Set validations at the document and field level

7.10 Setting Up the Field Evaluation

Oracle Forms Recognition supports two methods for candidate evaluation:

- Custom methods implemented as Visual Basic compatible scripts
- Evaluation using Oracle

Setting up the evaluation method is not required, if:

- You use custom methods or
- You use zone analysis with a 1:1 zone/field relationship.
- In all other cases, the evaluation method must be specified. During evaluation, Oracle Forms Recognition analyzes the areas around each candidate for characteristic properties that can be learned.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

Setting the Evaluation Method

To set the evaluation method:

- 1) In the Fields tab on the left side of the window, select a field.
- 2) On the right side of the window, select the Evaluation tab.
- 3) Under Available Evaluation Engines, select Brainware Extraction.
- 4) To specify the geometry of the area around the candidate that is to be analyzed, select the Microlayout tab at the bottom of the window. Note that microlayout settings only have a small influence on extraction

results. They need a lot of samples to be distinguished. In most cases, the default setting will work fine.

- 5) Select one of the following options:

Option	Description
Table-based	The context of the candidate is taken from a top-asymmetric region around the candidate, the line to the left and the column above. This configuration is the best for candidates in tables. This is the default microlayout.
Left-Top oriented	The context of the candidate is taken from a left-asymmetric region around the candidate and the line to the left. This configuration is the best for candidates in captions or after colons.
Symmetric	The context of the candidate is taken from a symmetric region around the candidate. This configuration is the best for candidates in running text.
Line oriented	The context of the candidate is taken from the region to the left and to the right of the candidate. This configuration is the best for candidates in lines.

Table 7-11: Microlayout options

7.11 Brainware Field Extraction Engine for Generic Fields Extraction

7.11.1. Description

The “Brainware Field Extraction” engine introduces a new dimension in automatic indexing (extraction) of header field data on a generic level (i.e., when multiple logical document categories (classes) are handled with a single internal knowledgebase). The engine is based on a new advanced N-gram Triton technology and provides high quality field extraction based on statistical evaluation of:

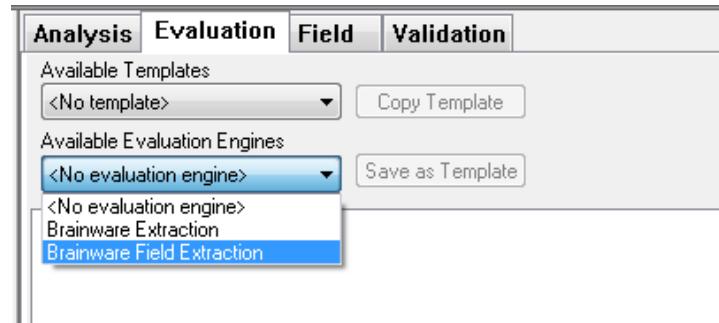
- Surrounding (keywords) around the learned field
- Format of the learned field
- Typical location of the learned field
- Correlation between different fields learned in context of one document class.

All the information above is learned automatically. The new engine also autonomously extracts candidates while time consuming specification of regular expressions via the Format Analysis Engine is no longer required for the processing.

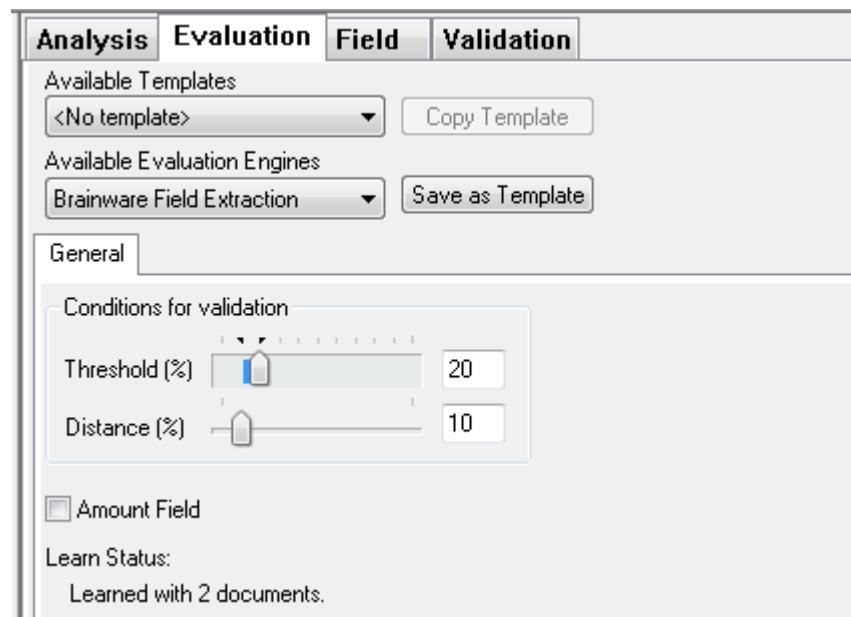
The engine fully supports supervised learning workflow.

Brainware Field Extraction (BFE) engine can be configured and trained in the same way as the Brainware Extraction engine. See sections “[11.4 Field-Level Settings](#)” or “[7.10 Setting Up the Field Evaluation](#)” of the guide for more details.

The engine can be assigned to any header field of a document class using the Evaluation tab of the field definition settings and selecting “Brainware Field Extraction” item from the list of available engines:



When the engine is assigned it can be configured similar to Brainware Extraction engine. As for the Brainware Extraction engine, the BFE settings view also shows the brief “learned” status for the selected field:



There are a couple of differences related to configuring the BFE engine as opposed to the Brainware Extraction engine:

- Format Analysis engine pre-processing and time consuming configuration is NOT required for the BFE engine function. See “Restrictions” and “Scripting” subsections below for more details, particularly in regards to the case, when the candidates extracted by the Format Analysis are nevertheless supposed to be kept as a part of the extraction’s outcome.
- Microlayout settings are not supported by this engine.
- There is one extra check box setting called “Amount”. This setting is supposed to be checked for those fields that have to be treated as amounts. In this case, as one of the internal extraction conditions the

engine will consider all “amount” fields as the ones with potential numeric correlation.

7.11.2. Restrictions

Unless specifically handled, the Brainware Field Extraction engine deletes all previously available candidate objects (e.g., the ones created by the preceding execution of the Format Analysis engine) and creates and evaluates self-extracted candidates.

7.11.3. Scripting

The following script sample can be used if for any reason it is desired that the extracted BFE candidates are to be replaced with the ones extracted by the Format Analysis engine or if both kinds of candidates are supposed to be kept in the candidates array.

```
Private Sub Date_PostEvaluate(pField As SCBCdrPROJLib.SCBCdrField, pWorkdoc As
SCBCdrPROJLib.SCBCdrWorkdoc)

    Dim i As Long
    For i = pWorkdoc.Fields.ItemByName("Date").CandidateCount - 1 To 0 Step -1
        ' Comment the code line below if you'd like to keep both types of candidates (from FAE and BFE)
        pWorkdoc.Fields.ItemByName("Date").RemoveCandidate(i)
    Next i

    pWorkdoc.DocState = CDRDocStateClassified
    pWorkdoc.Fields.ItemByName("Date").FieldState = CDRFieldStateReset
    Project.AllClasses.ItemByName("Invoices").AnalyzeField pWorkdoc, "Date"

End Sub
```

7.11.4. Usage & Notes

Due to quality, performance, and capacity of the disk space required per one class' BFE learnset, it is not recommended to use the Brainware Field Extraction engine for the “vendor” level training, i.e., when a class of similar documents with very similar layout is supposed to be trained with just a few (1-5) documents to achieve perfect extraction results for particular high-volume vendor class.

General recommendation is to use the engine for generic training only, i.e., for data extraction from no categorized documents. In this connection, the engine has to be trained with at least 10 documents per extracted fields, while the ideal amount of documents per field is **50-100** samples. Good OCR quality for the trained documents is preferred but not a mandatory requirement.

At the same time, exceptional learnset samples in terms of both document quality and layout uniqueness are generally acceptable.

Even though the engine is integrated in supervised learning workflow (SLW), due to above mentioned reasons, it makes sense to keep using the former Brainware Extraction engine for automatic SLW vendor level training. For this purpose, it is recommended to assign the old “Brainware Extraction” engine to the header fields of the SLW’s root classes using a special dedicated class for generic extraction via Brainware Field Extraction engine. For example, the following classes’ hierarchy:

```

Invoices
  Generic
    VendorClass1
    ...
    VendorClassN
  Void

```

Where “Invoices” class is the root template class for SLW training, while “Generic” class defines generic extraction via BFE engine. In this connection, the standard classification result for “invoices” has to be set to “Generic”, so that in case a document has not been classified to one of available vendor class with precise layout extraction “VendorClassX”, it goes to the “Generic” class with generic extraction pattern defined. After the generic processing has been applied, the classification result has to be set back to “Invoices” in case further SLW processing is to be maintained. This can be achieved via the following script code placed into “PostExtract” event’s handler of the “Generic” document class:

```

' Cedar Document Class Script for Class "Generic"
Private Sub Document_PostExtract(pWorkdoc As SCBCdrPROJLib.SCBCdrWorkdoc)
  pWorkdoc.DocClassName = "Invoices"
End Sub

```

In some project configurations, when vendor classification succeeds but does not deliver any results for some selected fields, it may also make sense to take an advantage of the new “Retain previous extraction results” option and define double extraction processing to combine generic extraction with vendor level extraction.

Note: The Brainware Table Extraction (BTE) and Brainware Field Extraction (BFE) engines’ external learnsets are now stored in a secure encrypted form (this effects “bte.ptb” / “bte.xtr” and “bfe.ptb” / “bfe.xtr” learnset files stored per class’s learnset directory, in case an external BTE / BFE learnset is available for a class).

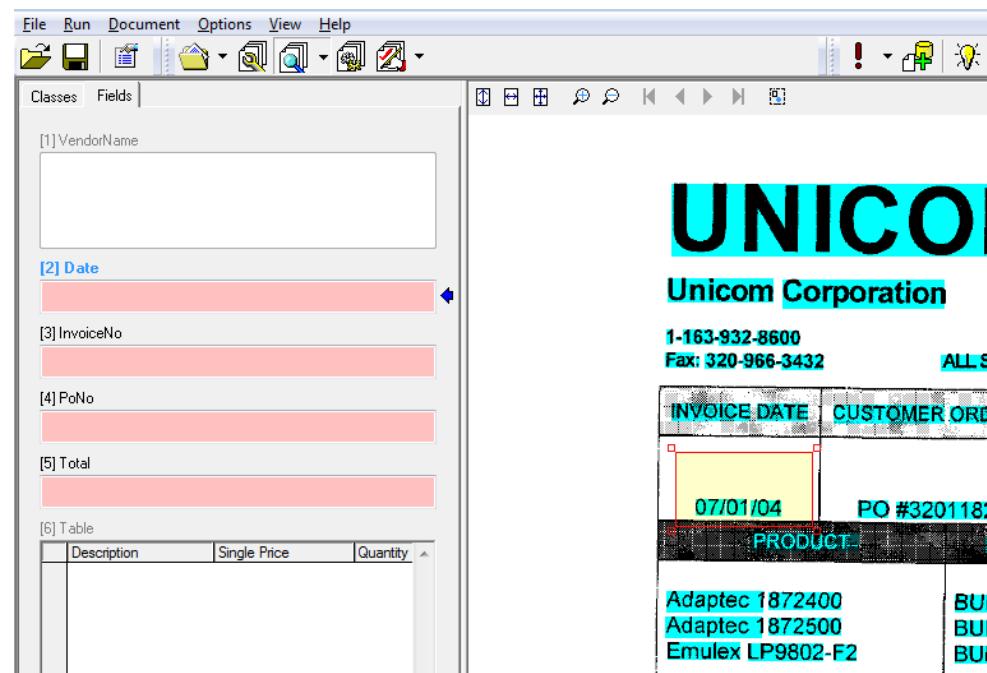


7.12 Training of Header Fields in Normal Train Mode without Configuring Field Formats

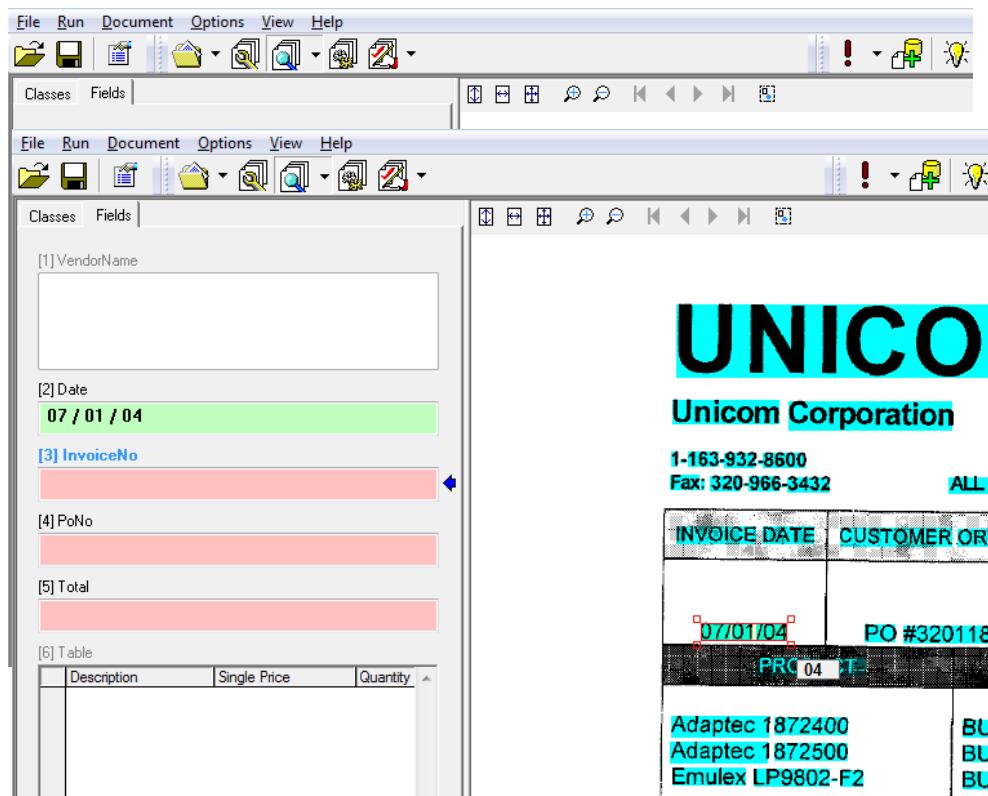
7.12.1. Description

Training of header fields in Normal Train mode of Oracle Forms Recognition Designer application can be applied without any Format Analysis pre-processing.

Open the required (already OCR-ed) document in Normal Train mode with desired class name assigned, select a header field (in any highlighting mode, i.e., “Highlight All Words”) with Brainware Extraction or Brainware Field Extraction engine assigned and use mouse rubber banding to select the desired words from the document:



The system will then select the available words with their best matching position:



Now double-click on the selected area. Internally the system is going to create the candidate object and apply the field assignment as required for further training.

7.12.1.1. Usage

This feature was primarily designed to allow quick learning of the Brainware Field Extraction engine without necessity to define header field formats via Format Analysis engine's regular expressions and/or without a need to configure SLW to use Verifier Train mode for the purpose of Brainware Field Extraction learning.

Note that this feature can be used for training of the former Brainware Extraction engine, as well. On the other hand, unless specifically desired, it is not recommended to utilize it for the Brainware Extraction engine for the following reasons:

- Further extraction with the Brainware Extraction engine requires availability of the expected extraction result among the pre-extracted (via Format Analysis engine) candidates. The engine only evaluates the existing candidates assigning them individual weights. These weights are then used by the general extraction subsystem to assign the final extraction result. Therefore, if extraction result was not among the auto-extracted candidates initially and was just created "run-time" during learning, the probability that the same case will occur for a hypothetical similar document to extract is very high. This will then lead to complete unavailability of the correct extraction result.

When a document is being trained with Brainware Extraction, the engine processes the learned field's content using it as the single member of the internal "Correct Results" and using all its other available candidates as multiple members of the "Wrong Results" class. Thus, it is clear that overall quality of Brainware Extraction engine's outcome also depends on quality of "Wrong Results" class' content. This content, in case no candidates were available prior to start of the document learning procedure, will be reduced up to just one single member for the "Wrong Results" class, which is going to be the first available word in the document. While such content is sufficient for training / extraction goal in general, it is obviously not optimal in terms of quality.

7.13 Learning the Extraction

For Brainware Extraction, you have to take a couple of sample documents and to manually assign some candidates to the respective field. Oracle Forms Recognition is then able to learn the way the data should be extracted.

7.13.1. Creating Learn Sets

The set of sample documents that you need to provide for data extraction is called the extraction Learn Set. Carefully select the samples as the quality of your Learn Set is crucial for the success of the extraction.

When you select the sample documents for the Learn Sets, take the following into account:

- Use only documents with good OCR results for the Learn Set. When in doubt, highlight the OCR results to review the documents. Never use handwritten documents.
- Use only documents that generate candidates for all relevant fields.
- Where possible, prefer documents that generate a couple of candidates instead of just one for each field. The system analyzes the neighboring words of candidates. It not only learns positive indicators for successful candidates, but also negative indicators.
- The number of samples needed to create a good extraction Learn Set depends on the task. In general, you need more samples to cover extraction than to cover classification.

Task Prerequisites

The prerequisites for this task are:

- Your project settings must allow for manual addition of documents to the Learn Set.
- Your project settings must permit data extraction as runtime functionality.
- Learning data extraction is done class by class. Therefore you should prepare homogeneous sets of sample documents where all documents within a set belong to the same class.
- You can either learn all fields defined for a class at once, or one field at a time. In the first case, your project settings should support selection of the first field when switching to the next document, in the second case

your project settings should make sure that the field selection is not changed when switching to the next document.

Creating Learn Sets for all Fields in a Class

To create Learn Sets for all fields in a class:

- 1) Switch to Document Selection Mode.
- 2) Select the first document from the batch that contains the documents for your Learn Set.
- 3) Switch to Train Mode. On the left side of the window, the Classes tab is in the foreground.
- 4) In the list in the lower section of the Classes tab, double-click the class you want to train. If you use field inheritance, select the parent class. The Fields tab displays the fields of the selected class. The fields are empty, and the first field is selected. Candidate highlighting is turned on automatically.

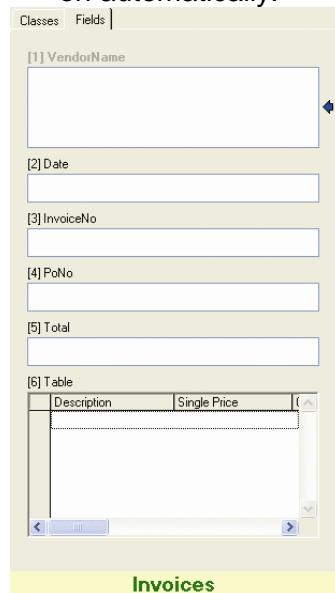


Figure 7-29: Fields tab in train mode

- 5) In the toolbar, click on button “Classify/Analyze current document” to highlight all candidates for the first field on the document.



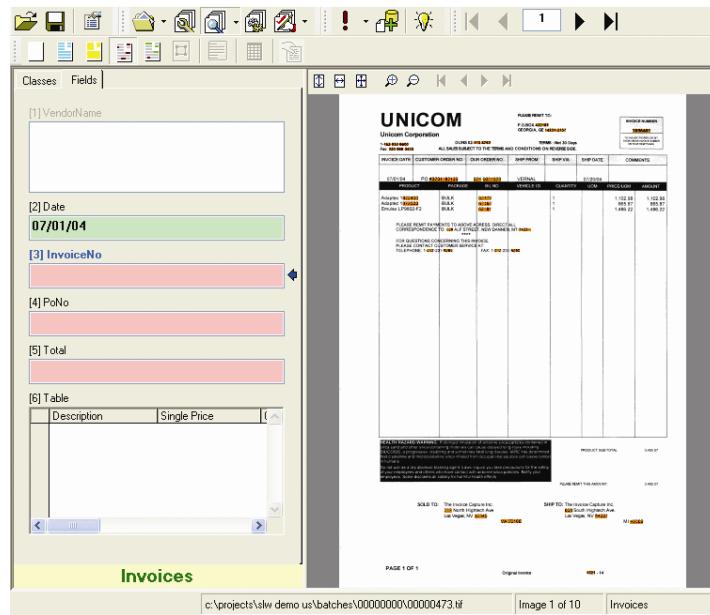


Figure 7-30: Candidate selection in train mode

- 6) To select the correct candidate, just click it. The candidate's text is written to the field, and the field's background color changes to green. The next field is selected automatically, and its candidates are highlighted automatically. When all document fields have a value, the document is automatically added to the extraction Learn Set. The program continues automatically with the next document and the first field. All you have to do is to continue choosing candidates until you have enough samples.
- 7) You can check the number of documents in the extraction Learn Set in the Classes tab.

Classes		Fields	
Unicom Corporation 1234563			
Class	Correlation		
Unicom Corporation 1...	100,0		
Invoices	000,0		
Class Hierarchy	Classific...	Extraction	
Local.sdp			
Invoices	0	0	
Unicom Corpor...	1	1	

Figure 7-31: Documents in the extraction learn set

Creating Learn Sets for a Single Field

To create Learn Sets for a single field in a class:

- 1) Switch to Document Selection Mode.
- 2) Select the first document from the batch that contains the documents for your Learn Set.

- 3) Switch to Train Mode. On the left side of the window, the Classes tab is in the foreground.
- 4) In the list in the lower section of the Classes tab, double-click the class you want to train. The Fields tab displays the fields of the selected class. The fields are empty, and the first field is selected. Candidate highlighting is turned on automatically.
- 5) On the Fields tab, select the field.
- 6) On the toolbar, click on button “Classify/Analyze current document” to highlight all candidates for the selected field on the document.
- 7) To select the correct candidate, just click it. The candidate’s text is written to the field, and the field’s background color changes to green.
- 8) In the toolbar, click on the button “Add document to learnset” to add the current document to the extraction Learn Set. The program continues automatically with the next document and the selected field.
- 9) Repeat **Step 6** to **Step 8** until you have enough samples.



Your sample documents may not always be perfect. To handle this, the following options are available:

- You can skip fields or redo training of a field by manually selecting a new field. In this case, click on



for manual analysis and click on



to manually add the current document to the extraction Learn Set. You may have to confirm that you want to use the document with some fields still being empty.

- You can use words to fill the fields that were not found as candidates. Highlight all words, click the word you want to add and confirm the following message box. Note that in this case you still have to adjust your analysis settings to make sure the candidate will be found in the future.

7.13.2. Editing Learn Sets

You can edit the extraction Learn Set just like the classification Learn Set (Section [5.5.3](#)). Just select the Learn Set as document input, then right-click a class and select View Extraction Learn Set.

7.13.3. Learning

During learning, Oracle Forms Recognition takes your Learn Sets and the manually assigned candidates. It identifies the correlation between successful candidates, unwanted candidates and their environment. It thus learns to extract data automatically if they are similar to the ones that you have selected.

Learning is required:

- Once you have set up your extraction scheme and created Learn Sets,
- When you have changed field definitions by adding, deleting, moving or renaming fields,
- When you have changed any parameters affecting the analysis and evaluation methods,
- When you have changed a Learn Set.



Classification and extraction are usually learned together. To learn extraction, proceed as described for classification (Section 4.6.5).

7.13.4. Checking the Learn Status of a Field

You can check at any time whether a field has already been learned successfully or whether it requires relearning.

Task Prerequisites

The prerequisites for this task are:

- The program runs in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

Checking a Field's Learn Status

To check the learn status of a field:

- In the Classes tab on the left side of the window, double-click a class. The corresponding Fields tab is displayed.
- Select a field.
- Select the Evaluation tab on the right side of the window.
- Check the Brainware Extraction tab. It displays the learn status.

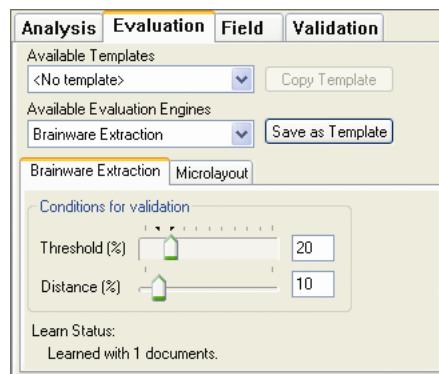


Figure 7-32: Learn status of a field

7.14 Testing the Extraction

When the fields have been set up and the analysis and evaluation methods have been defined and configured, the extraction can be tested.

Task Prerequisites

The prerequisites for this task are:

- There is an active document set.
- The classification must work.
- If Oracle evaluation is required, the evaluation must have been trained.
- Your project settings must allow data extraction as runtime functionality.

There are several methods to test the extraction.

In Definition Mode

- If the Classes tab is in the foreground, only classification will be tested.
- If the Fields tab is in the foreground, classification and extraction will be tested.

Use one of the following highlighting options to determine candidates, weights and validity:

Button	Description	Menu command
	Highlights all candidates for the currently selected field in maroon. A candidate is a possible value for a field identified in the processing step. To view the weight of the candidate, point to it with the mouse. The weight is displayed as a tooltip.	View - Highlight Candidates
	Highlights all fields in the document. If the field is valid it is highlighted in green, otherwise it is highlighted in red. To view the name of the field, point to it with the mouse. The name is displayed as a tooltip.	View - Highlight Fields

Table 7-12: *Highlighting options for extraction analysis*

Use one of the following buttons to analyze the documents:

The test results are displayed in the Fields tab on the left side of the window.

Button	Description
	Processes the current document. The button's drop-down menu enables/disables the debug mode.
	Processes the next document.
	Processes all documents in the current set starting with the current one.

Table 7-13: *Buttons for document analysis available in Definition Mode*

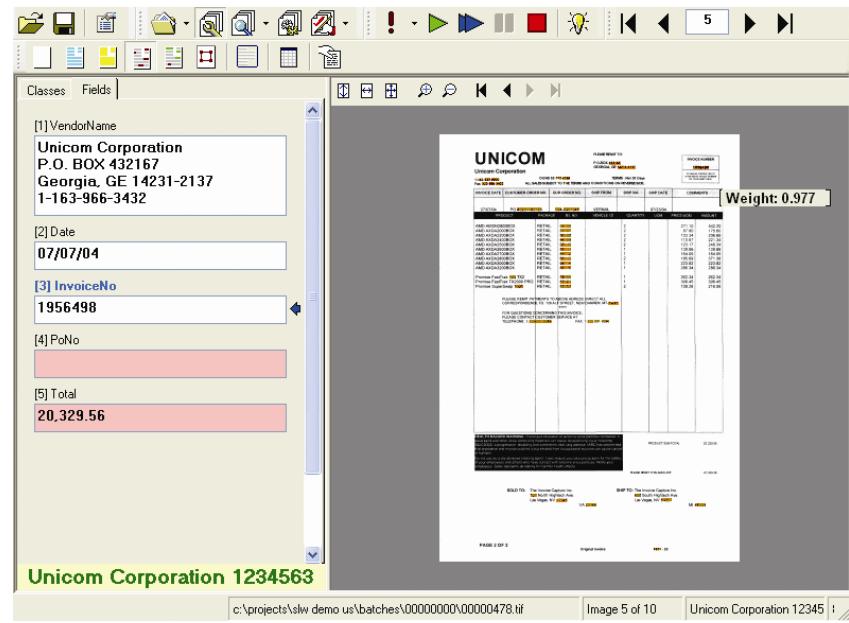


Figure 7-33: Data extraction test in definition mode

Possible results on the field level are:

- The field is empty. This happens if
 - no candidate was found or
 - no candidate had the required weight.
- The field is invalid. This is indicated by the red background color and happens if
 - the best candidate had the required weight, but not the required distance or
 - the best candidate did not meet standard or script-based validation requirements.
- The field is valid. This is indicated by the white background color.

Not In Train Mode

Data extraction is not carried out in Train Mode, the candidate selection is always done by the user. Therefore you cannot test the extraction in Train Mode.

In Runtime Mode

Use one of the following buttons to analyze the documents:

Button	Description
	Processes documents in the current set starting with the current one.
	Pauses the processing.
	Stops the processing of documents. Clears any results from previous runs.

Table 7-14: Buttons for document analysis available in Runtime Mode

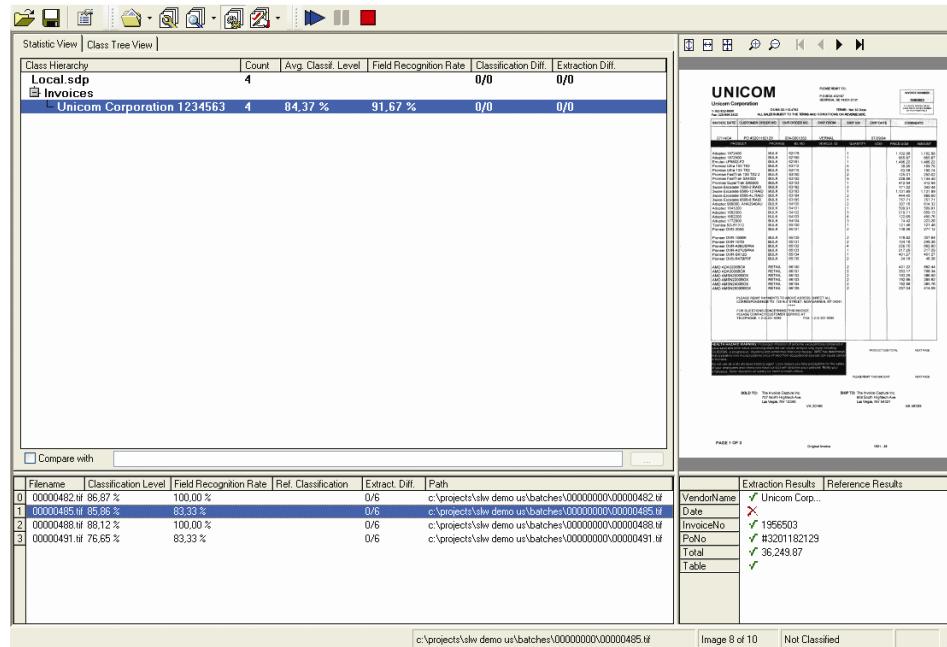


Figure 7-34: Runtime mode extraction results

The extraction-related columns in the Statistic View tab have the following meaning:

Column	Description
Avg. Classif. Level	Actual number of classifications vs. maximum number of classifications for the selected class in percent.
Classification Diff.	Class-level comparison of actual extraction results with results from a reference file. The first number represents the number of differences, the second one represents the total number of extractions. If there is a difference between test results and reference results, this is indicated by the red color.

Table 7-15: Class-Related Extraction Results

The extraction-related columns in the pane to the lower left have the following meaning:

Column	Description
Field Recognition Rate	Actual number of extractions vs. maximum number of extractions for the selected document in percent.
Extraction Diff.	Document-level comparison of actual extraction results with results from a reference file. The first number represents the number of differences, the second one represents the total number of extractions. If there is a difference between test results and reference results, this is indicated by the red color.

Table 7-16: Document-Related Extraction Results

The pane to the lower right displays the field values determined for the current document and compares them with the results for the reference documents.

- Valid results have a check mark.
- Invalid results have a cross.
- Differences between the test result and the reference result are indicated by the red color of the print.

In Verifier Test Mode

If you use table analysis and want to check the extraction results, do this in Verifier Test Mode. The test options described above only tell you whether a table was found at all, and whether the extracted result was valid. Which data was actually written to the table cells is only visible in Verifier Test Mode.

7.15 Optimizing the Extraction

Most extraction problems are due to either:

- Incomplete configuration
- Insufficient quality of the Learn Set
- Insufficient quality of the OCR

7.15.1. Resolving Problems with Incomplete Configuration

Incomplete configuration will most likely result in empty fields for all documents in a test set. The problem may be restricted to certain fields.

- For a given field, use candidate highlighting to check whether your analysis settings deliver enough candidates.
- For a given field, check the candidates' weights.
 - If they are all 0, check whether the evaluation method has been specified at all. (Section 7.3).
 - Check whether the evaluation has been learned (Section 7.13).
 - If you used field inheritance, there might be a problem with parent and child configuration. Check both configurations.

7.15.2. Resolving Problems with the Learn Set

Problems with the Learn Set will most likely result in low average extraction levels with empty and invalid fields. For some documents in the test set, the extraction will work, for others not. The problem will most likely affect all fields that use the Learn Set.

- Check the candidates' weights and the distances. If your weights and distances are too low, you need more samples.
- Add candidates which were previously not classified correctly due to the initially insufficient Learn Set.
- Use candidates from the same document with an almost identical weight. These candidates are suitable to differentiate.
- Avoid candidates with a high weight. These candidates do not improve the Learn Set, because they would already be selected correctly.

7.15.3. Resolving Problems with the OCR

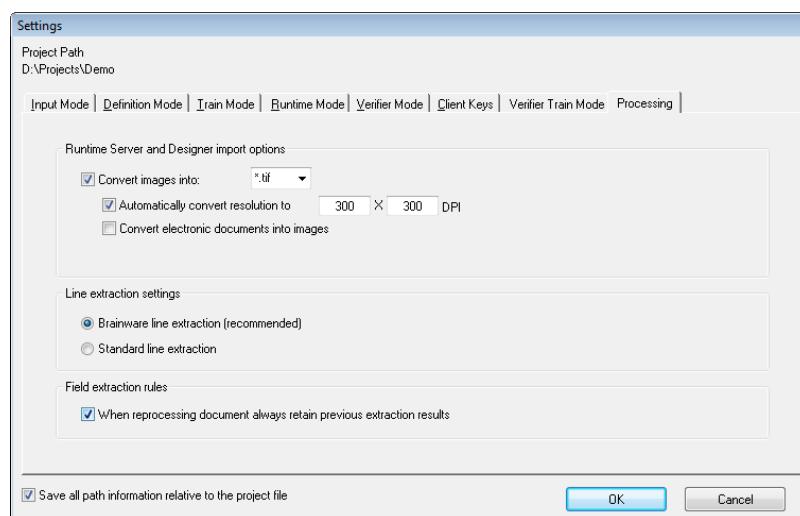
Problems in the OCR will most likely make the extracted data unusable. If you use a standard validation (No Rejects), you will obtain low average extraction levels with many invalid fields.

- The problem may be caused by the quality of your images. Make sure that your document input is properly prepared. For example, check scanner settings or fax export settings.
- The default OCR settings may not be suitable to process your document input. If candidates are found with many unrecognized characters, change the OCR settings at the zone level or at the field level. If the OCR is so bad that you cannot find candidates, you may have to change the OCR settings at the project level. For instructions on how to change OCR settings, please refer [Chapter 9](#).

7.16 Applying Extraction Retaining Previously Available Extraction Results

7.16.1.1. Description

The feature can be activated on a project level and, as soon as activated, affects all applications that apply extraction processing in Oracle Forms Recognition. It can be turned on by checking “When processing document always retain previous extraction results” option in the “Processing” tab of the Project Settings dialog of the Oracle Forms Recognition Designer application:



When activated, the system always combines new extraction results with those previously available in the working document. For example, if a WorkDoc contained fields A, B, and C and then extraction is applied to extract fields C, D, and E, the system will attach missing fields A and B to the updated WorkDoc, so that it finally contains C, D, E, A, and B. In this connection, a smart rollback is going to be applied for the content of field C, in case the new extraction result appeared to be empty. The roll-back,

as well as attaching the old fields is going to be applied retaining all the secondary properties of the field objects (like attached candidate objects or enclosed tables) and not only the extraction result itself.

7.16.1.2. Usage & Scripting

The “Retain previous extraction results” feature can be activated if double (or triple) document processing is required. This can be configured either via two separate projects or via secondary extraction initiated directly from within the first project’s custom script.

Example:

Extraction for header fields “A”, “B”, and “C” is supposed to be applied with one of the sub-classes of a parent class “Header Fields” that defines the extraction scheme for all three above mentioned fields. The secondary extraction is applied for another table field “T” and it has to be separated, e.g., applied via a totally different class “Table Fields” that includes definition and extraction scheme for the field “T” only.

1st approach – double project processing:

Project “P1” contains definition of classes’ hierarchy with root “Header Fields” class. “Retain previous extraction results” feature is turned off. A Runtime Server instance applies an extraction workflow step with “P1” redirecting the documents to state 551 in both failure and full success cases. Another Runtime Server instance applies extraction with the second project “P2” that contains the definition of “Table Fields” class. “Retain previous extraction results” feature is turned ON for “P2”. This Runtime Server instance has 551 as input extraction state and “normal” 552 / 700 output workflow states for extraction failure / success respectively. The resulting WorkDocs contain all desired fields “A”, “B”, “C”, and “T”.

2nd approach – double processing within one project via custom script:

Same as in the first approach but there is just one project “P1” that contains both classes’ hierarchies: the one with “Header Fields”, and the one with “Table Fields”. By default it always applies extraction via the first hierarchy but, if required, can also launch the second level processing via a script like the one below:

```
Private Sub Document_PostExtract(pWorkdoc As SCBCdrPROJLib.SCBCdrWorkdoc)
    On Error GoTo ERROR_HANDLER
    Project.AllClasses.ItemByName("Table Fields").Extract pWorkdoc
    ERROR_HANDLER:
    Project.LogScriptMessageEx CDRTYPE_ERROR, CDRSEVERITY_SYSTEM_MONITORING, "Second level
    extraction has failed."
End Sub
```

Chapter 8 Setting Up Supervised Learning



The Supervised Learning Workflow (SLW) is used to automatically create and learn new document classes. This automatic process creates the new derived Document Classes for a generic – base – document class (level 0.) This Document Class is not inherited from any other document class.

The derived Document Classes (level 1) cannot have further derived Document Classes.

In addition, the SLW has to be enabled in both Oracle Forms Recognition Designer and Oracle Forms Recognition Verifier.

Remember that you must learn any document you add to the local Learn Set before it is released. Otherwise, the subclass will not be created in the project. In addition, the local project must be saved in order for the sub-class to be created in the global project.

8.1 Training the Base Class

A generic or base Document Class – which is also sometimes called a base class or base DocClass – is a generic category into which all the documents you're processing will fit. An example would be "Invoices."

The classification for this generic class is not trained automatically and therefore must be pre-configured manually. To do this:

- 1) Configure the classification step by either assigning ASSA, Oracle, or any other available classification engine, or using this generic DocClass as default classification result.
 - To select a classification engine, click on the generic Document Class name in Definition Mode and select Show Properties from the Edit menu. On the Classification Editor on the right side of the screen, select a classification engine.
 - To define a document class as default classification result, click on the project name in Definition Mode and select Show Properties from the Edit menu. On the Classification Editor on the right side of the screen, notice the dropdown box for Default Classification Result. Select your generic document class for this setting. The Supervised Learning Workflow can only be applied for base classes and their direct sub-classes. Only administrator-selected base classes can become SLW nodes, where SLW node is a class node that defines how its sub-nodes will be automatically created, learned, etc. The simplest way to define a project's SLW node classification is through its default classification result. The method works if there is only one SLW node.
 - Establishing multiple classification results can be done via script. In Designer, establish a default classification result. Then use the "Document_PostExtract" event in the scripting module to set "pWorkdoc.DocClassName" to a different class. This technique enables you to keep the generic extraction pointed toward the default class, while moving the validation script to a different class.

- Insert at least one header field (usually called a text field) for which the Associative Search Engine is selected as the analysis engine.
 - Set the Classname Format on the Analysis Editor. The header field is the one that will be used to find the document class name used to create a new derived document class (if the class doesn't already exist,) and then to automatically classify the document.
- 2) Additionally, the Classification field on document class-level must be defined. Select the Document Class tab on the right side of the screen, and notice the dropdown box for Classification field. Select your generic document class for this setting from the drop-down list.

8.2 Training Other Fields

- 1) For all other text fields that are defined for a generic document class besides the one for which the Associative Search Engine is selected, you must use the Format Analysis Engine for analysis and the Brainware Extraction Engine for the evaluation engine.
- 2) If you have table fields, you must use Brainware Table Extraction for those fields.



In Oracle Forms Recognition, field names cannot contain periods or other special characters.

8.3 Creating Derived Document Classes

8.3.1. Options for Creating Derived Classes in Designer

8.3.1.1. How the Derived Classes are created

You do not have to manually configure the derived Document Classes; they will be created automatically when the documents are added to the Learn Set.

All you need to do in order for the derived classes to be created are select Verifier Train Mode from the Settings menu, check the extraction results, and add the documents to the Learn Set.

When the documents are added to the Learn Set, a new derived Document Class is automatically created. The new DocClass name corresponds to the settings established for the document-level settings of the field Classname Format on the Analysis Editor. Therefore, this must be defined in a way that ensures uniqueness of every document class name that could be created, that means that the ID, or any other unique field, should be part of the Classname Format.

Though not obligatory, it can be useful to train some additional fields for the generic class now. This would mean that there would already be extraction results for the new class, and the Verification form would therefore already be partially populated.

To train the generic Document Class now, switch to Train Mode. If there is only one generic Document Class, you can set it as the default classification result. When this option is set, all documents are classified to

the generic Document Class and only the extraction results have to be checked.

8.3.1.2. How Oracle Forms Recognition does the Classification

For the new automatically learned classes the system uses fixed and pre-determined engines that cannot be adjusted. Namely, the SLW uses:

- **Template Classification** to automatically train Level 1 classification (usually called vendor-classification in the context of Oracle Forms Recognition projects used for invoice processing.)
- **The Associative Search Engine** to automatically detect a new class name, and, optionally, to automatically train Level 1 classification.
- **Brainware Extraction** to train automatic extraction of header fields for fields that have Brainware Extraction and Format Analysis engines assigned for the parent base document class.
- **Brainware Table Extraction** to train automatic extraction of header fields for fields that have Brainware Table Extraction engine assigned for the parent base document class.

Even though a new learned DocClass has pre-defined engines that cannot be adjusted, the classes used in Supervised Learning can have any other engines assigned. When new classes are created automatically, they initially have the configurations of the engines mentioned above. However, the configuration can be changed, adjusted, or tuned manually.

8.3.1.3. Adding Supervised Learning to Template Classification

The Template classification engine is used to automatically train the derived (level 1) document classes. However, the user can also choose that the results of the Associative Search engine will be taken into account for the classification. These settings are established on the Supervised Learning Editor.

- 1) Select Show Properties from the Edit menu.
- 2) Click on the Fields tab on the left side of the screen and then on the Supervised Learning tab to the right of the Validation tab.)
- 3) On this tab, you can choose from Make supplier field invalid and/or:
 - Do smart decision. The system will decide which is the right DocClass based on an algorithm that compare the results of the associative search and the template classification.
 - Assign current document class name to supplier field. The system decides which document class will be used to assign the document to the class name in the field you created, based on the result of the template classification.
 - Assign supplier field content to current document class name. The system will use the result of the Associative Search Engine if the DocClass is available; otherwise the result of the template classification will be used.)
 - Do Nothing. The system uses only the result of the template classification and not the result of the Associative Search Engine.

8.3.2. Options for Creating Derived Classes in Verifier

In Oracle Forms Recognition Verifier, users can set an option on the Self-Learning tab for the properties that a document will be automatically added to the Learn Set when a certain percent of the fields are invalid. Users can also choose to be prompted whenever a document is added to the Learn Set.

Chapter 9 Advanced Recognition Settings

In Oracle Forms Recognition, you can use the following recognition techniques:

- OCR (Optical Character Recognition)
- Barcode Recognition
- OMR (Optical Mark Recognition)

OCR is applied to provide text input for the classification step. In the extraction step, either of the recognition techniques can be used.

Depending on the recognition method, Oracle Forms Recognition provides several recognition engines you can select from:

- For OCR:
 - FineReader8 (default OCR engine)
 - Recognita OCR Engine
 - Kadmos OCR/ICR Engine
- For barcode recognition:
 - Recognita Barcode Engine (default barcode engine)
 - Cleqs Barcode Engine
- For OMR
 - Cairo OMR Engine (default OMR engine)

Recognition is performed on demand during the classification and extraction steps. On demand means recognition can be performed as requested, any number of times. The result is stored in the Workdoc.

Each engine has its default parameter set that should work well in most cases. However, to enable you to select the optimum parameters for your problem if this should be required, you can customize the recognition settings independently on several levels for each processing step involving recognition.

9.1 Scope of Recognition Settings

9.1.1. Project-Level Settings

Project-level settings affect:

- The classification step
- Extraction steps using format analysis
- Extraction steps using address analysis
- Extraction steps using zone analysis, provided that no different settings have been specified at the zone level.

Project-level settings affect every document processed with this project. They influence both quality and performance. Therefore, be very careful when changing them.

However, you should edit them if your classification does not work properly due to OCR problems, or if you have OCR-related problems getting candidates from format analysis or address analysis. You also should edit at the project-level to change the default engines for each recognition type.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- In the Classes tab on the left side of the window, the entry representing your project is selected.
- On the right side of the window, the tabs with class/field properties are visible.
- The Project tab is displayed in the foreground.

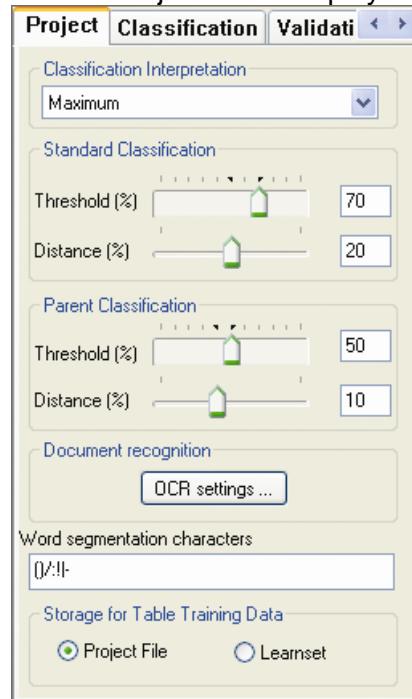


Figure 9-1: Project tab

Available Options

The following options are available:

- To change preprocessing and recognition setting, click the OCR settings button. This displays the General OCR Settings Properties.

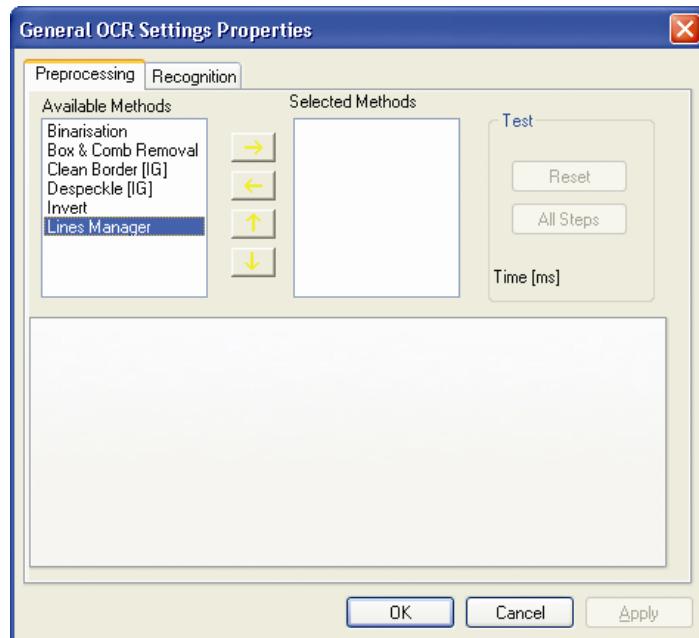


Figure 9-2: Project-Level Recognition Settings

- For detailed instructions on customizing the preprocessing options please refer to Section 9.2.2.
- For detailed instructions on customizing the recognition options, please refer to Section 9.2.4 and Section 9.3.
- To change the rules for word segmentation, edit the enumeration of characters in the Word segmentation characters text box.



Be extremely careful with this. You should have a couple of sample documents at hand and use the highlighting options to immediately check the consequences of your changes. Keep in mind that classification and extraction methods that rely on learning use a dictionary created from the words in your documents. If learning has already taken place, it needs to be repeated.

9.1.2. Page-Level Settings

The project-level recognition settings are actually taken from and written to a special reading zone, the All zone: This zone represents the entire page and is normally not visible.

To display the All zone:

- 1) Switch to Definition Mode.
- 2) In the Classes tab, select the entry representing your project.
- 3) From the View menu, select Show Page. In the viewer, the All zone is displayed as a gray rectangle.

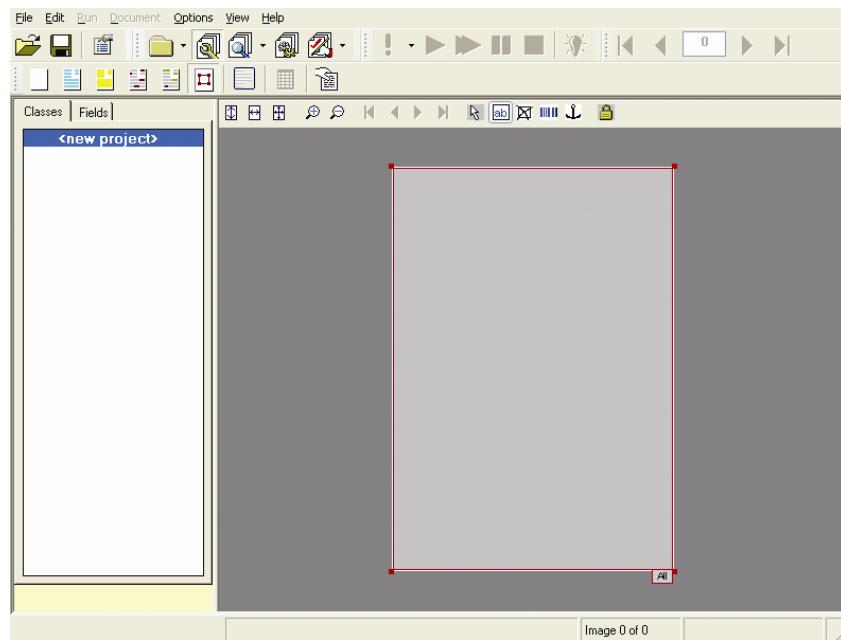


Figure 9-3: The All zone that represents the entire page

- 4) Select the All zone.
- 5) Right-click the All zone and select Properties from the shortcut menu. This displays the Zone Settings Properties for the All zone.

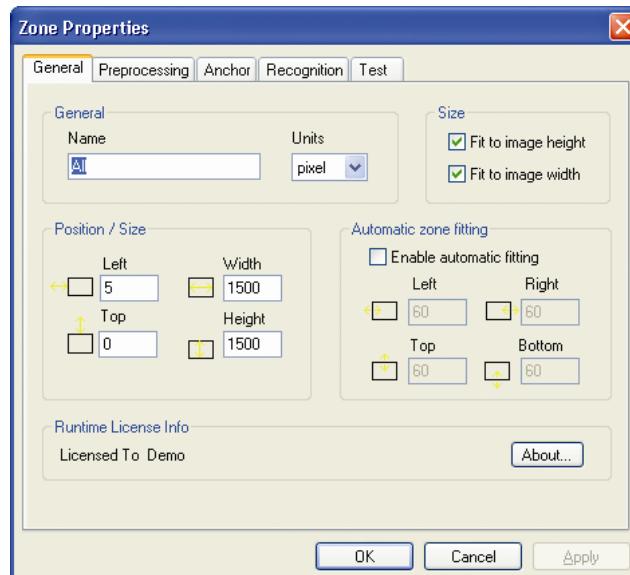


Figure 9-4: Recognition properties of the All zone



You should not edit these properties, since some of the displayed options do no make sense when applied to the entire document set. Edit at the project-level. (Section 9.1.1) Synchronization between project-level settings and page-level settings is done automatically.

9.1.3. Zone-Level Settings

Zone-level settings affect extraction steps using zone analysis. Locally, they override project-level settings. You can use a different set of parameters for each reading zone.

You should edit zone-level settings if you are experiencing recognition-related problems to extract the correct data.

At the zone level, you can normally use all kinds of preprocessing and recognition options that improve your results. Due to the small reading area, the loss in performance is comparably small.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected for which zone analysis has been defined.
- The viewer displays a document from the respective class.
- Obviously, there must be zones on the document to edit.

Editing Zone-Level Settings

To edit zone-level settings:

- 1) Select the reading zone.
- 2) Right-click the zone and select Properties from the shortcut menu. This displays the Zone Settings Properties.

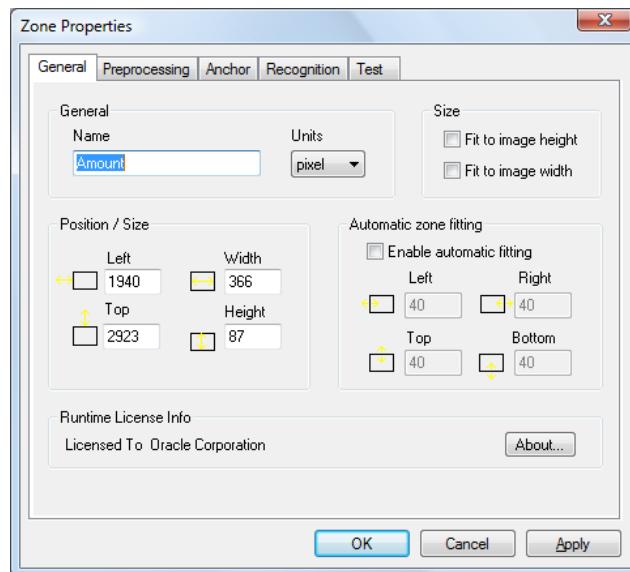


Figure 9-5: Zone level Settings

- For detailed instructions on customizing the general options, please refer to Section 9.2.1.
- For detailed instructions on customizing the preprocessing options, please refer to Section 9.2.2.

- For detailed instructions on using anchors, please refer to Section **7.6.3** and Section **9.2.2**.
- For detailed instructions on customizing the recognition options, please refer to Section **9.2.4** and Section **9.3**.
- For detailed instructions on testing your settings, please refer to Section **9.2.5**.

9.1.4. Field-Level Settings

Field-level settings affect extraction steps using format analysis or address analysis. It can be used to read the field again after the best candidate has been selected. By this time, the format and the geometry of the field is well known. Therefore, the OCR quality can be improved dramatically by using a different OCR engine and/or by imposing certain restrictions via classifiers.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- The respective field is selected.
- On the right side of the window, the tabs with class/field properties are visible.
- The Fields tab is displayed in the foreground.



Figure 9-6: Field tab

Editing Field-Level Recognition Settings

To edit field-level recognition settings:

- 1) If the current field is a derived field, you can use inherited OCR settings of the parent class. Inheritance is the default behavior. To override the parent class settings, clear Use derived OCR settings. This enables the remaining OCR parameters.
- 2) Check Read field again to activate OCR optimization.
- 3) Click on the OCR settings button. The field's OCR properties are displayed.

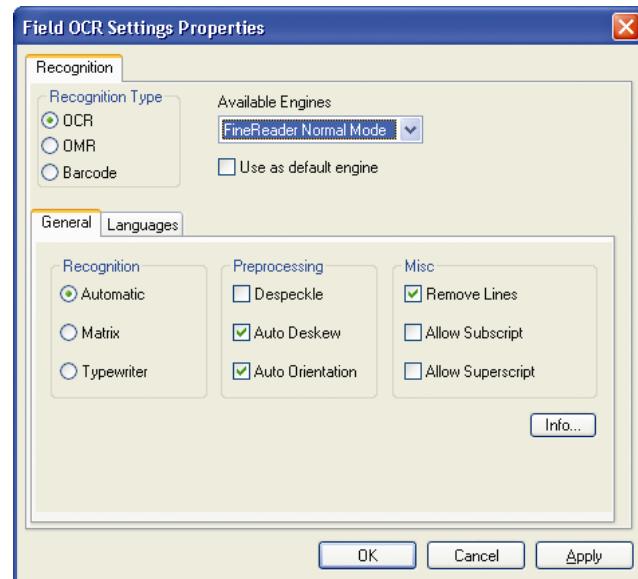


Figure 9-7: Recognition properties of a field

For detailed instructions on customizing the recognition options, please refer to Section 9.2.4, Section 9.3, Section 9.4, and Section 9.5.

9.2 Engine-Independent Settings

9.2.1. The General Tab

To edit size and position of the reading zone, select the General tab.

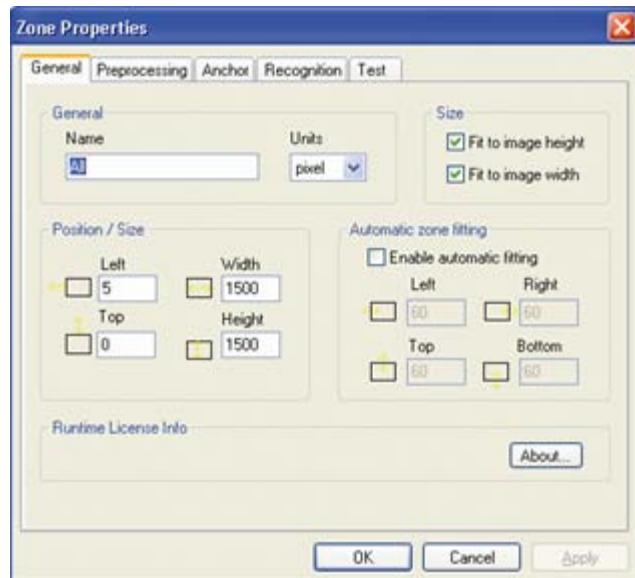


Figure 9-8: OCR General tab

The following options are available:

- Under General:
 - Name: Use this option to specify the name of the reading zone. By default, All is the reading zone for the entire page.
 - Units: Use this option to specify the units used for geometric parameters (pixel, inch, or mm).
- Under Size:
 - Fit to image height: Use this option to adjust the height of the zone to the height of the page.
 - Fit to image width: Use this option to adjust the width of the zone to the width of the page.
- Under Position / Size:
 - Left: Use this option to specify the distance of the reading zone to the left edge of the page.
 - Top: Use this option to specify the distance of the reading zone to the top edge of the page.
 - Width: Use this option to specify the width of the reading zone.
 - Height: Use this option to specify the height of the reading zone.

9.2.2. The Preprocessing Tab

To edit preprocessing options, select the Preprocessing tab.

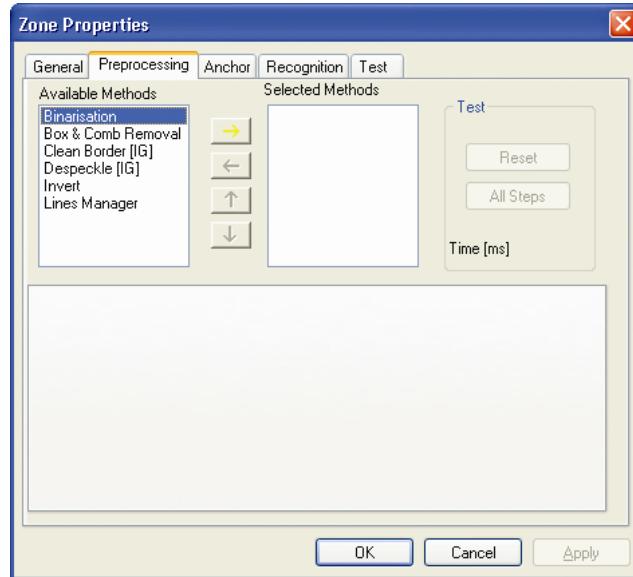


Figure 9-9: OCR Preprocessing tab

Enabling Preprocessing Methods

To enable preprocessing methods:

- 1) Under Available Methods, select one or multiple entries.
 - Select Despeckle to remove speckles from your documents. Speckles are made up of groups of black pixels surrounded by white pixels or vice versa.
 - Select Lines Manager to remove horizontal or vertical lines from your document.
 - Select Clean Border to improve the quality of images that have a dark border as, for example, often generated in photo copies.
- 2) Click on the button shown at right to move the selected entries to Selected Methods.



Disabling Preprocessed Methods

To disable preprocessing methods:



- 1) Under Selected Methods, select one or multiple entries.
- 2) Click on the following button to remove the selected entries from Selected Methods.

Ordering Preprocessing Methods

Preprocessing methods are applied in the same order as listed under Selected Methods.

To order preprocessing methods:



- 1) Under Selected Methods, select an entry.
- 2) Click on the following button to move up or click the following button to move down.

Configuring the Line Manager

To configure the line manager:

- 1) Under Selected Methods, select Line Manager.
- 2) On the General tab, check Remove hor. lines to remove horizontal lines. Enter a minimum line length in mm in the Min. hor.... text box.
- 3) On the General tab, check Remove ver. lines to remove vertical lines. Enter a minimum line length in mm in the Min. ver.... text box.

Testing the Effect of Preprocessing Methods

To test the effect of preprocessing methods:

- 1) Make sure the current document is visible and not hidden behind the dialog box.
- 2) Do one of the following:
 - To test a single method: Under Selected Methods select an entry and click the Single Step button.
 - To test all selected methods: Click on the All Steps button. Check the preprocessing effects by looking at the document. The time required for preprocessing is displayed under Test.
- 3) For further tests, click Reset before you proceed.



If performance is an issue, check the sum of recognition time and preprocessing time. Even if preprocessing takes a while, recognition may be faster after preprocessing.

9.2.3. The Anchors Tab

To assign anchors to the current reading zone, select the Anchors tab.

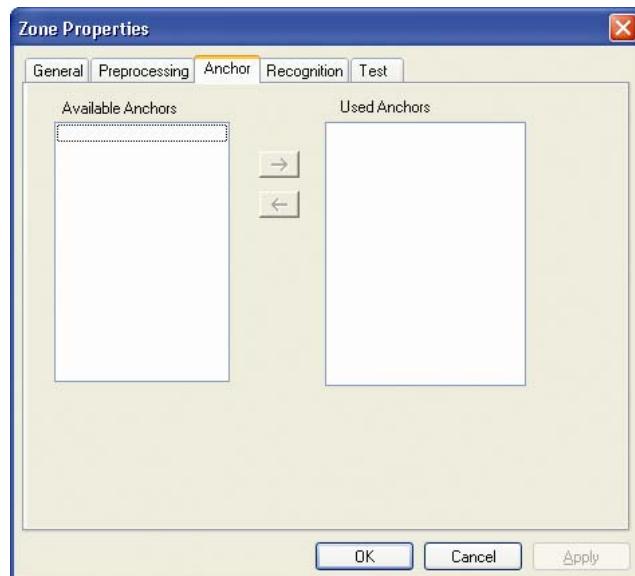


Figure 9-10: OCR Anchors tab

Available Operations

The following operations are possible:

- To assign anchors, select them from the Available Anchors list box and click on 
- To delete assignments, select anchors from the Selected Anchors list box and click on 

9.2.4. The Recognition Tab

To edit recognition settings, select the Recognition tab.

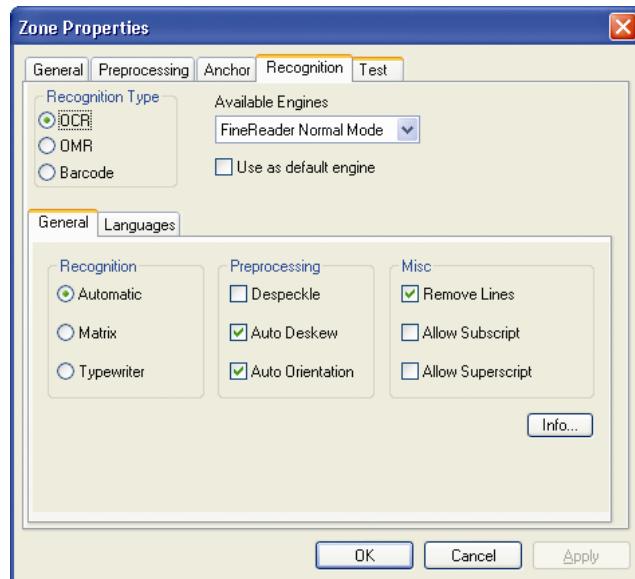


Figure 9-11: OCR Recognition tab

To select a recognition engine:

- 1) Under Recognition Type, select OCR, OMR, or Barcode.
- 2) Under Available Engines, select the recognition engine.
- 3) To use the selected engine as default engine for the current recognition type, check Use as default engine.

For more information about customizing the selected engine, please see:

- FineReader8 OCR Engine (Section 9.3.1)
- Recognita OCR Engine (Section 9.4)
- Kadmos OCR/ICR Engine (Section 9.5)
- Recognita Barcode Engine (Section 9.6)
- Cleqs Barcode Engine (Section 9.7)

9.2.5. The Test Tab

To test the recognition results with the current document, select the *Test* tab.

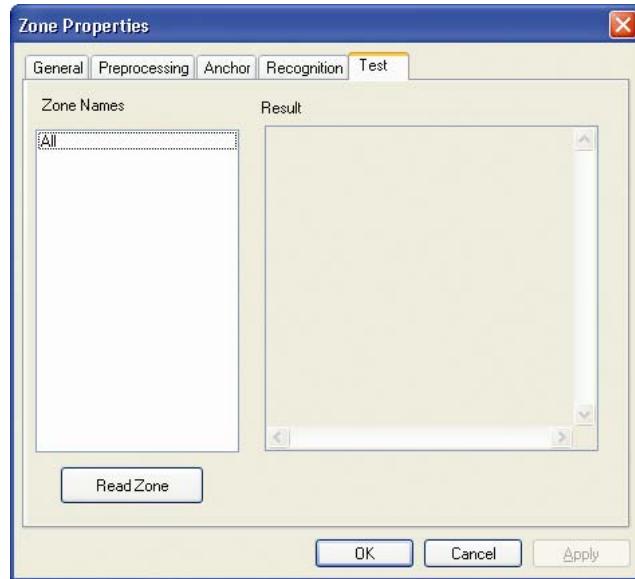


Figure 9-12: OCR Test tab

To perform the test, do one of the following:

- If no zone is selected: In the Zone Names list box, click the zone name.
- If there is a zone selected: Click on the Read Zone button.

The recognition result is displayed in the Result text box. Below, the execution time and -if applicable- the degree of blackness is displayed.



Avoid recognition tests with entire pages.

9.3 The FineReader OCR Engine

The FineReader OCR Engine includes a normal and a fast mode. In fast mode, this engine is optimized for enterprise documents with poor or marginal printer quality, such as documents printed with dot matrix or chain printers. Oracle Forms Recognition Designer uses FineReader Fast (the default) and FineReader Normal.

9.3.1. FineReader8 Normal Mode

9.3.1.1. General Tab

To edit general settings, select the General tab.

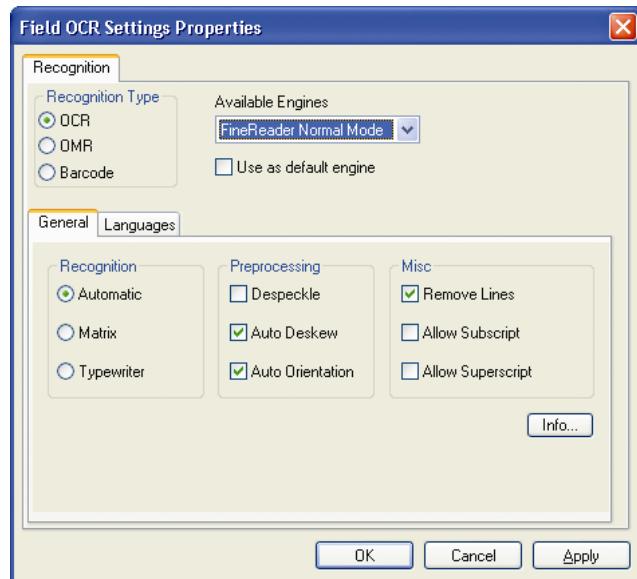


Figure 9-13: General tab of the FineReader Normal Mode.

The following options are available:

- Recognition: The options are Automatic, Matrix, and Typewriter:
 - Automatic: Select this option to automatically detect how the documents have been printed. As a rule, use this option unless your document input is very homogeneous and from a dot-matrix printer or a typewriter.
 - Matrix: Select this option for material printed with dot-matrix printers.
 - Typewriter: Select this option for material created with typewriters.
- Preprocessing: The options are Despeckle, Auto Deskew, and Auto Orientation:
 - Despeckle: Select this option to remove speckles from your documents. Speckles are made up of a group of black pixels surrounded by white pixels or vice versa.
 - Auto Deskew: Select this to automatically fix the alignment of badly scanned pages.
 - Auto Orientation: If checked, the engine will automatically detect the page orientation and rotate the image to the correct position if necessary.
- Miscellaneous
 - Remove Lines: Select to remove all internal lines, either horizontal or vertical.
 - Allow Subscript: Select this option to allow a character that is printed on a level lower than the rest of the characters on the line, for example, the "2" in the chemical formula "H₂O"
 - Allow Superscript: Select this option to allow for letters, characters, or symbols that are written above, or above and to the right or left of, another character. For example, "Oracle Forms Recognition™"
- Info Button: Information about the Runtime license.

9.3.1.2. The Languages Tab

FineReader supports nearly 30 languages. The standard installation of Oracle Forms Recognition consists of English, French, German, Italian, Spanish, and Digits. Additional languages are available and can be installed separately.

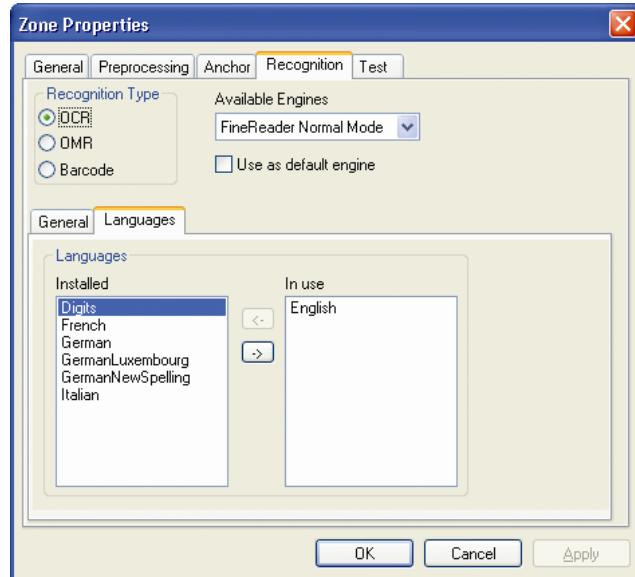


Figure 9-14: Choosing languages in FineReader Normal Mode

Editing Language Settings

To edit language settings, select the Language tab.

- Languages: The options are as follows:
 - Installed: Set of languages installed on the system.
 - In Use: Select your text language. Recognition will be processed with the corresponding language data files (language database). Select multiple languages only if you are processing multilingual documents.

The following languages are available

Albanian	Armenian
Czech	Danish
Dutch	English
Finnish	French
German	Greek
Hungarian	Icelandic
Italian	Canadian
Norwegian	Polish

Portuguese	Romanian
Russian	Slovakian
Slovenian	Spanish
Swedish	Turkish

Table 9-1: FineReader Normal Mode available languages

9.3.2. FineReader Fast Mode

9.3.2.1. The General Tab

To edit general settings, select the General tab

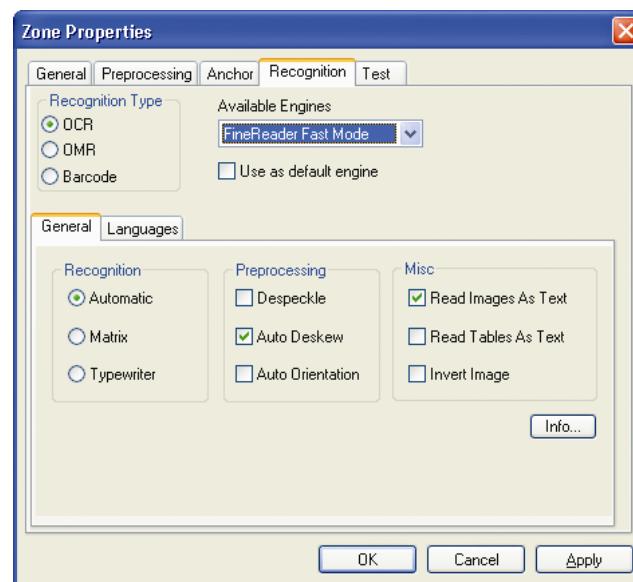


Figure 9-15: Editing settings for text, preprocessing and others FineReader Fast Mode General Tab

- **Recognition:** The options are Automatic, Matrix, and Typewriter:
 - Automatic: Select this option to automatically detect how the documents have been printed. As a rule, use this option unless your document input is very homogeneous and from a dot-matrix printer or a typewriter
 - Matrix: Select this option for material printed with dot-matrix printers.
 - Typewriter: Select this option for material created with typewriters.
- **Preprocessing:** The options are Despeckle, Auto Deskew, and Auto Orientation:
 - Despeckle: Select this option to remove speckles from your documents. Speckles are made up of a group of black pixels surrounded by white pixels or vice versa.
 - Auto Deskew: Select this to automatically fix the alignment of badly scanned pages.

- Auto Orientation: If checked, the engine will automatically detect the page orientation and rotate the image to the correct position if necessary.
- Miscellaneous
 - Read Images as text If checked, graphics will be interpreted as a text. Example: Retrieves text from a company's logo.
 - Read Tables as text If checked, tables will be interpreted as a text
 - Invert Image: Select this to automatically detect black characters on a white background and white characters on a black background

9.3.2.2. The Languages Tab

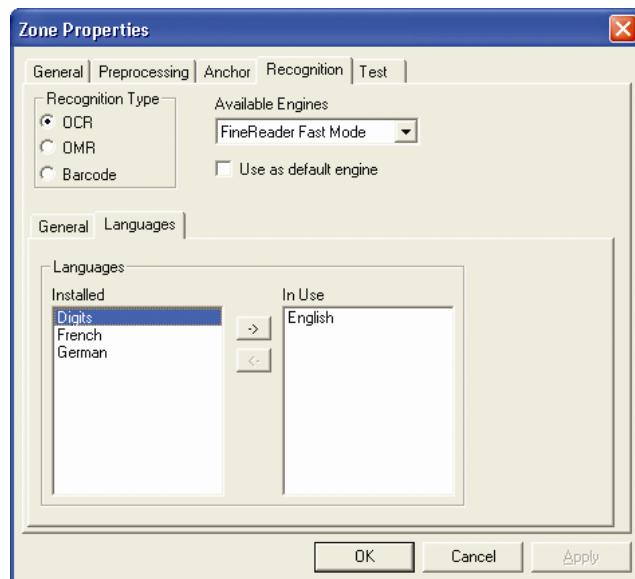


Figure 9-16: Setting languages on the Languages tab for FineReader Fast Mode.

Languages: The options are as follows:

- Installed: Set of languages installed on the system.
- In Use: Select your text language. Recognition will be processed with the corresponding language data files (language database). Select multiple languages only if you are processing multilingual documents.

9.3.3. FineReader 8.1

9.3.3.1. The General Tab

To edit general settings, select the General tab

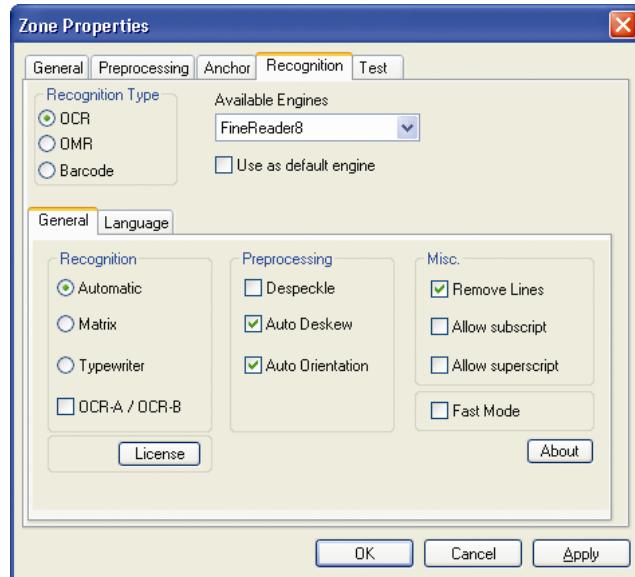


Figure 9-17: Editing settings for text, preprocessing and others FineReader 8.0 General Tab

- **Recognition:** The options are Automatic, Matrix, and Typewriter:
 - Automatic: Select this option to automatically detect how the documents have been printed. As a rule, use this option unless your document input is very homogeneous and from a dot-matrix printer or a typewriter
 - Matrix: Select this option for material printed with dot-matrix printers.
 - Typewriter: Select this option for material created with typewriters.
 - OCR-A / OCR-B: Select this when the documents use OCR-A and OCR-B fonts. This is typically where high OCR character recognition rates are needed. The fonts are optimized for machine character recognition. For example, they are used on passports and other security documents.
- **Preprocessing:** The options are Despeckle, Auto Deskew, and Auto Orientation:
 - Despeckle: Select this option to remove speckles from your documents. Speckles are made up of a group of black pixels surrounded by white pixels or vice versa.
 - Auto Deskew: Select this to automatically fix the alignment of badly scanned pages.
 - Auto Orientation: If checked, the engine will automatically detect the page orientation and rotate the image to the correct position if necessary.
- **Miscellaneous**
 - Remove Lines: Select to remove all internal lines, either horizontal or vertical.
 - Allow Subscript: Select this option to allow a character that is printed on a level lower than the rest of the characters on the line, for example, the "2" in the chemical formula "H₂O"

- Allow Superscript: Select this option to allow for letters, characters, or symbols that are written above, or above and to the right or left of, another character. For example, “Oracle Forms Recognition™”
- *Fast Mode*: If checked recognition is quicker but less accurate.
- About Button: Information about the Runtime license.

9.3.3.2. The Languages Tab

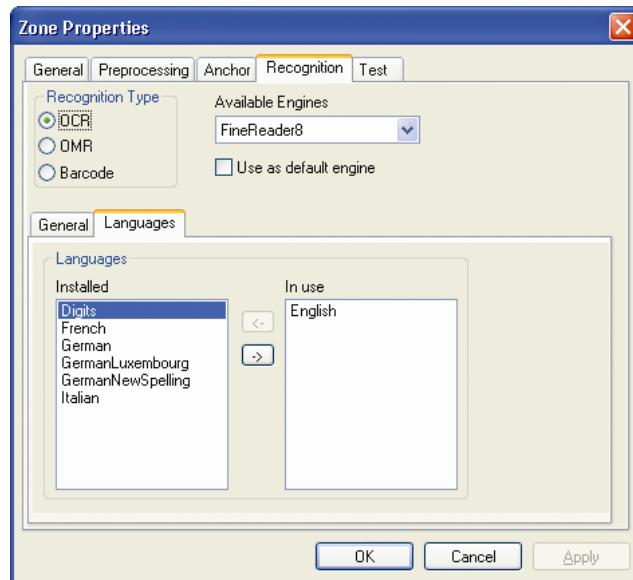


Figure 9-18: Setting languages on the Languages tab for FineReader 8.0.

Languages: The options are as follows:

- Installed: Set of languages installed on the system.
- In Use: Select your text language. Recognition will be processed with the corresponding language data files (language database). Select multiple languages only if you are processing multilingual documents.

9.4 The Recognita OCR Engine

9.4.1. The General Tab

To edit general settings, select the General tab.

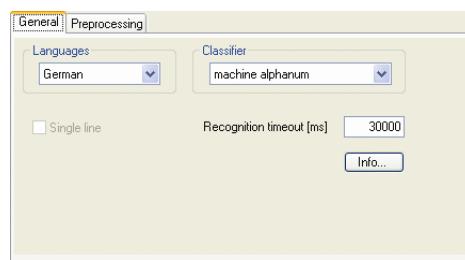


Figure 9-19: General tab of the Recognita OCR Engine

The following options are available: Language, Classifiers, and Recognition timeout.

- Languages: Select your text language. The recognition results will be compared with entries in the corresponding dictionary.
- Classifiers: Select one of the following options:
 - Machine alphanum: for machine-printed material containing alpha characters and numbers
 - 24-pin draft dot-matrix: for material printed with dot-matrix printers with 24 pins.
 - 9-pin dot-matrix: for material printed with dot-matrix printers with 9 pins.
 - hand, numeric: for hand-written numbers.
- Recognition timeout [ms]: Specify the time in milliseconds after which the recognition will be cancelled even if there is no result.

9.4.2. The Preprocessing Tab

To edit preprocessing settings, select the Preprocessing tab.

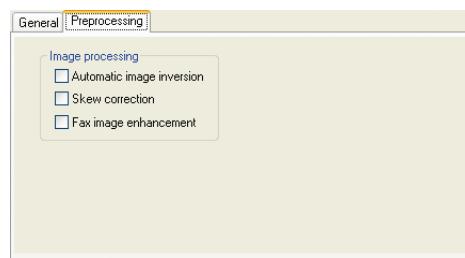


Figure 9-20: Preprocessing tab of the Recognita OCR Engine

The following options are available: Automatic image inversion, skew correction, automatic rotation, and fax image enhancement.

- Automatic image inversion: Select this to automatically detect black characters on a white background and white characters on a black background.
- Skew correction: Select this to automatically adjust pages that were scanned at an angle.
- Automatic rotation: Select this to automatically rotate pages so that the printing is upright.
- Fax image enhancement: Select this to activate specialized preprocessing options for faxes.

9.5 The Kadmos OCR/ICR Engine

The Kadmos OCR/ICR Engine is recommended if you need to process hand-written material.

9.5.1. The General Tab

To edit general settings, select the General tab.

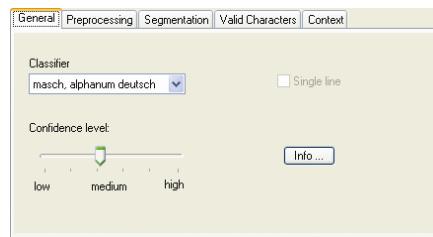


Figure 9-21: General tab of the Kadmos OCR Engine

Two options are available: Classifier and Confidence Level.

- **Classifier:** Select one of the following options. Your selection determines the range of valid characters. These characters are displayed on the Valid Characters tab and can be further restricted there (Please see [9.5.4 The Valid Characters Tab.](#))
 - **Hand, alphanumeric, German:** for German hand-written material containing alpha characters and numbers
 - **Handprint:** for US or UK handwritten material.
 - **Hand + machine print, numeric:** for material containing handwritten or machine-printed numbers and currency symbols, but no other alpha characters
 - **Normfont:** for material written with CMC7, E13B, F7B fonts.
 - **OCRA, OCRB:** for material written with dedicated OCR fonts.
 - **Machine print, alphanumeric:** for UK, US, and German machine-printed material containing alpha characters and numbers.
- **Confidence level:** Use the slider to specify the threshold for accepting characters. Characters below the required confidence level are termed as rejects. High confidence levels cause more rejects, but there will be fewer errors in the accepted results. High confidence levels also affect performance. Generally, it takes about 10 times longer to read with the highest confidence level than with the lowest.

9.5.2. The Preprocessing Tab

To edit preprocessing settings, select the *Preprocessing* tab.

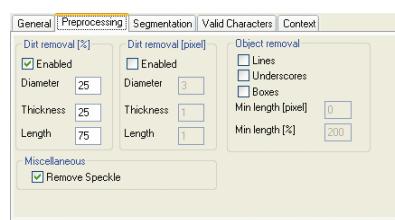


Figure 9-22: Preprocessing tab of the Kadmos OCR Engine

The following options are available: Dirt Removal, Objects Removal, and Speckle Removal.

- **Dirt removal [%] / Dirt removal [pixel]:** Select one of these options to reduce background noise on your documents. You need to select the Enabled check box and to specify the maximum size of spots that are removed, either using the pixel scale, or as a fraction of the line thickness of the found characters. The size parameters are:

- Diameter: maximum diameter of a spot
- Thickness: maximum horizontal length of a spot
- Length: maximum vertical length of a spot
- Objects Removal: Select this option to remove lines or other geometrical shapes that could interfere with the OCR from the documents. This setting is often required for forms. You can remove:
 - Lines
 - Underscores
 - Boxes
- In addition, you need to specify the minimum size of these objects, either using the pixel scale, or as a fraction of the line thickness of the found characters. The size parameters are:
 - Min. length [pixel]:
 - Min. length [%]:
- Remove Speckle: Select this option to automatically remove speckles that are found within the text lines.

9.5.3. The Segmentation Tab

To edit segmentation rules for words and lines, select the *Segmentation* tab.

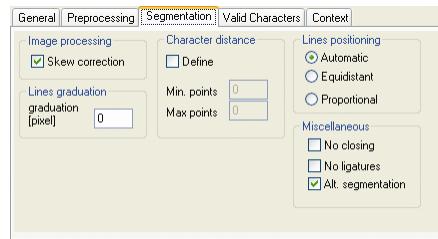


Figure 9-23: Segmentation tab of the Kadmos OCR Engine

The following options are available: Skew correction, line graduation, character distance, and character positioning.

- Skew correction: Select this option to automatically adjust pages that were scanned at an angle.
- Lines graduation: Select this option to speed up processing if you can specify the vertical character distance. Use 0 if the distance is unknown. This option is for experts only.
- Character distance: Select this option to speed up processing if you can specify the horizontal character distance. To activate the option, check Define. You need to specify the minimum and the maximum distance in points using the following parameters:
 - Min. points
 - Max. points
- Character positioning: Select one of the following options to specify the behavior of the text font:
 - Automatic: Use this option if you do not know how character distances behave or if your document input is heterogeneous with respect to character distance.
 - Equidistant: Use this option if your text consists of fixed width font.

- Proportional: Use this option if your characters have a varying distance.
- Miscellaneous:
 - No closing: Select this option if you are sure that your documents contain only characters that do not touch each other and are clearly separated. This option is for experts only.
 - No ligatures: Select this option if you are sure that your documents contain no ligatures. Ligatures were used previously in typesetting. With some characters, you get a very large distance if you represent them using a pair of letters. Therefore, a united pair or triple was used. This was called the ligature. Today they are still in use to improve readability, and some computer fonts include them. They may include such combinations as ff, fi, fl, ffi, ffl, Rp, ct, st, Sh, Si, Sl, SS, and St. This option is for advanced users only.



Figure 9-24: Normal characters vs. ligatures

- Alt. segmentation: Select this option to avoid the check for alternative character segmentation options. This option is for advanced users only.

9.5.4. The Valid Characters Tab

To restrict the range of valid characters, select the Valid Characters tab.

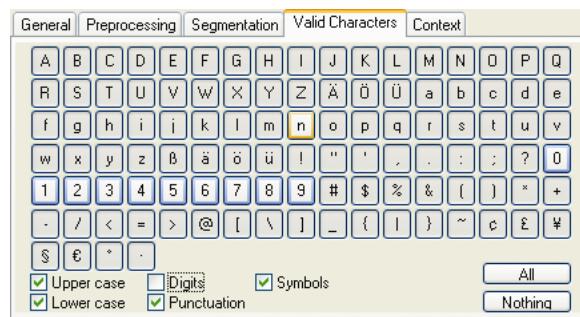


Figure 9-25: Valid Characters tab of the Kadmos OCR Engine

- In the upper section, the Valid Characters tab displays a button for each possible character of the selected classifier. (Please see Section 9.5.1). If a button appears to be pressed, the corresponding character is valid; otherwise it is invalid.
- In the bottom section, there are check boxes that enable you to edit entire character groups in one step. If a check box is selected, the corresponding character group is valid.
- The All and Nothing buttons enable you to edit the entire character set in one step. If you click All, all characters are marked as valid. If you click Nothing, all characters are marked as invalid.

9.5.5. The Context Tab

To specify settings with respect to word and line surroundings, select the Context tab.

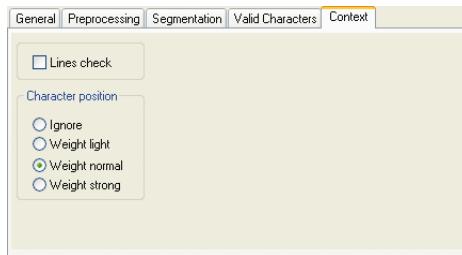


Figure 9-26: Context tab of the Kadmos OCR Engine

Two options are available: Lines Check and Character Position

- Lines Check: Select this option to check alternative line segmentation options if a line contains many characters with poor recognition quality.
- Character Position: Select one of the following options to take the position of a character within a line into account:
 - Ignore
 - Weight light
 - Weight normal
 - Weight strong

9.6 The Recognita Barcode Engine

The Recognita Barcode engine is the default engine for Barcode recognition.

9.6.1. The General Tab

To edit general settings, select the General tab.

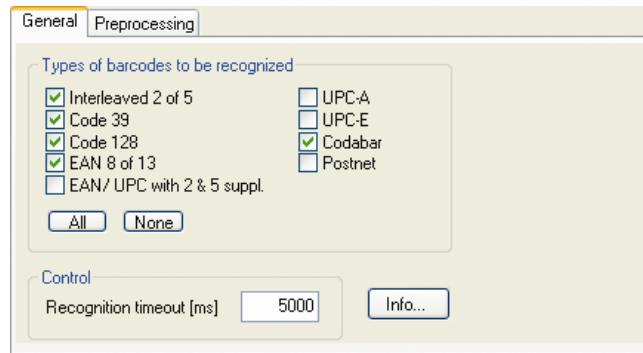


Figure 9-27: General tab of the Recognita barcode Engine

Two options are available: Types of Barcodes and Recognition Timeout.

- Types of barcodes...
 - Use the check boxes to select barcode types that you expect to find. Do not check more options than required as this will slow down processing and affect accuracy.
 - Click on All to select all barcode types.

- Click on None to clear all selections.
- Recognition timeout [ms]: Specify the time in milliseconds after which the recognition will be cancelled even if there is no result.

9.6.2. The Preprocessing Tab

To edit preprocessing settings, select the Preprocessing tab.



Figure 9-28: Preprocessing tab of the Recognita barcode Engine

Four options are available: Automatic Image Inversion, Skew Correction, Automatic Rotation, and Fax Image Enhancement.

- Automatic image inversion: Select this to automatically detect black characters on a white background and white characters on a black background.
- Skew correction: Select this to automatically adjust pages that were scanned at an angle.
- Automatic rotation: Select this to automatically rotate pages so that the printing is upright.
- Fax image enhancement: Select this to activate specialized preprocessing options for faxes.

9.7 The Cleqs Barcode Engine

The Cleqs Barcode Engine is a barcode engine compatible with Oracle Forms Recognition.

9.7.1. The General Tab

To edit general settings, select the General tab.

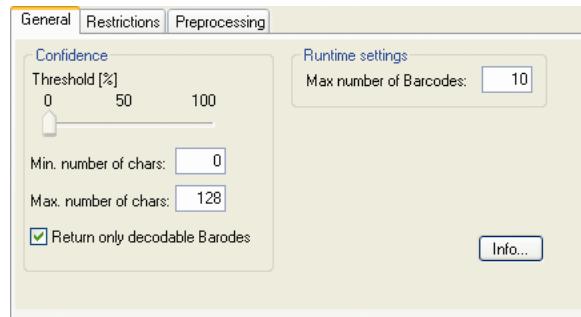


Figure 9-29: General tab of the Cleqs barcode engine

The following options are available:

- Confidence: Currently not available
- Min. / Max. number of chars: Enter the minimum or maximum length of the barcode in characters.
- Return only...: Check this option to accept barcodes only if all characters are recognized, i.e. no rejects.
- Max. number of Barcodes: Enter the maximum number of barcodes to be recognized within the reading zone. The default is 10, which can usually be reduced to speed up processing.

9.7.2. The Restrictions Tab

To edit barcode types, select the *Restrictions* tab.

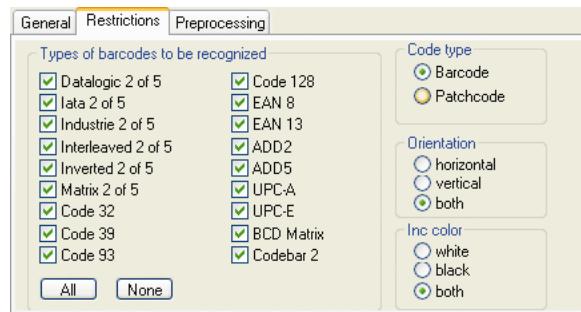


Figure 9-30: Restrictions tab of the Cleqs barcode engine

The following options are available:

- Code type: Select whether you want to recognize barcodes or patchcodes. A patchcode is a pattern of horizontal black bars separated by spaces and typically placed near the leading edge of a paper document. Patchcodes can be used to separate documents.

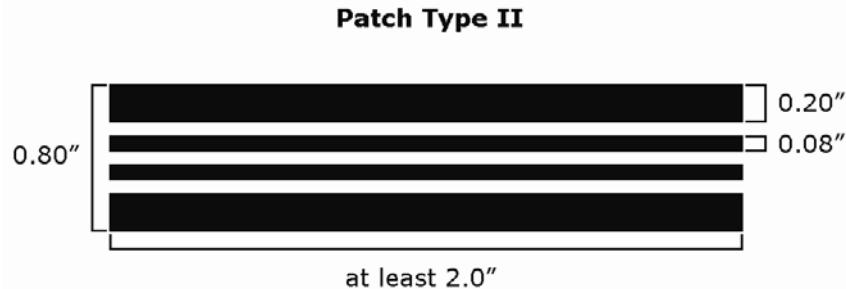


Figure 9-31: Sample patchcode

- Types of barcodes...
 - Use the check boxes to select barcode types that you expect to find. Do not check more options than required as this will slow down processing and affect accuracy.
 - Click on All to select all barcode types.
 - Click on None to clear all selections.
- Orientation:
 - horizontal: Select this option only if all your barcodes or patchcodes are oriented horizontally.
 - vertical: Select this option only if all your barcodes or patchcodes are oriented vertically.
 - both: Select this options to process heterogeneous material.
- Ink Color:
 - white: Select this option to detect white barcodes on a black background.
 - black: Select this option to detect black barcodes on a white background.
 - both: Select this option to detect white barcodes on a black background and black barcodes on a white background.

9.7.3. The Preprocessing Tab

To edit preprocessing settings, select the Preprocessing tab.

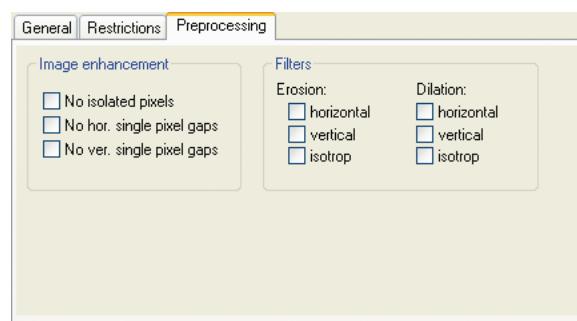


Figure 9-32: Preprocessing tab of the Cleqs barcode engine

The following options are available:

- Image enhancement:
 - No isolated pixels: Select this option to automatically remove small speckles from the reading zone.

- No hor. single pixel gaps: Select this option to automatically fill small gaps in horizontal lines. This option is recommended to process barcodes with a corresponding orientation.
- No ver. single pixel gaps: Select this option to automatically fill small gaps in vertical lines. This option is recommended to process barcodes with a corresponding orientation.
- Filters / Erosion: The erosion filter thins down lines by setting any black pixel to white if it is located at a specified direction to at least one white pixel in the source image. To specify the direction, select from the following options:
 - horizontal
 - vertical
 - isotropic (i.e., all directions)
- Filters / Dilation: The dilation filter thickens lines by setting any white pixel to black if it is located at a specified direction to at least one black pixel in the source image. To specify the direction, select from the following options:
 - horizontal
 - vertical
 - isotropic (i.e., all directions)

9.8 The Cairo OMR Engine

9.8.1. The General Tab

To edit general settings, select the General tab.

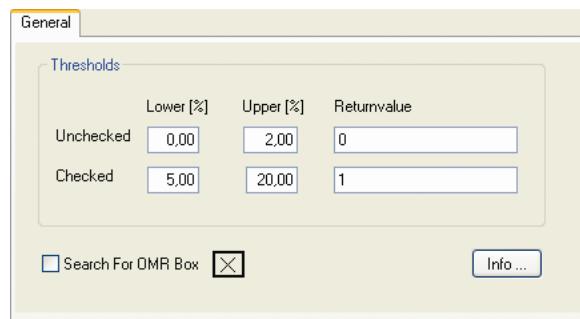


Figure 9-33: General tab of the Cairo OMR engine

You need to specify threshold values to distinguish Unchecked from Checked areas. The following options are available:

- Unchecked:
 - Lower [%]: Lower limit for degree of blackness in percent.
 - Upper [%]: Upper limit for degree of blackness in percent.
 - Returnvalue: A number or a character string. This value is returned if the measured degree of blackness lies between the lower and the upper limit for Unchecked. In this case, it can reliably be assumed that the OMR zone is unchecked.
- Checked:

- Lower [%]: Lower limit for degree of blackness in percent. The value should of course exceed the upper limit for Unchecked.
- Upper [%]: Upper limit for degree of blackness in percent.
- ReturnValue: A number or a character string. This value is returned if the measured degree of blackness lies between the lower and the upper limit for Checked. In this case, it can reliably be assumed that the OMR zone is checked.

If it cannot be decided whether the OMR zone is checked or not, i.e. for all degrees of blackness outside the ranges specified, a question mark is returned, similar to the behavior of OCR engines with unrecognized characters.

In particular if your OMR zones are filled in manually, do not choose too high values for the upper limit of checked OMR zones. A very high degree of blackness may rather indicate that a manual entry has been corrected. If this can be safely excluded, you can of course also configure the OMR recognition to never return question marks.

Chapter 10 Regular Expressions

10.1 What are Regular Expressions?

Regular expressions are a generalized pattern language that Oracle Forms Recognition uses for format analysis. With regular expressions, strings that match a specified pattern can be identified in a document's text. Although regular expressions look cryptic, they are easy to learn.

Try using regular expressions if you have problems getting the correct candidates for field extraction with simple expressions. Regular expressions precisely describe the candidates you are looking for.

10.2 Literal Characters in Regular Expressions

Two types of characters are used in regular expressions: Literal and special.

Literal characters are made up of normal text characters, such as letters or numbers, and of all symbols that are not used as operators.

The second type of characters are special characters. These are symbols that can be used as operators.

* - [] ^ { } \ .

If a special character appears in a regular expression as a literal character, it must usually be marked so that it is treated as a literal character and not as an operator. To use a special character as a literal character, place a backslash in front of the symbol, or enclose the symbol with square brackets.

10.3 Operators in Regular Expressions



Operators consist of one or more special characters.

Operator	Description
	<p><i>Match-self Operator</i> This operator is represented by any literal character. Its definition is included for completeness only. It matches the character itself. <i>Example:</i> <code>t</code> matches only the string <code>t</code>. It does not match the string <code>tt</code>.</p>
	<p><i>Concatenation Operator</i> This operator is not represented by any character. It concatenates two regular expressions <code>a</code> and <code>b</code>. <code>b</code> is simply placed after <code>a</code>. The result is a regular expression that will match a string if <code>a</code> matches its first part and <code>b</code> matches the rest. <i>Example:</i> <code>xy</code> matches <code>xy</code>.</p>
.	<p><i>Match-Any-Character Operator</i> This operator is represented by a period. It matches any single printing or non-printing character. <i>Example:</i> <code>a.b</code> matches any three-character string beginning with <code>a</code> and ending with <code>b</code>.</p>
*	<p><i>Match-Zero-or-More Operator</i> This operator is represented by an asterisk. The <code>*</code> operator is always used following a literal character or a special character. It repeats the smallest possible preceding regular expression as many times as necessary to match the pattern, including one repetition and zero repetitions. <i>Examples:</i> <code>o*</code> matches any string made up of zero or more <code>o</code>'s. <code>fo*</code> matches <code>f</code>, <code>fo</code>, <code>foo</code> and so on.</p>
<code>\{count\}</code> <code>\{min,\}</code> <code>\{min, max\}</code>	<p><i>Interval Operators</i> The Open Interval Operator is represented by <code>\{</code>. The Close Interval Operator is represented by <code>\}</code>. Interval operators repeat the smallest possible preceding regular expression a specified number of times: <code>\{count\}</code> matches exactly <code><count></code> occurrences of the preceding regular expression. <code>\{min,\}</code> matches at least <code><min></code> occurrences of the preceding regular expression. <code>\{min,max\}</code> matches between <code><min></code> and <code><max></code> occurrences of the preceding regular expression. The interval is invalid if <code><min></code> is greater than <code><max></code>, or any of <code><count></code>, <code><min></code>, or <code><max></code> is outside the range 0 – 256.</p>
<code>[]</code> <code>[^]</code>	<p><i>Character Class Operators</i> <code>[</code> and <code>]</code> are used in regular expressions as special characters to indicate a character class. A character class matches a single character, regardless of how many characters or character ranges are defined in the character class. Characters contained in the class can be listed individually. Alternatively, character ranges can be specified using the – range operator. A character class can contain as many individual characters as needed, and can contain multiple character ranges. A negated character class can also be specified. A negated character class consists of any character except the characters and/or ranges listed in the character class. A negated character class includes the <code>^</code> metacharacter as the first character in list. Most special characters lose any special meaning inside a character class. The following characters still have a special meaning at certain positions within an expression: <code>]</code> closes the character class unless it is the first character. <code>\</code> quotes the next character unless it is the last character before the closing bracket. <code>-</code> represents the range operator unless it is the first character after the opening bracket or the last character before the closing bracket. Empty character classes are invalid.</p>

Operator	Description
	<p><i>Range Operator</i> The range operator is represented by a hyphen -. It specifies a range of characters when used inside a character class. <i>Examples:</i> a-f matches any character between a and f: a, b, c, d, e, or f. A-Z matches any capital letter. a-z matches any lower case letter 0-9 matches any number.</p>
	<p><i>Escape Operator</i> The escape operator is represented by a backslash \. It is used to quote certain special characters: If you need to use the literal value of a special character within an expression, then a backslash should be inserted before that special character to signal that the following character is to be treated literally.</p>

Table 10-1: Special Characters in Regular Expressions

10.3.1. Example: Find an Invoice Number

Task

The invoice number is between 6 and 10 characters long.

It consists of digits but may also contain an R or a K.

Sometimes the numbers are separated by a slash /.

Solution

[0-9RK/] \{6-10\}

matches 892785/222, 9R095949, or 000000484.

How the expression was constructed

[0-9RK/] The first half of the expression indicates the characters that could be included in the invoice number. The characters 0-9 state that the invoice number consists of any character from 0 through nine, including 0 and 9. RK are the letters that might be included.

The forward slash shows that the invoice number might include a forward slash. These characters are enclosed in square brackets to show a character class.

\{6-10\} The second half of the expression indicates the existence of an interval of between 6 and 10 characters long, including 6 and 10. The two backslashes and the open and close French brackets are necessary components of an interval expression.

10.3.2. Example: Find a Date

Task

The date consists of digits and can have a short or a long format. Various characters are used: period, slash, and hyphen.

Solution

[0-3][0-9][-/][0-3][0-9][-/][0-9]\{2,4\}

matches 02-20-2000, 02/20/00, or 02.20.2000.

How the expression was constructed

[0-3][0-9][-./]

[0-3] Indicates that the numerical expression for the month is either one or two characters long.

[0-9] The numerical expression for month can include any number from 0 to 9, including 0 to 9.

[-./] Either a dash, a period, or a slash separates day from the month (which is defined in the second part of the expression.)

[0-3][0-9][-./]

[0-3] The numerical expression for the day of the week is either one or two characters long.

[0-9] The numerical expression for day of the week can include any number from 0 to 9, including 0 to 9

[-./] Either a dash, a period, or a slash separates the month from the year (which is defined in the third part of the expression.)

[0-9]\{2,4\}

[0-9] The numerical designation for year can include any numeral from 0 to 9, including 0 and 9

\{2,4\} The year can be either two characters long or for characters long.

Task

Spelled months must also be considered.

Solution

[[AJFMSOND] [a-ceg-il-prvy]\{2,8\}[,][]\{1,2\} \{2,4\}

matches May 13, 2000, for example.

How the expression was constructed

[[AJFMSOND] [a-ceg-il-prvy]\{2,8\}[,][]\{1,2\} \{2,4\}

[[AJFMSOND] Indicates that the words may begin with the listed uppercase characters. The list includes only the letters that begin the names of the months.

[a-ceg-il-prvy] The lowercase letters that are building blocks for the names of the months

[,] The comma after the month

[] The square brackets, with a space in the middle, indicate the space between the comma and the year, **\{2,8\}** specifies that the month can be two to nine characters long

\{1,2\} The day of the month can be one or two characters long

\{2,4\} The third part of the expression indicates that the year can be either two or four characters long.

10.3.3. Example: Find an E-mail Address

Task

Find an expression that is more specific than `*@*.*` that matches any word containing the @ character.

Solution

`[a-z.]\{2,20\}@[a-z.]\{2,10\}`

How the expression was constructed

[a-z.] Indicates that the email address can include of all letters in the alphabet (from A to Z, including A and Z) and that these letters are followed by a dot.

\{2,20\} Indicates that the first part of the email address is between 2 and 20 characters long, not including 2 and 20. (The author of the expression used a comma to show a non-inclusive range, instead of a dash to show an inclusive range.)

@ Indicates that the email address definitely includes an ampersand.

[a-z.] The last part of the email address can include all letters in the alphabet (from A to Z, including A and Z) and that these letters are followed by a dot.

\{2,10\} Indicates that the first part of the email address is between 2 and 10 characters long, not including 2 and 10.

Chapter 11 Advanced Evaluation Settings

11.1 Project-Level Settings

11.1.1. Classification Interpretation – How Does It Work?

Let's assume we have given classes, a given document, and several classification methods that return confidence levels. It is unlikely that all methods will return the same confidence level. To get the best bet on what the confidence really is, we need to compute a combined result.

Oracle Forms Recognition supports three ways to do this:

- The Maximum method
- The Average method
- The Weighted Distance method.

11.1.1.1. The Maximum Method

In this method, only the maximum confidence level of a class is taken into account. This is the default setting.

Example



CLASSID	Result	Method A	Method B
CLASSID	Percentage	Percentage	Percentage
Class A	88	88	68
Class B	67	67	60
Class C	63	62	63

Table 11-1: The Maximum method for classification evaluation

11.1.1.2. The Average Method



The average of all confidence levels for a class is taken into account.

Example

CLASSID	Result	Method A	Method B
CLASSID	Percentage	Percentage	Percentage
Class A	78	88	68
Class B	63.5	67	60
Class C	62.5	62	63

Table 11-2: The Average method for classification evaluation

11.1.1.3. The Weighted Distance Method

The maximum of all results for all classes is taken as a reference. For each result, the distance to this reference is calculated. For each class, the distances are added. This sum is subtracted from the maximum result obtained for that class.

Example



	Result	Method A	Method B
CLASSID	Percentage	Percentage	Percentage
Class A	$68 = 88 - (0+20)$	88 (0)	68 (20)
Class B	$18 = 67 - (21+28)$	67 (21)	60 (28)
Class C	$8 = 63 - (28-27)$	62 (26)	63 (25)

Table 11-3: The Weighted Distance method for classification evaluation

In general, the portion of e-mails that will be classified is as follows:

Maximum > Average > Weighted Distance

In particular, with the Weighted Distance method, it is highly unlikely that e-mails will be assigned to a class if the class did not get high confidence levels from both methods applied.

11.1.2. Project-Level Standard Classification – How Does It Work?

Standard classification uses two values defined at the project level to decide whether a document can be classified or not:

- A minimum confidence level called a threshold.
- A minimum difference in confidence between the best class and the second-best competitor called distance.

Both requirements must be met to classify a document.

Example

Let's take our results from Section 11.1.1, where the Maximum method was applied.



	Result
Class A	88
Class B	67
Class C	63

Let's further assume that the default values for threshold and distance are applied:

Parameter	Value
Threshold	70
Distance	20

Result

Class A is the best class. Confidence for class A is above the threshold.

Class B is the second-best class. The distance to Class A is 21. This is just above the required distance.

The document will be assigned to Class A.

Example

Let's take our results from Section [11.1.1](#), where the Average method was applied.



Result	
Class A	78
Class B	63.5
Class C	62.5

Let's again assume that the default values for threshold and distance are applied:

Parameter	Value
Threshold	70
Distance	20

Result

Class A is the best class. Confidence for Class A is above the threshold.

Class B is the second-best class. The distance to Class A is 14.5. This is just below the required distance.

The document cannot be classified using standard classification.

Example

Let's take our results from [11.1.1](#), where the Weighted Distance method was applied, and the default values for threshold and distance.



Result	
Class A	68
Class B	18
Class C	8

Let's again assume that the default values for threshold and distance are applied:

Parameter	Value
Threshold	70
Distance	20

Result

- Class A is the best class. Confidence for class A is below the threshold.
- Distances to the next classes are very high.
- The document cannot be classified using standard classification.

If you use the weighted distance method, you probably have to work with smaller thresholds to obtain a satisfactory fraction of classified documents.

11.1.3. Project-Level Parent Classification – How Does It Work?

So far, no hierarchical elements were taken into account for classification. However, if classification is not possible using the flat mechanism, hierarchical elements may resolve the conflict.

One of the available hierarchical methods is parent classification. If parent and child classes compete for the same documents, the documents will rather be assigned to the children. If there are several children with similar confidence levels, the parents can decide which class is the correct one.

Parent classification uses two additional values defined at the project level:

A parent threshold (50 percent by default)

A parent distance (10 percent by default).

In **Figure 11-1: Parent Classification: Illustration of parent classification**, classification would occur to the medium branch, and the child class with 80 percent confidence would win.

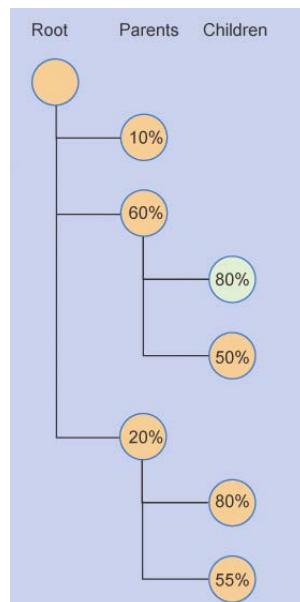


Figure 11-1: Parent Classification: Illustration of parent classification

For more information about hierarchical classification elements, please refer to Section [11.3.1](#).

11.1.4. Project-Level Default Classes – How Do They Work?

Normally, all documents that cannot be assigned to a particular class are marked as Not Classified in Oracle Forms Recognition Designer's Runtime Mode.

During production, they are marked by Oracle Forms Recognition Runtime with a particular status value indicating that classification was not successful. The corresponding documents will not be processed any further.

To prevent this, you can define a default class for each project that will be assumed if classification fails. You can also use this feature to create applications without classification, but with extraction.

11.1.5. Modifying Project-Level Settings

Task Prerequisites

- The prerequisites for this task are:
- The program is in Definition Mode.
- In the Classes tab on the left side of the window, the *.sdp file for your project is selected.
- On the right side of the window, the tabs with class/field properties are visible.

Available Options

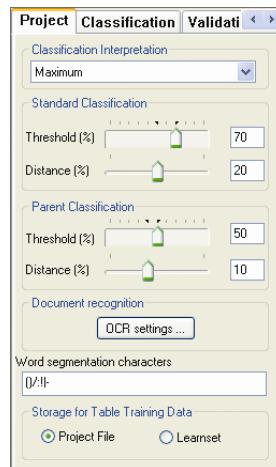


Figure 11-2: Project tab

On the Classification tab, the following options are available:

- To set a default class, select an entry from the Default Classification Result list box.

On the Project tab, the following options are available:

- To change the algorithm to obtain combined results for given classes, select an entry from the Classification Interpretation list box.
- To change Threshold or Distance for Standard Classification, use the sliders or type values into the corresponding text boxes.
- To change Threshold or Distance for Parent Classification, use the sliders or type values into the corresponding text boxes.

11.2 Method-Level Classification Settings

11.2.1. Method-Level Absolute Results – How Do They Work?

For a certain class and document, each classification method may return different result types. Possible result types are:

- Confidence: This document belongs to a specified class with a probability that is given in percent.
- Yes: This document is definitely in this class.
- Maybe: This document might belong to this class.
- No: This document does definitely not belong to this class.
- -: This method is not applied.

The various classification methods are not equally reliable. For example, it is dangerous to decide that a document is an invoice based only on the fact that it is a certain size. **Table 11-4** presents the possible results for each classification method. It also shows which result type is returned by default.

Method	Result	Default or Configured
Brainware classification	Confidence Yes No	Default Configured Configured
ASSA	Confidence Yes No	Default Configured Configured
Template classification	Confidence Yes No	Default Configured Configured
Phrase classification	Confidence Yes No	Default Configured Configured
Image size classification	Maybe No	Default Default
Form classification	Yes Maybe Confidence	Default Default Configured
Layout classification	Confidence Yes No	Default Configured Configured
Brainware Layout Classification	Maybe No Confidence	Configured Configured Default
Language classification	Maybe No Confidence	Configured Configured Default

Table 11-4: Possible automatic results vs. classification methods

Yes and No are called absolute results. If the program is configured accordingly, they are obtained if confidence levels returned by one of the methods are either very high or very low.

If a method returns Yes for a class, the combined result will be Yes. Classification of the document will stop at this stage. All other classes will be excluded automatically.

If a method returns No for a class, the combined result will be No. Within the current branch, classification of the document will stop at this stage: All child classes will be excluded automatically.

You can use absolute results to speed up the entire classification process. Image size classification is a suitable method to exclude entire branches very quickly. Template classification can be used to positively confirm formal classes very quickly. The same is true for forms classification.

11.2.2. Method-Level Multiple Views – How Do They Work?

By default, in Oracle Forms Recognition, each document can only be assigned to one class. However, Oracle Forms Recognition also supports the concept of multiple views, i.e. a single set of documents can be classified several times, each time according to different criteria. Within a single view, a document cannot belong to more than one class. However, a document may well belong to more than one class if the classes are in different views. You could, for example, first classify news by topic and then classify the same news by geographical region. Multiple views may also be required to process documents with multiple topics.

Example:



Result		
Class A	View 1	90
Class B	View 1	69
Class C	View 2	60
Class D	View 2	80

Let's assume that the default values for threshold and distance are applied:

Parameter	Value
Threshold	70
Distance	20

Result:

- Class A is the best class from View 1. Confidence for class A is above the threshold.
- Class B is the second-best class in View 1. The distance to Class A is 31. This is above the required distance.
- Class D is the best class from View 2. Confidence for class D is above the threshold.
- Class C is the second-best class in View 2. The distance to Class D is 20. This is just the required distance.
- The document is assigned to Class A and to Class D.



A more complex application of views is the creation of a cascading classification scheme. (**Figure 11-3**) In this case, you need to assign parent classes and child classes to different views. Document redirection from the parent class to the subordinated view occurs automatically.

For example, you can use the fast formal classification methods (template classification, image size classification) to roughly sort your documents.

Then apply the semantic classification methods (Brainware classification, phrase classification) to this pre-sorted documents to determine the target classes. You will need fewer classes and improve the performance at the same time.

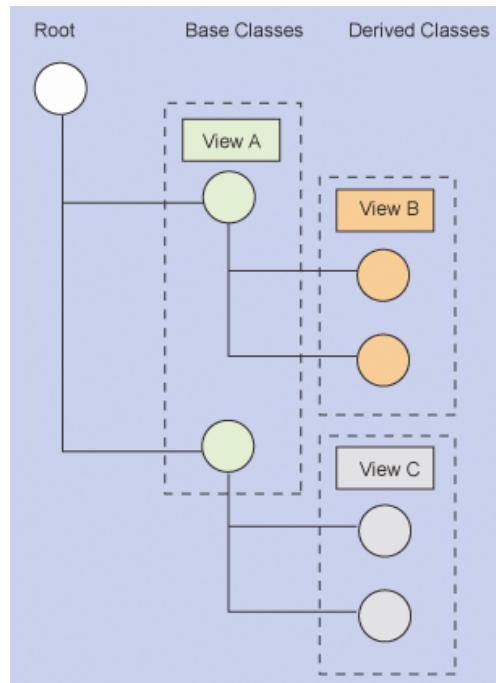


Figure 11-3: Cascading classification scheme

11.2.3. Modifying Settings for Brainware Classification Methods

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- The pane on the right side of the window with the class/field properties is visible.

Creating a View

To create a view:

- 1) In the Classes tab, select the *.sdp file. The Classification tab is displayed on the right side of the window.
- 2) Under Used Classification Engines..., select Brainware Classify Engine. A corresponding tab is displayed below the list box.

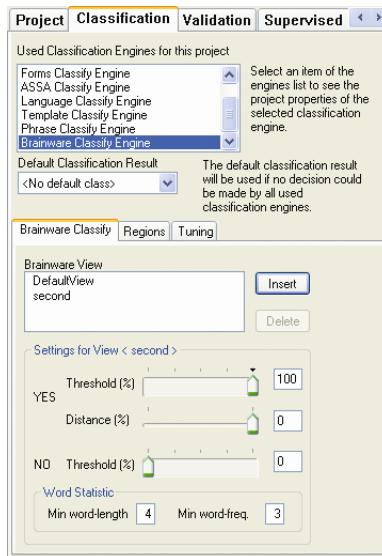


Figure 11-4: Settings for Brainware classification

- 3) On the Brainware Classify Engine tab, click the Insert button. The New Oracle View dialog box is displayed.
- 4) In the text box, enter a name for the new view. The name must not contain spaces.
- 5) Click OK. The new view is displayed in the Oracle View list box.

For instructions on how to assign classes to views, please refer to Section [11.3.3](#).

Each Oracle Forms Recognition project automatically contains a view called DefaultGroup. Without user intervention, all classes use this view.

Changing Evaluation Settings

To change the evaluation settings for a view:

- 1) In the Classes tab, click the *.sdp file. The Classification tab is displayed on the right side of the window.
- 2) Under Used Classification Engines..., select Brainware Classify Engine. A corresponding tab is displayed below the list box.
- 3) Select the view from the Oracle View list box.
- 4) Under Settings for view..., use the sliders or text boxes to set the following values for absolute classification:
 - YES Threshold: Minimum confidence for a class within the view to return Yes.
 - YES Distance: Minimum distance to the second-best class within the view to return Yes.
 - NO Threshold: Maximum confidence for a class within the view to return No.
- 5) Under Word Statistic, you can specify parameters for words that are to be included in the view's dictionary that embodies the base for learning with Oracle's neural network. As a rule, you do not have to change these values.
 - Min. word length: Minimum number of characters in words. Shorter words will not be taken into account.

- Min. word frequency: Minimum number of occurrences in the Learn Sets of this view. Words that occur less frequently will not be considered.

You can restrict the text base for dictionary creation to certain areas within the document. This may speed up processing as no full-page OCR is carried out. To actually use this advantage, make sure that the Oracle Forms Recognition Runtime settings don't override your restrictions. For further information on OCR settings in Oracle Forms Recognition Runtime, please refer to the ***Oracle Forms Recognition Runtime Server User's Guide***.

Restricting Dictionary Creation

To restrict the dictionary creation to certain areas within the documents:

- 1) In the Classes tab, click the entry representing your project. The Classification tab is displayed on the right side of the window.
- 2) Under Used Classification Engines..., select Brainware Classify Engine. A corresponding tab is displayed below the list box.
- 3) Select a view from the Oracle View list box.
- 4) Select the Regions tab.



Figure 11-5: Regions tab for Oracle view

- 5) Check the Restrict engine to region check box.
- 6) Select the pages that are affected by the restriction.
- 7) For each selected page, enter the regions that are to be taken into account.

As you are setting regions, remember that Top 100 %, Bottom 100%, Left 100% and Right 100 % equal an empty area. The entire area would be specified by Top 0 %, Bottom 100%, Left 0%, Right 100%. Top 20, bottom 100 would cover the bottom 80 percent of the document, cutting 20 percent off from the top. Top 0%, Bottom 80%, would cover the top 80 percent of the document, cutting 20 percent off from the bottom.

11.2.4. Modifying Template Classification Settings at the Method Level

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- The pane on the right side of the window with the class/field properties is visible.

Changing Settings

To change the settings for this method:

- 1) In the Classes tab, click the entry representing your project. The Classification tab is displayed on the right side of the window.
- 2) Under Used Classification Engines..., select Template Classify Engine. The Template Classify tab is displayed below the list box.

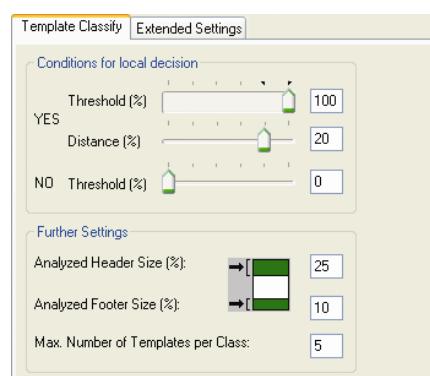


Figure 11-6: Settings for template classification

- 3) Under Conditions for local decision..., use the sliders or text boxes to set the following values for absolute classification:
 - YES Threshold: Minimum confidence for a class to return Yes.
 - YES Distance: Minimum distance to the second-best class to return Yes.
 - NO Threshold: Maximum confidence for a class to return No.
- 4) Under Further Settings..., use the text boxes to set the following values for template classification:
 - Analyzed Header Size
 - Analyzed Footer Size
 - Max Number...: Maximum number of internal templates that can be created during learning.

11.2.5. Modifying Phrase Classification Settings at the Method Level

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- The pane on the right side of the window shows the Classification/ Document Class/Validation tabs.

Changing Settings

To change the evaluation settings for this method:

- 1) In the Classes tab, click the entry representing your project. The Classification tab is displayed on the right side of the window.
- 2) Under Used Classification Engines..., select Phrase Classify Engine. The corresponding tab is displayed below the list box.

11.2.5.1. Editing Phrase Classification

On this tab, you can insert, delete, edit, test, import, and export lists of phrases to search for.

Inserting and Deleting Phrases

There are two ways to insert phrases: By typing them in the New Phrase field, or by selecting a word from a document. For the second way:



- 1) Click the Highlight All Words button on the toolbar.
- 2) On the document, select a word or phrase. The word now populates the New Phrase field. If you click another word, it will be appended to the phrase.



Whether you type your phrases or select them from a document, click the Insert button to add the phrase to the Active Phrase Grid.



To delete a phrase from the grid, select the phrase and click the Delete button.

Editing a Phrase

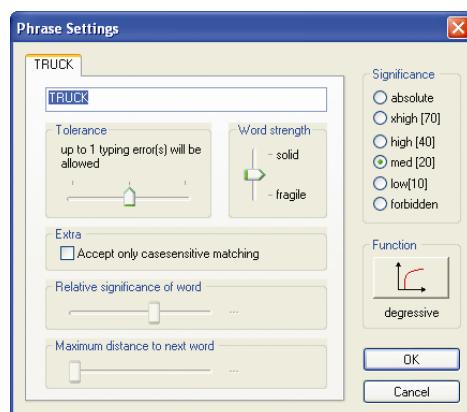


Figure 11-7: Editing Phrase Settings

Editing a phrase enables you to increase the complexity of phrase analysis. You can set Word Strength, tolerance, case sensitivity, enhanced word postulational (under function) and enhanced significance settings – absolute and extra high.

Restricting Analysis Areas

You can restrict the text that is analyzed to certain areas within the document, for any of the phrases you've included. This may speed up processing as no full-page OCR is carried out. To actually use this advantage, make sure that the Runtime Server settings don't override your restrictions.

To restrict the method to certain areas within the documents:

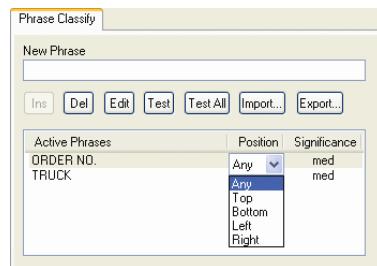


Figure 11-8: Phrase Positioning

- 1) On the *Phrases* Grid, select a phrase to restrict.
- 2) In the *Position* column, click the position of the phrase. The default is *Any*. By changing the selection, you can restrict OCR to the top half, bottom half, left half, or right half of the document. If any part of the phrase extends into the selected half then it will be detected.

Establishing Significance Settings

- 1) On the *Phrases* grid, select a phrase.
- 2) In the *Significance* column, click the current significance setting for the phrase. The default is *Medium*. By changing the selection, you can vary how much weight the phrase will carry during analysis. The settings are *High*, *Medium*, *Low*, and *Forbidden*.

Sharing Phrase Classification Words and Settings with Other projects

The *Import* button enables you to import classification settings from other projects in which the phrases were saved as Export (*.exp) files. Likewise, via the *Export* button, you can save phrases to share with other projects. Import and Export is done at the Class level.

11.2.6. Modifying Image Size Classification Settings at the Method Level

At this level, no modifications are possible to Image Size Classification.

11.2.7. Modifying Forms Classification Settings at the Method Level

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.

The pane on the right side of the window with the class/field properties is visible.

Changing Evaluation Settings

To change the evaluation settings for this method:

- 1) In the Classes tab, click the entry representing your project. The Classification tab is displayed on the right side of the window.
- 2) Under Used Classification Engines..., select Forms Classify Engine. The corresponding tab is displayed below the list box.

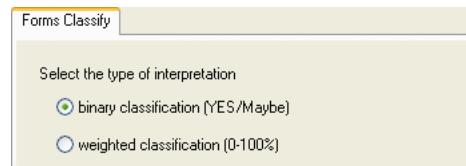


Figure 11-9:Settings for forms classification

- 3) Select one of the following options:
 - Binary classification: Possible atomic results of forms classification are Yes and Maybe. This is the default.
 - Weighted classification: Forms classification returns a confidence as atomic result.

11.3 Class-Level Settings

11.3.1. Class-Level Subtree Classification – How Does it Work?

Subtree classification is a means to push classification from parent to child classes by defining reduced requirements for classification into the subtree.

Subtree classification uses two additional values defined at the class level:

- A subtree threshold (60 percent by default)
- A subtree distance (10 percent by default.)

It is also possible to entirely exclude the parent class as valid classification result.



In the example below, without subtree classification, the parent class with 90 percent confidence would win. With subtree classification, classification would lead to the medium branch, and the child class with 60 percent confidence would win.

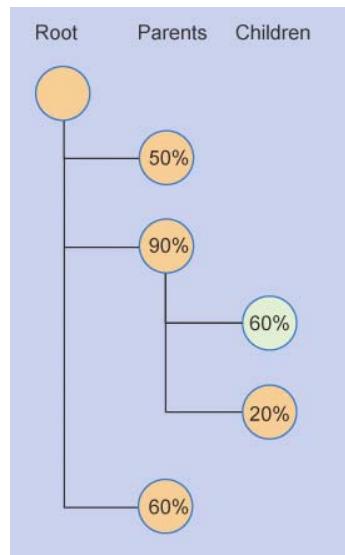


Figure 11-10: Subtree Classification

11.3.2. Class-Level Redirection – How Does it Work?

Redirection is something very simple: you just define that in case of classification to a Class A, the documents will in fact be assigned to a different Class B. Use this to combine several classes or in cascading classification schemes.

11.3.3. Modifying Class-Level Settings

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.

- The pane on the right side of the window with the class/field properties is visible.
- A suitable classification tree exists. When working with multiple views, you can, for example, create a base class for each view and insert derived classes below.

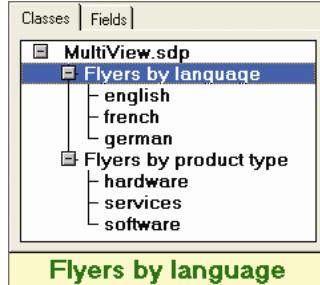


Figure 11-11: Sample classification tree for working with multiple views

Changing Class-Level Settings

To change the class-level settings:

- 1) In the Classes tab on the left side of the window, select a class.
- 2) On the right side of the window, select the Classification tab.
- 3) To assign the class to a view, click the Brainware Classify Engine method name.
- 4) In the Brainware Classify Engine tab, select a view from the list box.
- 5) On the right side of the window, select the Document Class tab.
- 6) To use a different display name for the class, enter it into the corresponding text box.
- 7) To exclude the class as classification result, clear the This DocClass... check box.
- 8) To hide the class in Oracle Forms Recognition Verifier, clear the Visible in correction... check box.
- 9) To push classification to the children of this class, check the Force Subtree Classification check box. To change Threshold or Distance for Subtree classification, use the sliders or type values into the corresponding text boxes.
- 10) To redirect classification results, select a target class from the list box at the bottom of the tab.
- 11) To apply a static page count to all documents of this class, check the static pagecount check box and specify the number of pages using the spin box.

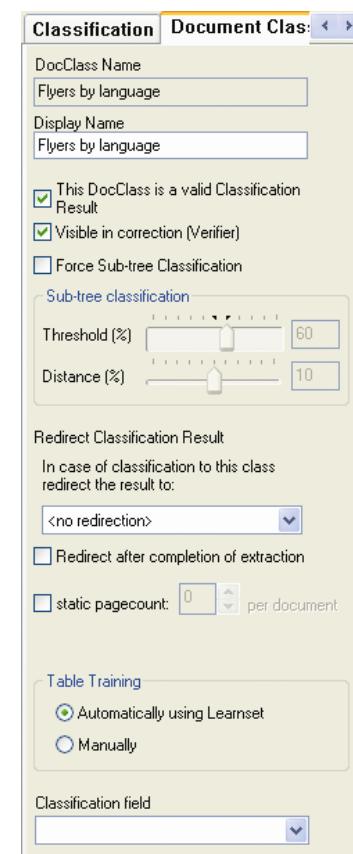


Figure 11-12: Document class tab

11.3.4. Modifying Settings for Brainware Layout Classification Methods

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- The pane on the right side of the window with the class/field properties is visible.

Creating a View

To create a view:

- 6) In the Classes tab, select the *.sdp file. The Classification tab is displayed on the right side of the window.
- 7) Under Used Classification Engines..., select Brainware Layout Classify Engine. A corresponding tab is displayed below the list box.

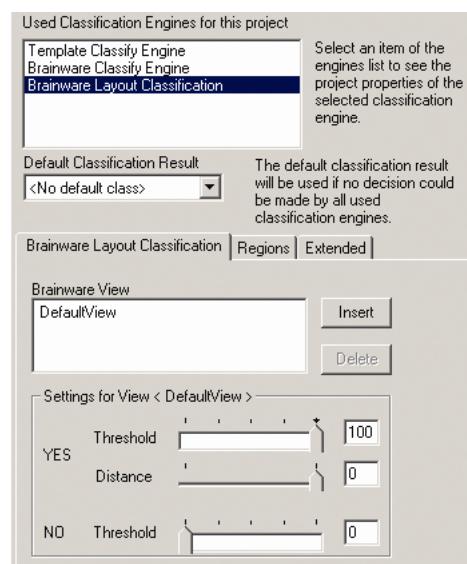


Figure 11-13: Settings Brainware Layout Classification

- 8) On the Brainware Layout Classify Engine tab, click the Insert button. The New Oracle View dialog box is displayed.
- 9) In the text box, enter a name for the new view. The name must not contain spaces.
- 10) Click OK. The new view is displayed in the Oracle View list box.

For instructions on how to assign classes to views, please refer to Section [11.3.3](#).

Each Oracle Forms Recognition project automatically contains a view called DefaultGroup. Without user intervention, all classes use this view.

Changing Evaluation Settings

To change the evaluation settings for a view:

- 6) In the Classes tab, click the *.sdp file. The Classification tab is displayed on the right side of the window.
- 7) Under Used Classification Engines..., select Brainware Layout Classify Engine. A corresponding tab is displayed below the list box.
- 8) Select the view from the Oracle View list box.
- 9) Under Settings for view..., use the sliders or text boxes to set the following values for absolute classification:
 - YES Threshold: Minimum confidence for a class within the view to return Yes.
 - YES Distance: Minimum distance to the second-best class within the view to return Yes.
 - NO Threshold: Maximum confidence for a class within the view to return No.
- 10) Under Word Statistic, you can specify parameters for words that are to be included in the view's dictionary that embodies the base for learning with Oracle's neural network. As a rule, you do not have to change these values.
 - Min. word length: Minimum number of characters in words. Shorter words will not be taken into account.
 - Min. word frequency: Minimum number of occurrences in the Learn Sets of this view. Words that occur less frequently will not be considered.

You can restrict the text base for dictionary creation to certain areas within the document. This may speed up processing as no full-page OCR is carried out. To actually use this advantage, make sure that the Oracle Forms Recognition Runtime settings don't override your restrictions. For further information on OCR settings in Oracle Forms Recognition Runtime, please refer to the ***Oracle Forms Recognition Runtime Server User's Guide***.

Restricting Dictionary Creation

To restrict the dictionary creation to certain areas within the documents:

- 8) In the Classes tab, click the entry representing your project. The Classification tab is displayed on the right side of the window.
- 9) Under Used Classification Engines..., select Brainware Layout Classify Engine. A corresponding tab is displayed below the list box.
- 10) Select a view from the Oracle View list box.
- 11) Select the Regions tab.

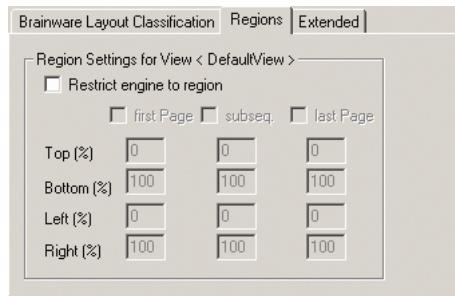


Figure 11-14: Regions tab for Brainware Layout Classification view

- 12) Check the Restrict engine to region check box.
- 13) Select the pages that are affected by the restriction.
- 14) For each selected page, enter the regions that are to be taken into account.

As you are setting regions, remember that Top 100 %, Bottom 100%, Left 100% and Right 100 % equal an empty area. The entire area would be specified by Top 0 %, Bottom 0%, Left 100%, Right 100%. Top 20, bottom 100 would cover the bottom 80 percent of the document, cutting 20 percent off from the top. Top 100, Bottom 20, would cover the top 80 percent of the document, cutting 20 percent off from the bottom.

To change the extended settings for the Brainware Layout Classification engine:

- 1) Select the Extended tab.
- 2) Under Extended Settings, set the following values:
 - Horizontal covering frequency: The number of zones each document is divided into across the page.
 - Vertical covering frequency: The number of zones each document is divided into down the page.
 - Do not differentiate between digits: Treat “123” and “987” as the same sequence of digits of the same length. Use this option when most numbers don’t have specific meaning like, for example, in the tables of a typical invoice document. Leave this option unchecked if the project’s documents contain specific sequences of digits that can be critical for layout classification e.g., bank account information specific to each vendor class.
 - Attach delimiters to words: This option should be checked if, in most cases, delimiters (like “,”, “.”, “/”, “;”, etc.) are essential to distinguish between words. An American format date, for example, may be better treated as a single differentiating word – “00/00/000” - in the classification’s surrounding compared with 3 “noise” words “00”, “00” and “0000”.



Note that the changes in settings will take effect only after the project has been saved and relearned.

Extended BLC Specific Settings

The specific extended settings of the BLC engine can be found on the “Extended” tab of the engine’s configuration. To access the engine settings, select the project node in Oracle Forms Recognition Designer

application, click on “Show / hide class and field properties”, select “Classification” tab and, finally, choose “Brainware Layout Classification” engine in the “Used Classification Engines for this project” list. Note that the “Brainware Layout Classification” item is going to appear in this list only if this engine is assigned to at least one class of the currently opened project.

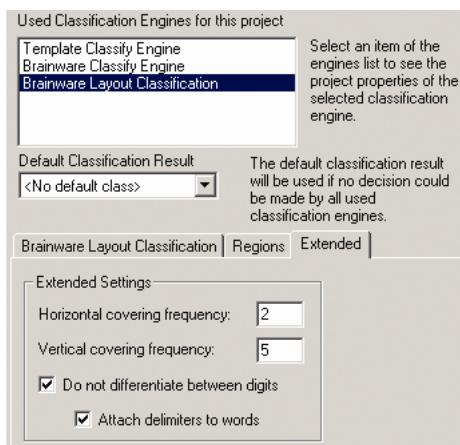


Figure 11-15: Extended Settings of Brainware Layout Classification Engine

As you can see on the screenshot, there are following BLC specific settings available (per configured “View”):

- **Horizontal covering frequency:** Specifies horizontal zones covering frequency (for the example above this number is two).
- **Vertical covering frequency:** Specifies vertical zones covering frequency (for the example above this number is five).
- **Do not differentiate between digits:** Determines whether all digits should be treated as different characters (when unchecked) or as a single characters (when checked), i.e. not distinguishing between “123” and “987” considering both as the same sequence of digits of the same length. The checked option can be used when most of the digits in a project do not have specific meaning, like for example, in the tables of a typical invoice document. On the other hand, if a project’s documents contain many specific sequences of digits that can be critical for layout classification (like, e.g., banking account information specific for each vendor class), then this option should be unchecked.
- **Attach delimiters to words:** This option should be checked if in most of the case the delimiters (like “,”, “.”, “/”, “;”, etc.) of the project’s documents are essential to distinguish between words. For example, like for a data in American format “00/00/0000” in terms of classification it may be better to consider “00/00/0000” as a single differentiating word instead of 3 separate words (“00”, “00” and “0000”). Note that the changes in settings will take effect only after the project has been saved and relearned.



11.4 Field-Level Settings

11.4.1. Field-Level Text Field Candidate Evaluation – How Does it Work?

Text field candidate evaluation works like classification evaluation.

Let's assume we have a given text field, a given document, and Brainware extraction as an evaluation method that returns weights for each candidate.

Candidate evaluation uses two values defined at the field level to decide whether there is a valid candidate or not:

- A minimum weight called threshold (by default 50 %)
- A minimum difference in weight between the best candidate and the second-best competitor called distance (by default 10%).

Both requirements must be met to extract a valid candidate.

Example:

	Weight of Candidate A	Weight of Candidate B	Weight of Candidate C
Field A	0.45	0.36	0.28
Field B	0.30	1.00	0.00
Field C	0.55	0.49	n/a

Table 11-5: Weights for Candidate evaluation

Result:

- For Field A, there is no valid candidate. The weight of Candidate A is below the threshold, and the distance to Candidate B is below the minimum distance.
- For Field B, candidate B is a valid candidate. Its weight is above the threshold and the distance to the second-best competitor, Candidate A, is above the minimum distance.
- For Field C, there is no valid candidate. The weight of Candidate A is above the threshold, but the distance to Candidate B is below the minimum distance.

11.4.2. Modifying Text Field Settings

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

Modifying Evaluation Settings

To modify the evaluation settings for a field:

- 1) On the left side of the window, select the field.
- 2) Select the Evaluation tab on the right side of the window.
- 3) On the Brainware Table Extraction tab, to change the Threshold or Distance for Brainware Extraction, use the sliders or type values into the corresponding text boxes.

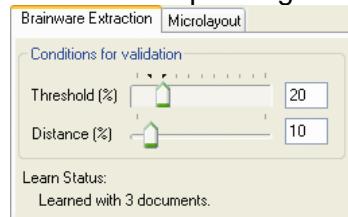


Figure 11-16: Evaluation parameters

- 4) Select the Field tab on the right side of the window. The validation parameters are displayed in the Validation group at the bottom of the tab.
- 5) If the current field is a derived field, you can use inherited validation settings of the parent class. To do this, check Use derived validation. This disables the remaining validation parameters.
- 6) If any field content should be treated as valid, select the Always valid check box. This disables the remaining validation parameters.
- 7) To mark fields as invalid if they contain uncertain OCR results, select the No Rejects check box. Use the slider to set the confidence required to accept characters.
- 8) To set a minimum length for valid field content, select Min. Length and set the required number of characters using the associated spin box. This option can also be used to make a field mandatory.
- 9) To set a maximum length for valid field content, check Max. Length and set the permitted number of characters using the associated spin box.

11.4.3. Field-Level Table Field Candidate Evaluation – How Does it Work?

In table analysis, each candidate is evaluated using the criteria listed below.

Table property	Range of Results
Fraction of default columns identified	0.0 – 1.0
Fraction of table columns mapped	0.0 – 1.0
Fraction of entries found in cells which require entries	0.0 – 1.0
Fraction of neighboring cells without overlap (column view)	0.0 – 1.0
Fraction of neighboring cells without overlap (row view)	0.0 – 1.0
Fraction of correct formats	0.0 – 1.0

Table 11-6: Table properties investigated during table candidate evaluation

For each table candidate, the total significance is determined as the average of the results per property. All table candidates which reach a certain threshold for the total significance are transferred to the Workdoc, ordered by the total significance. By default, the candidate with the highest significance is used for data extraction.

11.4.4. Modifying Table Field Settings

During table analysis, field-level validation settings defined via the user interface are ignored. However, the evaluation can be influenced using Sax Basic or WinWrap Basic scripts.

Chapter 12 Setting Up the Verification

The Oracle Forms Recognition suite features a dedicated application for quality assurance: Oracle Forms Recognition Verifier. This application provides a way to check and correct the results of automatic document classification and data extraction. In addition, it enables you to manually index documents.

Oracle Forms Recognition Verifier users are in charge of validating the documents, which are presented as batches. Whether a batch is valid or not is determined using the following rules:

- A batch is valid if all of its documents are valid.
- A document is valid
 - if it has a valid classification result and
 - if it has a valid extraction or indexing result.
- An extraction result is valid if all the fields are filled with valid content.

The Oracle Forms Recognition Verifier user is presented with all invalid or uncertain results from a given batch and needs to correct and confirm them. Normally, results that are invalid by definition cannot be confirmed by the user, but in the project definition, you can allow the user to validate invalid field results in exceptional cases. This procedure is called forced validation.

To enable you to adjust Oracle Forms Recognition Verifier to the requirements of your custom application, two modes are available in Oracle Forms Recognition Designer:

- The Verifier Design Mode, in which you set up forms to use in the verification step
- The Verifier Test Mode, in which you can dynamically simulate verification.

Setting up the verification is easy. The Oracle Forms Recognition Verifier user interface for classification verification is so simple that the same form can be used all the time – nothing needs to be defined for classification verification. What you need to create are the forms that will be used for verification of data extraction or for manual indexing. This step can be simplified by using default forms, but it can also be a complex task if there are special requirements. In addition to the features offered via the user interface, you can implement custom verification routines in Sax Basic or WinWrap Basic scripts.

In Oracle Forms Recognition, verification steps take place when a batch of documents reaches a predefined state that is represented by an integer number. The state changes again when verification is complete. States are used to distinguish valid and invalid results. For more information about input and output states, consult these manuals:

- **Oracle Forms Recognition Runtime Server User's Guide:** The settings of this module determine the input and output states in the entire Oracle Forms Recognition workflow.

- **Oracle Forms Recognition Verifier User's Guide:** The settings of this module determine the input and output states of verification steps.

12.1 Creating Verification Forms

12.1.1. Managing Verification Projects

Oracle Forms Recognition Designer organizes verification forms in verification projects. It uses the following structure:

- Each Oracle Forms Recognition Designer project can contain one verification project.
- Each verification project contains a set of forms that are assigned to document classes.
- Each document class has one form that will be used by default. The remaining forms are only used when a document that requires validation is in a certain pre-defined state.
- Each verification has up to four areas:
 - Form field area.
 - Current input area.
 - Document display area
 - User info area.
- A form field area can contain the following elements:
 - Form fields.
 - Labels.
 - Viewers.
 - Tables.
 - Buttons.
- A form field is a text field that can be specified as:
 - Text Field.
 - List Box.
 - Check Box.
 - Amount Field
 - Date Field.
- All elements of a verification project have properties that can be edited.

Oracle Forms Recognition Designer provides several functions for administering verification projects.

Task Prerequisites

The prerequisites for this task are:

- The program runs in Verifier Design Mode.
- Classes and fields are already defined.

Creating a New Verification Project

Switching to this mode will create a new verification project and make it available.

An empty verification project does not contain any forms. If you create a new project, an existing project including its forms will be deleted when you confirm.

12.1.2. Configuring Project Validation Properties

In Oracle Forms Recognition Designer, you can set validation properties

- At the project level
- At the form level
- At the field level.

The most general validation properties can be set at the project level, but you can partially override the project-level settings at the form and field level and make more specific settings there.

Task Prerequisites

The prerequisites for this task are:

- The program is in Verifier Design Mode.
- Classes and fields are already defined.

12.1.3. Setting Project Validation Properties

To set the project validation properties:

- 1) In the class selection pane at the upper left edge of the window, right-click the root node that represents the Oracle Forms Recognition Designer project.
- 2) On the shortcut menu, select Project Properties. The Validation Settings dialog box is displayed.



Figure 12-1: Project validation settings

- 3) Under Force Validation, select whether Oracle Forms Recognition Verifier users can validate a field even if its content is invalid by definition.
 - Permitted: The user can force validation by pressing ENTER three times.
 - Forbidden: The user cannot force validation.
- 4) Under Designer Test Mode Document Routing: If you have script code associated with the ScriptModule_RouteDocument event, you can use the states entered in this area to test your scripting in Oracle Forms Recognition Designer's Verifier Test Mode. These states will not be used in Oracle Forms Recognition Verifier.

12.1.4. Managing Verification Forms

There are four ways to create verification forms in Oracle Forms Recognition Designer:

- You can create empty forms first and add the form elements then.
- You can create default forms that automatically contain a form field, a label, and a viewer for each field that will be visible in Oracle Forms Recognition Verifier.
- You can create one form at a time.
- You can create forms for all classes in one step.

Task Prerequisites

The prerequisites for these tasks are:

- The program is in Verifier Design Mode.
- Classes and fields are already defined.

Creating an Empty Form

To create a single empty form:

- 1) In the class selection pane at the upper-left edge of the window, select a document class.
- 2) Do one of the following:
 - From the menu, select Edit - DocClass - Insert Empty Form.
 - From the shortcut menu of the document class, select Insert Empty Form.
 - Click on the drop-down arrow associated with the Insert Default Form button and select Insert Verification Form.

Create Default Forms

To create a single default form:

- 1) In the class selection pane at the upper left edge of the window, select a document class.
- 2) Do one of the following:
 - From the menu, select Edit - DocClass - New Default Form.
 - On the shortcut menu of the document class, select New Default Form.
 - Click the drop-down arrow next to the New Default Verification Form button and select New Default Verification Form.

To create a new verification project with one default form per document class, do one of the following:

- From the menu, select Edit - Project - New Default Forms.
- In the class selection pane at the upper-left edge of the window, right-click the root node that represents the Oracle Forms Recognition Designer project. From the shortcut menu, select New Default Forms.
- In the toolbar, click the New Default Form for all Classes button.



If you create a new project, an existing project including its forms will be deleted when you confirm.

12.1.4.1. Displaying Forms

To view a table of all forms contained in the current project, either:

- On the menu, select Edit - Verification Form - Show All.
- Right-click an entry in the form selection pane, or on the pane's background if no entries are available. On the shortcut menu, select Show All.

To view a table of all forms associated with a certain class:

- In the class selection pane at the upper-left edge of the window, click the class concerned.

Form Name	Default	In Filter	Out Filter	Assigned to
Form_Invoices_1	Yes	-1	-1	Invoices
Form_Invoices_2		601	-1	Invoices
Form_Invoices_3		551	602	Invoices
Form_Invoices_4		602	-1	Invoices

Figure 12-2: Table of forms

The table of forms has the following columns:

- Form Name: Displays the name of the form. It is generated automatically and consists of the prefix Form, the name of the associated document class, and a consecutive number.
- Default: Displays “Yes” if the form is the default form of a document class, and nothing if this is not the case. Default forms are used for each input state, unless another form has been explicitly assigned to an input state.
- In Filter: Displays the input state assigned to a form, or -1 if no special input state has been selected.
- Out Filter: Displays the output state assigned to a form, or -1 if no special output state has been selected. Output states are relevant if partial validation of documents is allowed and useful in the context of exception handling.
- Assigned to: Displays the name of the associated document class.

To display a form, either:

- Select a document class in the upper-left pane to display its first form.
- Select a form from the table of forms.

To display a form in maximum size, either:

- From the menu, select View - Verifier Design Mode - Maximize Verification Form.
- In the toolbar, click the Maximize Verification Form View button. When the grid is turned off and the form is maximized, you get a good idea of how your form will look at runtime.



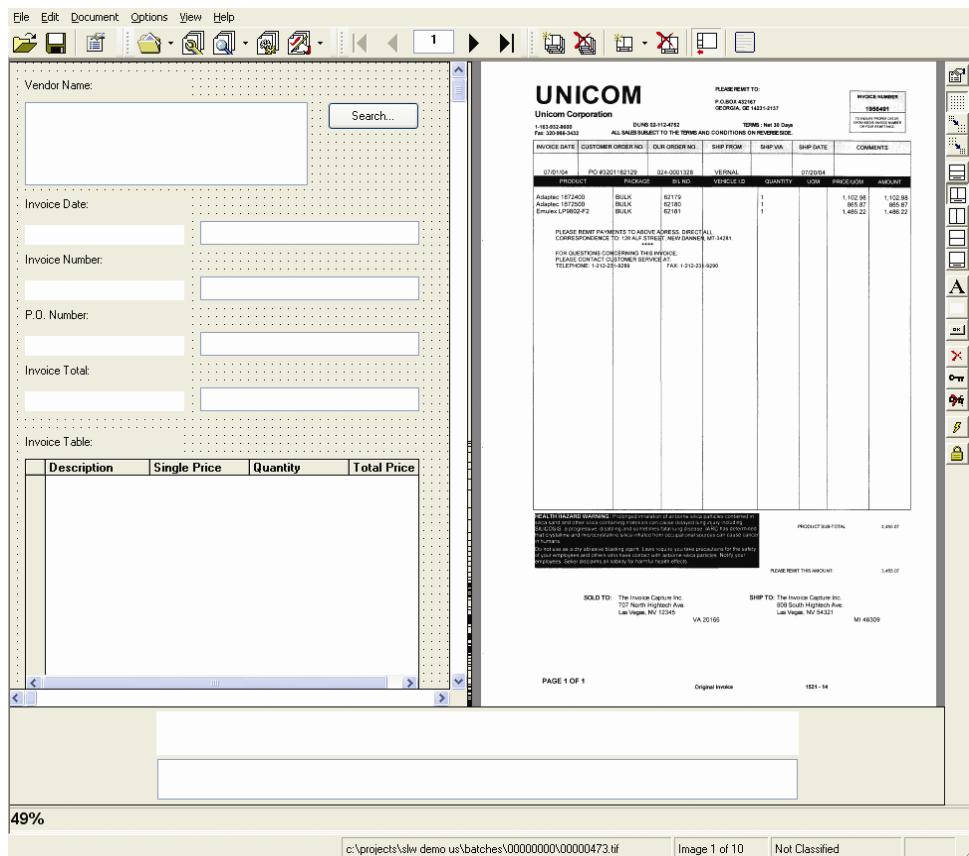


Figure 12-3: Maximized Form

12.1.4.2. Deleting Forms

To delete a single form:

- 1) In the form selection pane on the left side of the window, select a form.
- 2) Do one of the following:
 - From the menu, select Edit - Verification Form - Delete Form.
 - From the shortcut menu of the form, select Delete Form.
 - In the toolbar, click the Delete Verification Form button.



To delete all forms associated with a project, either:



- From the menu, select Edit - Project - Delete All Forms.
- In the Class Selection pane at the upper-left edge of the window, right-click the root node that represents the Oracle Forms Recognition Designer project. On the shortcut menu, select Delete All Forms.
- In the toolbar, click the Delete All Verification Forms button.

12.1.5. Configuring Form Validation Properties

Task Prerequisites

The prerequisites for this task are:

- The program is in Verifier Design Mode.
- At least one form is created.

Setting Form Validation Properties

To set the form validation properties:

- 1) Display a form and make sure that no form elements are selected.



- 2) Do one of the following:
 - In the vertical toolbar at the right edge of the window, click the Show selected object properties button.
 - Right-click the form's background to display a shortcut menu and select Properties. The Properties dialog box is displayed.

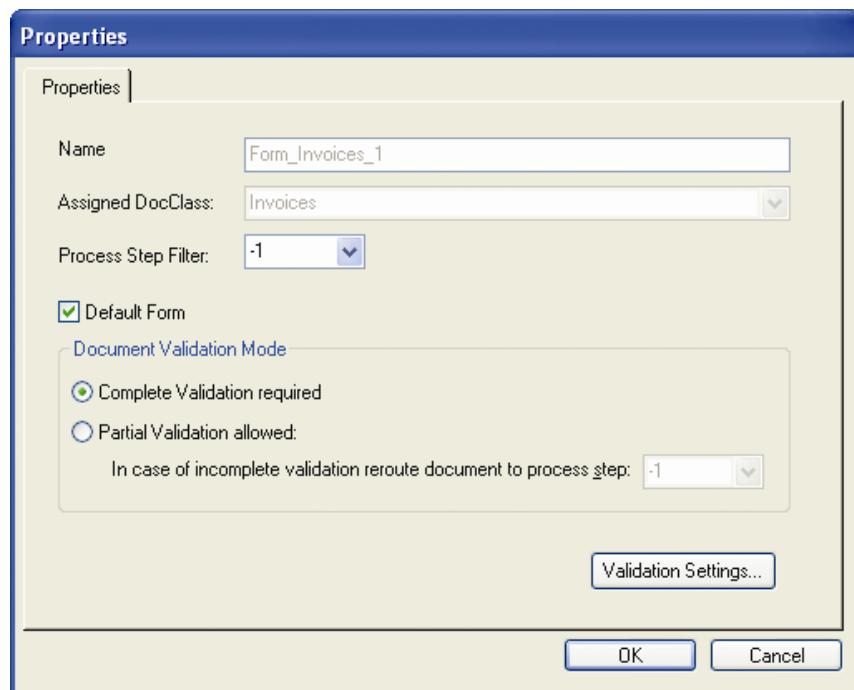


Figure 12-4: Property sheet of a form

- 3) Fill in the property sheet as follows:
 - Name: Displays the name of the form. This field is read-only.
 - Assigned DocClass: Displays the name of the associated document class. This field is read-only.
 - Process Step Filter: To use this form only for documents with a given state, select one of the pre-defined states from the list, or type a value into the field. For default forms, keep the initial value -1.
 - Default Form: Check this box to use the form as the default form, i.e. in all verification steps without a special pre-defined input state.
 - Document Validation Mode: Select complete validation if only one user verifies an entire batch and partial validation of several users

validate a batch in stages. If complete validation is required, the Oracle Forms Recognition Verifier user must validate all the fields in the documents of a batch before being able to release the batch. If partial validation is allowed, only the fields on the form must be validated. With partial validation, you can employ multiple forms, i.e. one for each stage. You can set an output state for partially validated documents in Oracle Forms Recognition Designer which overrides the output state set in Oracle Forms Recognition Verifier.

- 4) Click the Validation Settings button to establish the following settings:
 - Validation Engine: Select Standard Validation Engine to enable validation. Validation will not occur on the form unless the engine is enabled.
 - Force Validation Mode: Select whether forced validation is forbidden or permitted with this form. To force validation of a field, the Oracle Forms Recognition Verifier user must press ENTER three times. Default inherits the project-level validation setting.
 - Available Templates
 - General Validation Rules

For more information about the Validation Editor, please see [Chapter 6](#).

12.1.6. Configuring the Verification Form Layout

Each verification form is made up of up to four areas:

- Form field area: This area contains all or a subset of fields that have been defined for a given class.
- Current input area: This area contains a magnified version of the current field.
- Document display area: This area shows the current document, possibly with candidates highlighted
- User info area: This area works like a status bar. Custom messages can be displayed here telling the user why a field is invalid and providing hints concerning the correction of invalid results.

Regarding the arrangement of these areas, you can select from among five pre-defined layouts.

Selecting a Layout

To select a layout:

- Click the corresponding button in the vertical toolbar on the right side of the window. The new layout is applied to the current form. The form field area and the document display are divided by a splitter. You can move the splitter to adjust the size of these areas. The status bar displays the percentage of the window occupied by the upper or the left part, respectively. Be careful when sizing the areas: The splitter is only available in Verifier Design Mode, but not in Verifier Test Mode and not in Oracle Forms Recognition Verifier.

Button	Description
	Top: Document display area. Center: Form field area. Bottom: Current input area.

Button	Description
	Left: Form field area. Right: Document display area. Bottom: Current input area. This is the default layout.
	Left: Form field area. Right: Document display area.
	Top: Document display area. Bottom: Form field area.
	Top: Document display area. Bottom: Current input area.

Table 12-1: Form layout controls

12.1.7. Configuring Form Grids

To enable you to align form elements, the background of a form has a magnetic grid which can be turned on and off. In addition, the grid size can be adjusted. Grid settings are valid for all the forms in a project.

Task Prerequisites

The prerequisites for these tasks are:

- The program runs in Verifier Design Mode.
- A form is selected.

Enabling or Disabling a Grid

To enable or disable the grid:



- In the vertical toolbar on the right side of the window, click the Grid button in the toolbar.

Increasing or Reducing Distance

To increase or reduce the distance between grid lines:



- In the vertical toolbar on the right side of the window, click the “shrink grid” or the “enlarge grid” button.

12.1.8. Creating Form Elements

A form has three main elements: A label, a viewer, and a form field. From a form field, you can select a text field or table field. Using a text field or table field, you can create check boxes or combo boxes. You can also add a button to a form to fire actions.

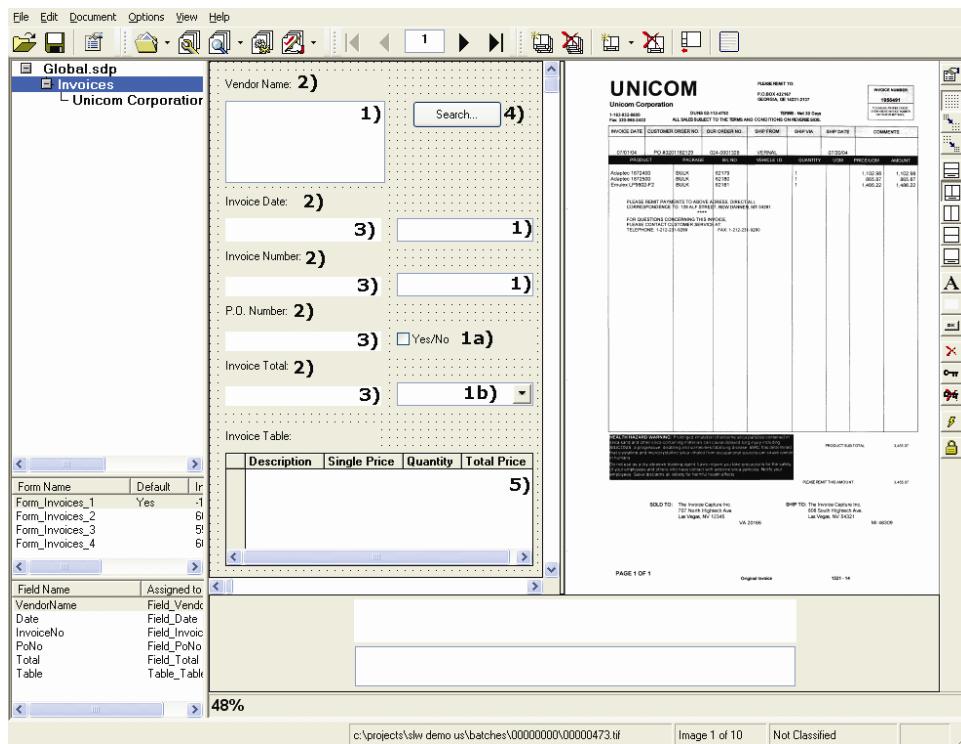


Figure 12-5: Elements of verification forms

element	description
1)	Form fields Controls that are used to display and edit extracted data and to enter data during manual indexing. You can use form fields to create Check boxes and Combo boxes.
1a)	Check boxes A toggle selection affecting data input applied when you have one of two values to choose from, such as on/off or yes/no. Check boxes are derived from Form Fields. You can set it up the caption with the text desired and select the default view.
1b)	Combo Boxes Contains a selection list to use when verifying an item on the document. Used during manual verification, this selection works with automatic completion.
2)	Labels Captions that help users to identify form fields and - if desired - also viewers and tables.
3)	Viewer Snippets of document areas, normally those that were extracted to fill fields or tables.
4)	Buttons Buttons that fire Actions for a new script event.
5)	Tables Relevant when table extraction is configured. The Verifier form supports multiple tables. However, even if you defined multiple tables, you can only display the first table on the verification form. You can display different tables on different forms.

12-1: Elements of verification forms

Oracle Forms Recognition Designer lets you add these elements to custom forms.

Task Prerequisites

The prerequisites for these tasks are:

- The program is in Verifier Design Mode.
- The form you want to design is selected.

12.1.9. Creating and Modifying Form Fields

12.1.9.1. Creating Form Fields

To add a form field to a form:

Drag and drop a data field from the field selection pane at the bottom-left edge of the window to the target position on the form. By default, the field type is a text field. To define a special field type such as a combo box or check box, select the properties from the shortcut menu or click the button on the toolbar.

12.1.9.2. Modifying Form Fields

To improve Verification results, you will probably want to change the way Verifier users interact with Verification forms. This is done by accessing the Validation Editor discussed in depth in [Chapter 6](#).

Converting a Text Field to Another Field Type

With the Validation Editor, you can change any field you created to a List Box, Amount Field, Date Field, Check Box, or back to a Text Field. You can also set Validation properties for each of these field types.

It's also possible to change a text field to a table field, but the procedure is somewhat different than the one discussed here for the other field types. To learn more about working with table fields, please see Section [7.2](#).

To modify field types:



- 1) Create a new field or select an empty field.
- 2) In the vertical toolbar at the right edge of the window, click the Show selected object properties button.
- 3) The Properties dialog box displays. Click the Validation settings button. For details about the property dialog box, please see Section [12.1.11](#) and Section [6.2](#).
- 4) In the Validation Type dropdown box, select a field type. The settings available to you will change depending on your selection. (Please see [Figure 12-8](#).)
- 5) Select either Do not allow values that are not on the list, or Search and show nearest value automatically.
- 6) Add items to the list that would pertain to the selected field. You can add and remove items at any time, or clear the list and start over.
- 7) Select Sort strings alphabetically for easy selection when verifying.
- 8) Click OK. The combo box appears next to the selected field.
- 9) Select the arrow button next to the box to view the selections.

Creating Check Boxes

Check Boxes are a type of form field. To create a check box:



- 1) Select an empty field or create a new empty field (Please see Section [12.1.8](#).)
- 2) In the vertical toolbar at the right edge of the window, click the Show selected object properties button.

On the Properties dialog box displays, click the Validation Settings button. This opens the Validation editor. For more details about the property dialog, please see Section **12.1.11**.

- 3) Under Field Type, select Check Box and press Details. The Check Box Field Properties box appears.(Please see **Figure 12-6**)
- 4) Enter a name for the Check Box Caption. Example: Yes/No.
- 5) Enter the Checked Value, which is the text that appears when the check box is selected. If you want, you can set this as the default.
- 6) Enter the Unchecked Value, which is the text that appears when the check box is not selected. If you want, you can set this as the default.
- 7) Click OK. The check box appears next to the selected field.

Creating Labels

To add a label to a form:



- 1) In the vertical toolbar on the right side of the window, click the Add new label element button. The mouse pointer changes.
- 2) Click inside the form and drag the frame to the desired size.
- 3) On the Change Captions dialog box, type a caption for the label.



Figure 12-6: The Label's Change Caption dialog box

- 4) Enter a name in the box. Click OK.



To change the caption, select Change Caption from the shortcut menu. A Label can only deleted from the form by using the Delete button from the vertical toolbar or Delete key.

Creating Viewers

To add a viewer to a form:



- 1) In the vertical toolbar on the right side of the window, click the Add new viewer element button:

A blue frame with white background appears at the upper edge of the form.

- 2) Drag the viewer to its target position.
- 3) Assign a field to be viewed, by selecting the properties dialog from the shortcut menu. Please see Section **12.1.13**.

Creating Buttons

To add a button to a form:



- 1) In the vertical toolbar on the right side of the window, click the Add New Button button.
- 2) Click inside the form and drag the blue frame to the desired size.

- 3) To name the button, right-click the button. The Change Captions dialog box appears

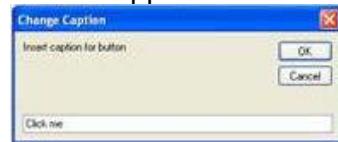


Figure 12-7: The Change Caption dialog box

- 4) Enter a name in the box. Click OK.

Please see Section [12.1.18](#) for information about configuring actions that are triggered by buttons.

Viewing Tables

You can only have tables in a form if table extraction is configured for the corresponding document class. A form can have more than one table. However, even if you defined multiple tables, you can only display the first table on the verification form. You can display different tables on different forms.

If your tables do not need verification, you can make your columns invisible. The invisible columns must be valid in order to validate the entire table.

12.1.10. Editing Form Elements

Oracle Forms Recognition Designer provides some commands for editing form elements.

Task Prerequisites

The prerequisites for these tasks are:

- The program is in Verifier Design Mode.
- The form containing the elements is selected.

Supported Operations

The following operations are supported for all elements:

- You can move a selected element using the mouse.
- You can resize a selected element by dragging the handles at each corner or by setting the size and position in the property box.
- You can delete a selected element using one of the following methods:
 - Press the DELETE key.
 - Click the X button in the vertical toolbar



12.1.11. Setting Field Validation Properties

Task Prerequisites

The prerequisites for this task are:

- The program is in Verifier Design Mode.
- At least one form with one form field is created.

Setting the Properties

To set the field validation properties:

- 1) Select a form field.
- 2) In the vertical toolbar at the right edge of the window, click the Show selected object properties button.

The Properties dialog box is displayed.

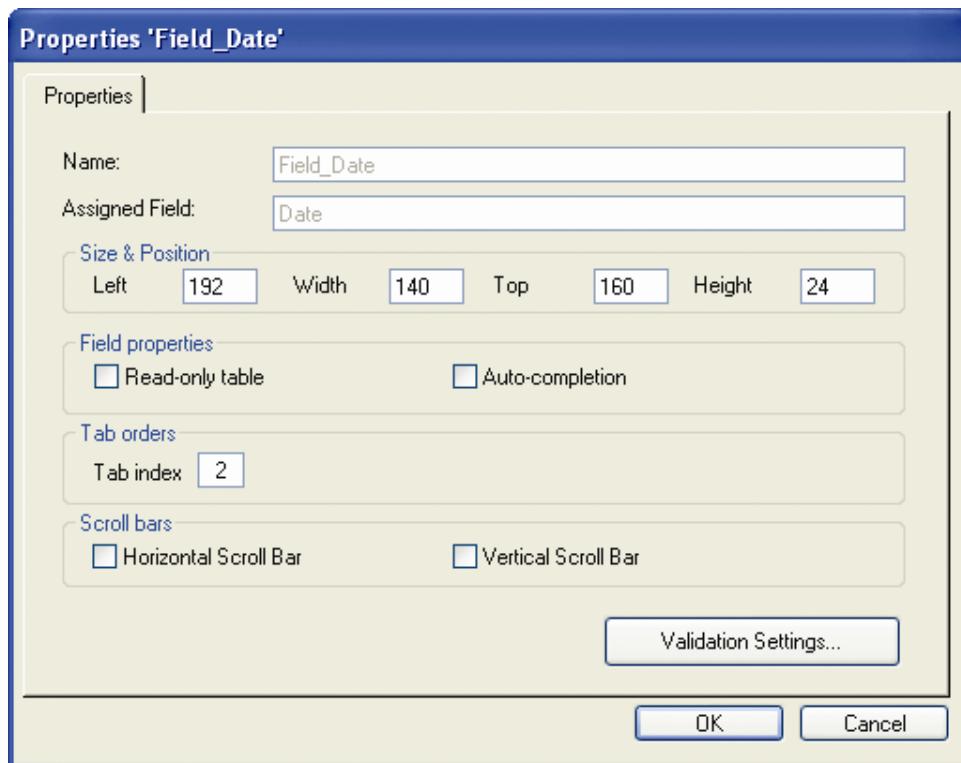


Figure 12-8: Property sheet of a form field

- 3) Fill in the property sheet as follows:
 - Name: Displays the name of the form field. This property is read-only.
 - Assigned Field: Displays the name of the associated data field. This property is read-only.
 - Size and Position: Affects form layout. Using numerical values rather than drag and drop enables you to design your form with greater precision. But in most cases, the default values – derived from the location you assigned to the field when you dragged it onto the form – are fine.
 - Read Only: Select Read-only to show static and dynamic complementary information to aid in manual verification.
 - Auto-completion helps to speed up typing. When you start to type, auto-text completes the word, suggesting the best matching item(s) among all of the words or candidates available after OCR and format analysis phases.
 - Tab index controls which Verification Form field gains focus next when the TAB key is pressed.

Fields are visited from low to high tab index. If the specified index is already in use by another verification field, its tab index and, when required, subsequent fields, will be incremented by one automatically.

- Validation Settings button to make further enhancements. For more information about these settings, please see **Chapter 6**.

12.1.12. Editing Text Fields

Oracle Forms Recognition Designer includes automated features for editing text fields that can help users enter and correct text faster. You can use automatic character entry when the auto-completion option is selected in the form field Properties dialog box to edit text fields and cells. Other options for character changes include Multi-line fields, combo boxes, and check boxes. You can also insert and replace text in cells and fields, either in single words or blocks of text, using drag and drop or by double-clicking on selected text.

Example of Auto-Completion

Multi-line fields are necessary for address analysis, but can also be useful in other cases. A multi-line field enables line wrap and displays a vertical scroll bar, if required. To add a new line to a multi-line field, press **CTRL+ENTER**.

A list box includes predefined strings related to the verification document. To aid in verification, you can select from the list of strings.



Figure 12-9: Example of a list box

The Check Box provides an either/or option that toggles table field options on and off. For example, a “Yes/No” check box checked for Yes would bring up field options related to the verification, and unchecked for No would hide them.



Figure 12-10: Example of a checkbox



Do not enter formatted text for auto-completion. Auto-complete does not work on formatted text and characters incorrectly read by OCR.

Auto-Completion

Auto-completion helps to speed up data entry. When you start to type, auto-text completes the word, suggesting the best matching items among all of the words or candidates available after OCR and format analysis. For example, you can type the first two characters of a 20-character invoice.

The auto-text feature finds the best matched candidate suggested by the Format Analysis engine and places it in that field. The auto-selected text is also highlighted in the original document. Select whether a single-line or a multi-line text field should be displayed. To override auto-completion, continue typing.

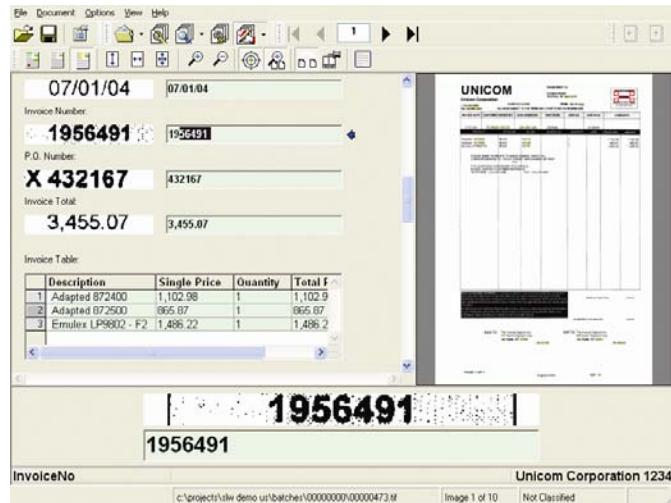


Figure 12-11: Example of auto-completion

Inserting Words In Fields

To speed up verification, you can insert words to replace or append text. The method for inserting words depends on the availability of candidates. A candidate is one that matches the learned words for that field. It will show up in green when you select it after selecting the field. Non candidates will display in orange when selected. You can insert words in fields or table cells. You can append or insert words and using the mouse to append or replace the field. Be sure to select the Highlight Candidates and Fields button in the toolbar editing field candidates.

Words With Candidates

If the word is a candidate for a field, you can append to or replace a word in a field box. A candidate is one that matches the learned selections for the field. It will show up in green when you select it after selecting the field. The append feature takes the current word left of the candidate and appends the field text. It places the text in the best location, either right or left of the word, and places the field by text or location of the word. Or, you can replace text. For example, a blank candidate might be replaced by "285.98."

- To append text with the new text, click the desired word next to the text that you want to append (this text will appear in green if it is a candidate). A box appears around the word. Double-click the box, or right click in the document and select Append Field Text by Word.
- To replace a word, click the desired word. A box will appear around the word. Double-click the desired candidate, drag and drop the word to the field, or right-click in the document and select Map Candidate from the shortcut menu to replace it.



You can insert only one candidate per field per document verification session.

Check to be sure that this word fits the format analysis rules defined for that particular field. If not, the word is highlighted in orange. In this case, it would not be a good candidate for the field.

Words Without Candidates

Even if the word does not belong to any candidates for the field, you can append or replace a word with a new one. Appending places the text in the best location, either right or left of the word, by text or location of the word. Or, you can replace the field text and location by the text and location of a word. A word that does not belong to any candidates for that field will display in orange when selected. For example, a field named "sales total" might be replaced by "invoice total."

- To append text with the new text, with the mouse drag a box around the desired word. Double-click the desired word in the box, or right click in the document and select Append Field Text by Word.
- To replace text, select the desired word with the mouse. A box will appear around the word. Double-click with the left mouse button, or select Replace Field Text by Word in the shortcut menu to replace it.



You can insert only one candidate per field, per document verification session.

Check to be sure that this word fits the format analysis rules defined for that particular field. If not, the word is highlighted in orange to help distinguish it. In this case, it would not be a good candidate for the field.

Inserting Blocks of Text

Inserting large blocks of text with minimal mouse movement is helpful when you have multiple word data verification elements, for fields such as address information or for cell descriptions. Before you can insert blocks of text, you must first select the settings in the Workflow dialog box in Verifier to immediately copy information. Please see the **Oracle Forms Recognition Verifier User's Guide**.

To insert large blocks of text:

- 1) Click and drag the left mouse button over the desired text in the image viewer.
- 2) Release the mouse button. A rectangle appears surrounding the text. Adjust the rectangle by selecting the nodes at any corner, if necessary.
- 3) Drag and drop the rectangle to the desired field or table cell. A copy of the rectangle will appear over the field (or table cell).

Or

Double-click the rectangle. The text in the rectangle replaces the text in the field (or table cell).



You can move or resize this rectangle by clicking in the area in the image viewer. When the rectangle appears, select the nodes to resize it, or drag it using the drag and drop method described above.

12.1.13. Configuring the Viewer Properties

Viewers can be used flexibly:

By default, each viewer is assigned to exactly one data field.

- Several viewers can be assigned to one data field, providing different views on the same zone of the document.
- One viewer can be used to visualize several fields, depending on the field selection at runtime.
- The viewer assignment and geometry are configured in the viewer's property sheet.

Task Prerequisites

The prerequisites for this task are:

- The program is in Verifier Design Mode.
- At least one viewer is created.

Setting Viewer Content Properties

To set the viewer content properties:

- 1) Select the viewer concerned.
- 2) Do one of the following:
 - Right-click to display a shortcut menu and select Properties.
 - In the vertical toolbar at the right edge of the window, click the Show selected object properties button.



The Properties dialog box is displayed.

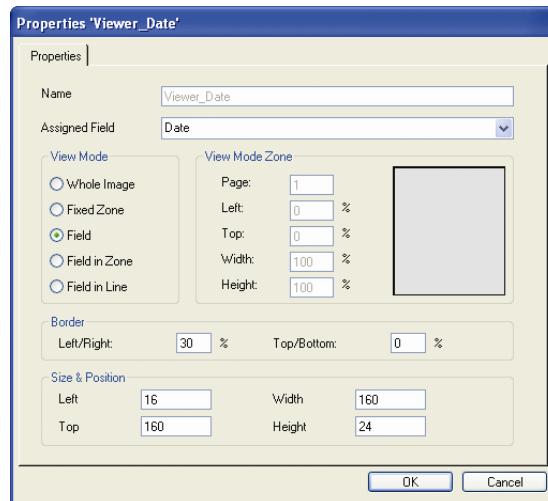


Figure 12-12: Viewer Property sheet dialog box

Complete the property sheet as follows:

- Name: Displays the name of the viewer. This property is read-only.
- Assigned Field: Displays the name of the associated data field and lets you change the selection. This field can also be empty if the content displayed should depend on the selected document only or on the field that is selected by the user at runtime.
- View Mode -

- Whole Image: If this option is selected, the viewer covers the entire page of the current document. You need to specify the page number in the View Mode Zone - Page field.
- Fixed Zone: If this option is selected, the viewer covers a fixed area of a page of the current document. You need to specify the page number in the View Mode Zone - Page field. In addition, you need to specify the distance of the viewer area from the top and left edge of the page, and the width and height of the area. These parameters are expressed as percentages of the height or width, respectively, of the entire page.
- Field: If this option is selected, the viewer covers the area of the document that contains the words used to fill the associated field. This works no matter whether the field assignment is set at design time or at runtime.
- Field in Zone: If this option is selected, the viewer covers a rectangle around the area of the document that contains the words used to fill the associated field. This works no matter whether the field assignment is set at design time or at runtime. In the View Mode Zone group, the dimensions of the rectangle are expressed as percentages of the height or width, respectively, of the entire page.
- Field in Line: If this option is selected, the viewer covers the lines around the area of the document that contains the words used to fill the associated field. This works no matter whether the field assignment was set at design time or at runtime.
- View Mode Zone: Please see View Mode-Fixed Zone
- Border: Where this makes sense, you can specify that a white border is displayed around the area covered by the viewer. The dimensions of the border are expressed as percentages of the height or width, respectively, of the entire area.
- Size and Position: Set size of the viewer and the position of the viewer on the form.

What you see in the viewer depends not only on the viewer properties, but also on the viewer dimensions. The viewer always covers the area specified in the property sheet, but actually shows a larger section of the page that matches the viewer dimensions. If the document areas are shown as minimized, they are not distorted. You should obtain the best results if the viewer dimensions closely resemble the geometry of the area that is to be shown.

12.1.14. Configuring Table Properties

When table extraction is configured, the table validation properties need to be set. In table validation, the single table cells behave like fields in regular data extraction.

Task Prerequisites

The prerequisites for this task are:

- The program is in Verifier Design Mode.
- A form is selected that has a table field.
- The table has been enabled.

Setting Table Validation Properties

To set the table validation properties:

- 1) Select the table.
- 2) Do one of the following:
 - Right-click to display a shortcut menu and select Properties.
 - In the vertical toolbar at the right edge of the window, click the Show selected object properties button.

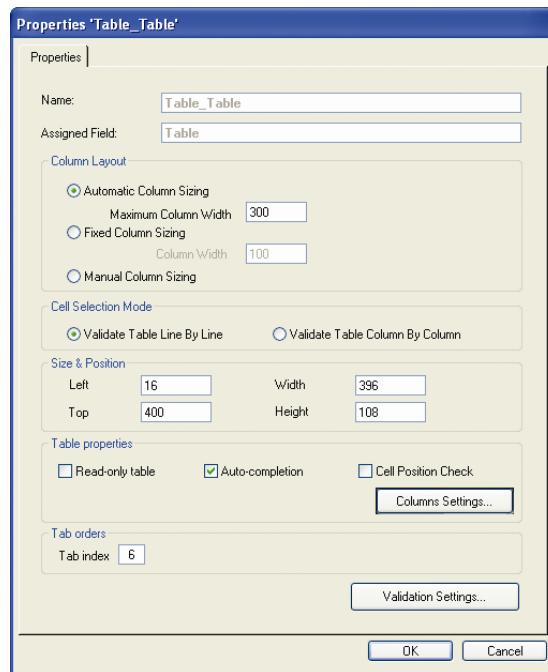


Figure 12-13: Table Property sheet dialog box

Fill in the property sheet as follows:

- Name: Displays the name of the table. This field is read-only and currently always empty.
- Assigned Field: Displays the name of the associated table field. Currently, only one table per document class can be configured.
- Column Layout
 - Automatic ...: Column widths are optimized automatically from the column content and restricted by a maximum value which is given

in pixels. The user can change the column width at runtime, but after moving to another document, the automatic settings will be applied.

- Fixed: Columns have a fixed width given in pixels which is the same for all columns but the last one. The user can change the column width at runtime, but after moving to another document, the fixed setting will be applied.
- Manual: The user can set the column width at runtime.
- Cell Selection Mode: Determines the order in which invalid cells receive focus when the user navigates through the table at runtime. If the order is line by line, the focus moves from left to right up to the end of a row, and then to the next row. If the order is column by column, the focus moves from top to bottom up to the end of a column, and then to the next column.
- Table Properties: Options include Read Only, Auto-completion, Cell position Check, and Columns Settings. Read Only sets a lock on the table against edits. Auto-completion enables faster verification of information. Auto completion methods might include check boxes or combo boxes, as well as automatic word completion when entering text.
 - Column settings include individual column settings, rather than settings for the entire table. For example, you can select a single column to be read only, rather than the whole table.

12.1.14.1. Setting Column Properties

To set the table validation properties:

- 1) Select the table.
- 2) Click on the “Column Settings...” button



Figure 12-14: Changing of table column display order in Designer application.

- 3) Select the column name to change and use the blue “up” and “down” arrow buttons to set the desired order.

12.1.15. Configuring Smart Indexing

Smart indexing is a method to fill fields using entries from a database table. It can be used in the automatic extraction step as well as during verification and manual indexing. In smart indexing, two types of fields are distinguished:

- Smart index field.
The information related to this field must be available both in the documents that are to be processed, and in the database table. Often, a unique identifier such as “Invoice #” or “Customer #” is used for this purpose.
- Index lookup fields.
The data related to these fields are obtained from the database table and not from the OCR data in the documents. This is because these fields are filled using a database lookup with the value of the smart index field as parameter. The lookup returns the table rows that will be used to fill the lookup fields. For more information, Please see Section [12.1.16](#).

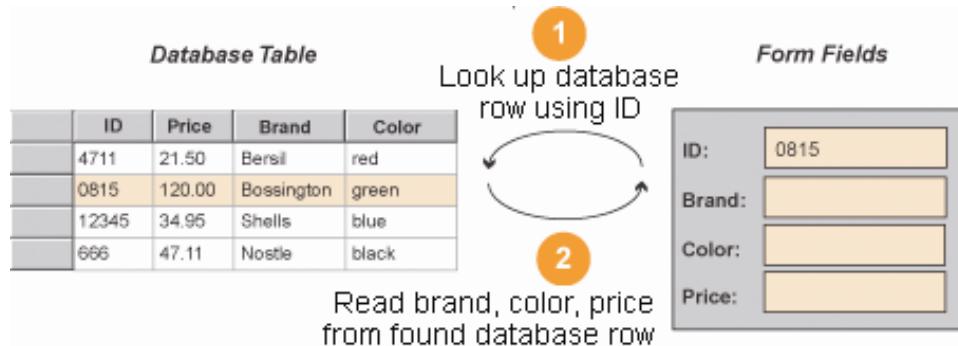


Figure 12-15: Smart indexing method

If used manually, the form for smart indexing should have the smart index field above the lookup fields. Otherwise the form's tab order will disturb the workflow.

Task Prerequisites

The prerequisites for this task are:

- The program is in Verifier Design Mode.
- A form is selected that has at least two form fields.
- The database exists that contains a table with corresponding columns.
- There is an OLE DB provider for the database system you use.

Configuring Smart Indexing

To configure smart indexing:

- 1) Select the form field that will be used as a smart index field.
- 2) In the vertical toolbar at the right edge of the window, click the Define smart indexing button.



The Smart indexing definition dialog box is displayed. It shows the available fields. The smart index field is highlighted in yellow and marked with a key icon.

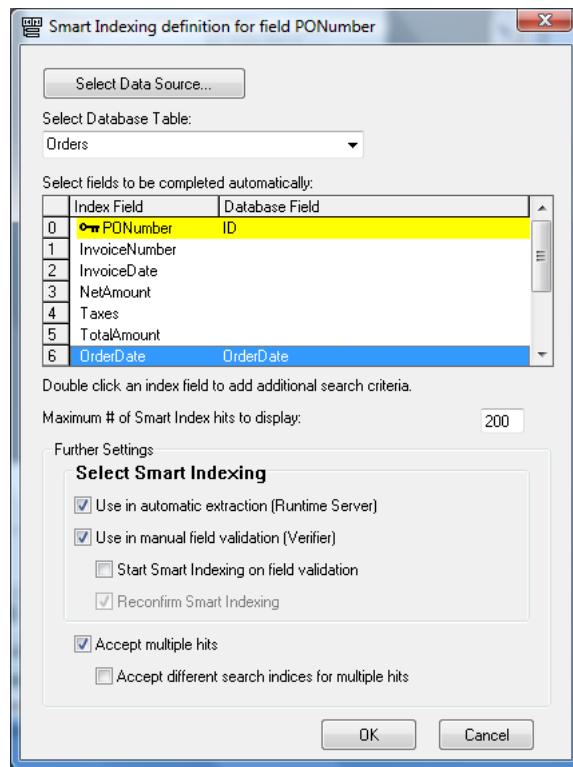


Figure 12-16: Smart indexing dialog box

- 3) Click on Select Data Source. The Data Link Properties dialog box is displayed.

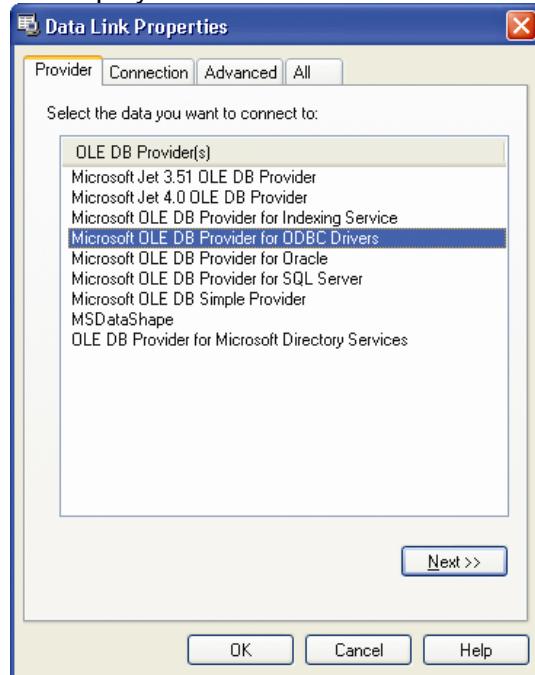


Figure 12-17: Data link properties - Provider

- 4) In the Provider tab, select the appropriate OLE DB provider for the type of data you want to access.
- 5) Click Next.
- 6) Use the Connection tab to specify how to connect to your data. The Connection tab is provider-specific and displays only the connection properties required by the OLE DB Provider of your choice. For more information, click Help.

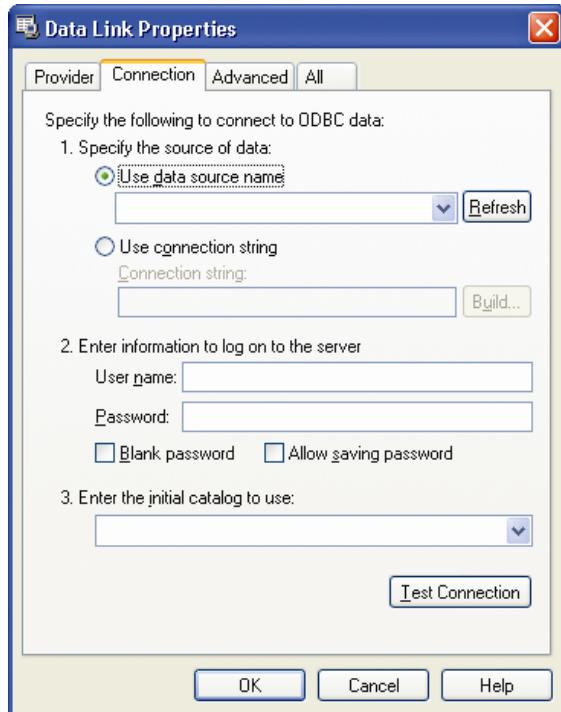


Figure 12-18: Data link properties - Connection

- 7) Click on OK. The Smart indexing definition dialog box is displayed again.
- 8) Select a database table from the Select database table list box.
- 9) Click on a cell in the Database Field column. A list is displayed, containing the names of all columns of the selected table. Map columns to
 - the smart index field
 - all lookup fields.
 Smart indexing will fill each field that is assigned to a database column.
- 10) Optionally, double-click each additional field that you want to use as index field. The corresponding fields are marked with key icons. Note that search criteria are evaluated using AND joins, i.e. there must be a matching row for both index values.
- 11) A database lookup using one index term may return multiple results. In interactive mode, a dialog box opens where the user can select the appropriate record. To limit the number of results, type an entry into the Maximum # of SmartIndex hits... text box, or accept the default.
- 12) Under Further Settings, specify where and when smart indexing should be performed.

- use in automatic extraction: Smart indexing is performed during the automatic extraction step by Oracle Forms Recognition Runtime.
- use in manual field validation: Smart indexing is available during the extraction verification or the manual indexing step in Oracle Forms Recognition Verifier .
- Start smart indexing ...: If this option is checked, the lookup is performed on validation, i.e. when the user presses ENTER in the index field. Otherwise the user needs to press ALT+F12 to trigger smart indexing.
- Reconfirm smart indexing: If this option is checked, the user has the opportunity to check and correct the values retrieved from the database (recommended). Otherwise the retrieved values are validated automatically.
- Accept multiple hits: If this option is checked, a valid lookup result may consist of multiple values.
- Accept different ...: If this option is checked, a valid lookup result with multiple values may have been obtained using different index fields.

12.1.15.1. Viewing Smart Indexing Fields

When editing the form, the Smart Index field will appear in yellow with the word “SmartIndex.”

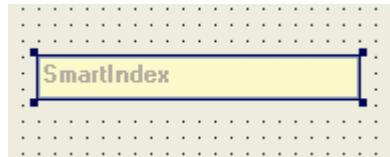


Figure 12-19: Example of smart indexing of the Invoice number on the form.

To delete the smart indexing definition:



- 1) Select the form field that is used as smart index field.
- 2) In the vertical toolbar at the right edge of the window, click the Delete smart index button. The smart index definition is deleted immediately.

12.1.16. Database Support for Smart Indexing

In smart indexing, you have two types of fields:

- Index Field
- Index Lookup Fields

12.1.16.1. Index Field

The data related to these fields are obtained from the database table and not from the OCR data in the documents. This is because these fields are filled using a database lookup with the value of the smart index field as parameter. The lookup returns the table rows that will be used to fill the lookup fields.

Index Lookup Fields

The information related to these fields must only be available in the database table, not in the documents. This is because these fields are filled using a database lookup with the value of the smart index field as parameter. The lookup returns the table rows that will be used to fill the lookup fields.

Although Oracle Forms Recognition Designer and Verifier support the use of an RDBMS with Smart Indexing, a problem arises when using a stand-alone database package such as Microsoft Access. When database access for Smart Indexing is configured, an ODBC connection to the data source must be defined. The definition is stored in a configuration file with a .dsn extension. However, ODBC used with Microsoft Access requires a static drive mapping (instead of a UNC path) to the data source.

For example, if the designated data source for Smart Indexing is located at \\DataSourceMachine\\ShareName\\DataSource.mdb, ODBC used with Microsoft Access requires that a drive letter (such as F:) be mapped to the data source. ODBC then stores the drive mapping in a .dsn configuration file. This seems to work, as long as the Oracle Forms Recognition project containing the Smart Indexing that references the data source is used on the machine on which the project was created.

However, when the project is opened on a machine other than the one on which it was created and an attempt is made to use the Smart Indexing feature, the application generates an “Object is closed” error. The work around for this error is to map the same drive letter (F:), stored in the .dsn configuration file that was created when the ODBC connection was defined, to the data source on the machine on which the project is being used. Although it is possible to synchronize drive mapping in some environments it is not conceivable in all network environments. This is especially true for those organizations that rely heavily on legacy applications requiring static drive mapping.

As a result of this ODBC constraint, Oracle Forms Recognition does not support the use of Smart Indexing with stand-alone databases such as Microsoft Access.

12.1.17. Correcting Table Fields

If the field is a table field, you can correct invalid cells as if they were text fields.

12.1.17.1. Using Auto-complete

Auto completion works in table cells as well as with text fields. When you type two or more characters, auto complete will suggest a word or phrase for that cell. The candidate appears in green if the field is valid, and orange if the field is invalid.

12.1.17.2. Inserting Words in Table Cells

You can insert single words or append existing text in table cells.

Words That Are Candidates for Cells

If the word belongs in a cell area, you can append or replace a word in a cell. The append feature takes the current word behind the candidate and appends it to the cell text. It places the text in the best location, either right or left of the word, and cell location by text or location of the word. The word belonging to a cell area will highlight in green when selected. Or, you can replace text.

To append text with the new text, you would double-click the desired word, or right click in the image viewer and select Append Cell Text by Word. If you have candidates, you can double-click the desired candidate to replace it, or right-click in the document, then select “Select Cell” from the shortcut menu.

In the search region, word candidates are all words that are not covered (by location) by other table cells and that have the same beginnings as the whole text of the cell.

Words That Are Not Candidates for a Cell

If the word does not belong to cell areas, it will display in orange when selected. Even if it is not a candidate, you can append or replace the word. Appending places the text in the best location, either right or left of the word, by text or location of the word. For example, a cell named “C2658” might be appended by “number.” Or, you can replace the cell text and location by the text and location of a word. To append text with the new text, you would double-click the desired word, or right click in the image viewer and select Append Cell Text by Word. To replace text, select the word, hold down CTRL and click the left mouse button, or select Replace Cell Text by Word in the shortcut menu.

Correcting Table Structure

You may need to correct the table structure as well. Table rows and columns exhibit shortcut menus that give you options to modify the table structure. To invoke them, right-click the row or column label. The available commands are summarized below.

Shortcut menu	Command	Description
Column	Unmap	Clears all data for the selected verification column and turns the state of the corresponding column of the recognized table back to “unmapped.” To view an unmapped column, double-click the table header in the verification form. All unmapped columns are highlighted in red.
	Map	Adds the column selected from the shortcut menu. Or, you can right-click an unmapped column to map it to a column in the verification form.
	Swap	Exchanges the position of the current column and the one selected from the drop-down menu.
Row	Insert	Inserts an empty row above the current one.
	Delete	Deletes the current row.
	Duplicate	Duplicates the current row.
	Append	Appends an empty row at the bottom of the table.

Table 12-2 Table shortcut menus:

12.1.18. Shortcut Menu Configuring Actions

Actions are triggers for scripted events that you can create to perform project-specific tasks. For example, you can trigger any allowed modification of Oracle Forms Recognition-related objects, or you can set an action to open an application or invoke third-party COM interface methods.

You can use buttons or keyboard shortcuts to activate an action.

To configure an action:



- 1) Select the Button icon and create a button on your form.
- 2) Name the button to reflect the desired action by right-clicking on the button. The Change Caption box appears.
- 3) Click the Action button.

The Define Actions dialog box appears.

- 4) Press Insert to add an action.
- 5) Press the Action label and enter a name for your action.
- 6) Press Description and enter a description of your action.
- 7) Press Button and select the name of the button that you want to link to the action.
- 8) Press Accelerator.

The Accelerator Properties box appears.

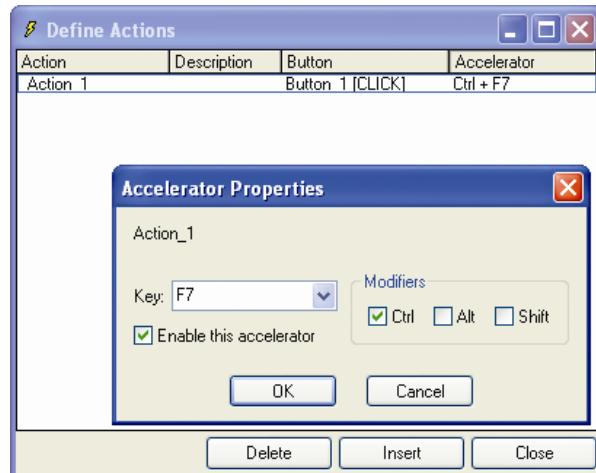


Figure 12-20: Accelerator Properties in Define Actions.

- 9) Select the type of keyboard combination for the accelerator, if desired.
- 10) Select the Script Editor by pressing the script button in the main menu.
- 11) Compose an event handler for a Document On-Action event.

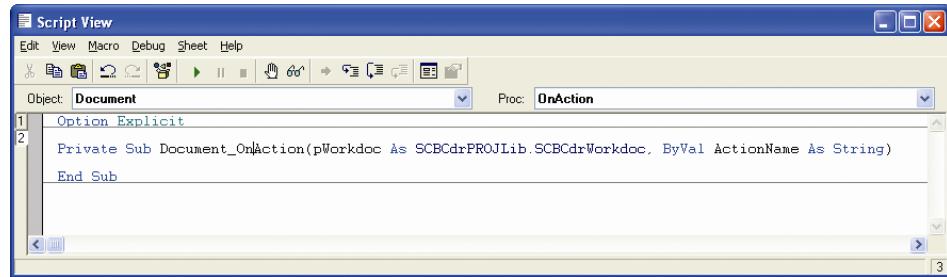


Figure 12-21: Example of a script for an action button

- 12) Switch to Verifier Test Mode and test the action. You should get a message box that confirms the activation.

12.1.19. Changing of Colors & Fonts for Elements of Verification Forms

Oracle Forms Recognition supports a set of script methods to dynamically or statically adjust fonts, colors, and background colors for verification forms and their verification elements. Please refer to the Scripting Guide documentation for more details.

12.2 Testing the Verification

The Verifier Test Mode provides a complete environment for the simulation of classification and extraction verification. This includes the corresponding state evaluations and transitions. However, changes of the Workdoc are not saved persistently. They are kept in memory only and discarded when the document input changes.

12.2.1. Verifier Test Mode User Interface

The user interface that is displayed depends on your current settings:

- It can be determined dynamically, using the document class and state. This leads to one of the following results:
 - The classification user interface is displayed.
 - The extraction/indexing user interface is displayed using the form corresponding to the current document's state.
 - There is no matching form, i.e. an empty user interface will be displayed.
- If the Force document... toolbar button is pressed, the selected form is displayed and used for extraction, independent from the document properties.

12.2.2. Verifier Test Mode Color Coding

In Verifier Test Mode, color coding is used to support the quality assurance process.

The appearance of the field area tells us something about the validity of the extracted data:

- A green background indicates a valid extraction result.
- A red background indicates an invalid extraction result.
- A question mark indicates illegible characters.

- A red character indicates rejects, i.e. Oracle Forms Recognition is in doubt whether the character was read correctly.

Similar information can be obtained from the document area:

- A green highlight indicates a valid extraction result.
- A red highlight indicates an invalid extraction result.
- A yellow highlight indicates a candidate.

Depending on the current selection in the field area, document highlighting can be applied to the following items:

- Document areas associated with text fields.
- Document areas associated with entire tables.
- Document areas associated with table columns.
- Document areas associated with table rows.
- Document areas associated with table cells.

12.2.3. Verifier Test Mode Icons

In the field area, the following icons are used to indicate the nature of the field:

Icon	Description
	Indicates the currently selected field.
	Indicates a smart index field that can be filled by a database lookup. This icon is visible only when a smart index field is selected.
	Indicates a smart index field that can be used to start a lookup. This icon is visible no matter whether a smart index field is selected or not.

Table 12-3: Icons in Verifier Test Mode

12.2.4. Verifier Test Mode Toolbar

The toolbar of the Verifier Test Mode provides some additional commands that help you to test the verification procedure. Use one of the following highlighting options to highlight fields and candidates:

Button	Description
	Highlights all areas on the current document that have been used to fill text fields. If the result is valid, the area is highlighted in green. If the result is invalid, the area is highlighted in red.
	Highlights only the area on the current document that was used to fill the current text field. If the extraction result is valid, the area is highlighted in green. If the extraction result is invalid, the area is highlighted in red.
	Highlights the area on the current document that was used to fill the current text field. If the extraction result is valid, the area is highlighted in green. If the extraction result is invalid, the area is highlighted in red. In addition, all other candidates for the current field are highlighted in yellow.

Table 12-4: Highlighting options in Verifier Test Mode

Further highlighting options are available via the menu. These are the same highlighting options as in document selection, definition and Train Mode.

Use the following buttons to control form and document display during the verification procedure:

Button	Description
	If this button appears pressed, the program always keeps the focus on the document area that is associated with the currently selected field. If required, the document section displayed in the viewer changes accordingly on field change.
	If this button appears pressed, the next documents are displayed with the currently selected magnification. Otherwise the default magnification is used after document change.
	If this button appears pressed, the next document will be displayed when you validate the current one. Otherwise no document change will take place, unless triggered via the navigation bar. Note that, in contrast to Oracle Forms Recognition Verifier, valid documents are not skipped in Verifier Test Mode.
	If this button appears pressed, the next document will be verified using the current form. Otherwise, document state and class assignment are used to determine the appropriate form on document change.

Table 12-5: Control options in Verifier Test Mode

12.2.5. Verifier Test Mode Keyboard Operation

In Verifier Test Mode, navigation and validation is mainly done using keyboard operations. Compared to Oracle Forms Recognition Verifier, a reduced set of keyboard operations is available.

The following operations can be used in classification mode:

Keyboard Shortcut	Description
n/a	If you know the correct class name, you may type its first characters and wait until the system automatically displays the full class name.
	Moves one class up in the selection list.
	Moves one class down in the selection list.
	Validates the classification result and displays the current document in extraction / indexing mode.
	Moves to the next field in the current document, or to the first field after document change.
	Moves to the previous field in the current document.
	Starts the database lookup, if smart indexing is configured.
	Deletes the end of the line.
	Deletes the entire field content.
	Inserts a new line into a multi-line field.
	Validates the current rejected character or field and moves to the next invalid character field. Depending on your current settings, this may involve a document change. Validation may also trigger smart indexing.

Table 12-6: Keyboard shortcuts in extraction / indexing mode

12.2.6. Testing the Visible Classes

Testing the classification verification is simple. All you need to check is whether classes that are not supposed to appear in Oracle Forms Recognition Verifier are actually hidden.

Prepare as document input:

- Unclassified documents. The quality of the documents is not important, you could for instance just use some *.tif images from the file system.

Use the following toolbar settings in Verifier Test Mode:

- Default settings.

To run a test:

- 1) Load the documents and switch to Verifier Test Mode. Because the current document is unclassified, the classification user interface is displayed.
- 2) To check the visible classes, open the list box at the bottom of the window.
- 3) Select a class and press ENTER. This classifies the document manually. The program will then check whether there is a form available for the selected class. If a form is available, the extraction is performed, and the document and its extraction results are displayed using this form.

12.2.7. Testing the Verification Form Layout

Next, you should test whether your verification form layout works under "normal" circumstances -- that is, with documents that extract nicely.

Prepare as document input:

- Classified documents. To work with documents that do not cause particular problems, you can take the documents from the Learn Set.
- Create separate batches for each document class to test single forms, and another batch with mixed content to test whether the correct form is displayed for each class.
- If you permit partial validation and have multiple forms per class, where each form is associated with a given state, you can edit the batch control file and modify the document state in order to force verification with a given form. Obviously this only lets you pretend that actually finished processing steps have not yet been performed, but not vice versa. Also, you need to make sure that batch states, folder states and document states remain consistent. For detailed information about the structure of the batch control file, please refer to the **Oracle Forms Recognition Runtime Server User's Guide**.

Use the following toolbar settings in Verifier Test Mode:

- Default settings are fine in most cases.
- To test a single form if your document input is heterogeneous concerning the classes, force validation with this form.
- To resolve special problems which only occur with some documents, do not navigate to the next document on validation.

To run a test:

- 1) Load the documents and switch to Verifier Test Mode. Since the current document is classified, the extraction / indexing user interface is displayed.

- 2) Press the TAB key to activate the first field. The arrow icon appears next to the field.
- 3) Check whether
 - your field has the required size,
 - you have multiline edits where you need them,
 - the associated viewer shows the appropriate document area,
 - the relevant information in the viewer is readable.
- 4) Use the TAB key to move to the next fields and check them as well.
- 5) When the last field is checked, press ENTER. This validates the document. The field background appears in yellow, and the mouse pointer assumes the shape of an hourglass. Once the document is validated, the next document is loaded into the viewer area.
- 6) Repeat this procedure for a number of documents to make sure that you cover all relevant cases.

12.2.8. Testing Validation Rules

Next you should test whether your validation rules are functional. The list below provides an overview of possible limitations concerning field content:

- Handling of OCR rejects.
- Permitted number of characters.
- Range of valid characters.
- Restriction to uppercase / lowercase characters.
- Handling of forced validation.
- Custom validation rules implemented as Sax Basic or WinWrap Basic scripts.

Prepare as document input:

- Classified documents.
- In order to run tests where you deliberately enter invalid input, you can use documents that extract nicely. You can, for instance, reuse the batches created previously to test the form layout.
- In order to test the handling of OCR rejects and of empty fields, create a corresponding set with OCR problems, for instance by scanning with a lower resolution.

Use the following toolbar settings in Verifier Test Mode:

- In order to test as many violations as possible with a limited number of documents, do not navigate to the next document on validation.

To run a test:

- 1) Load the documents and switch to Verifier Test Mode. Since the current document is classified, the extraction / indexing user interface is displayed.
- 2) Press the TAB key to activate the first field. The arrow icon appears next to the field.
- 3) Test the field validation rules as follows, and observe the messages that are displayed in the status bar:

- If the field contains OCR rejects, correct them and use the ENTER key to confirm each corrected character. You should not be able to validate the field if rejects are forbidden.
 - If applicable, enter strings that are too long or too short. You should not be able to validate the field unless the number of characters is within the valid range.
 - If applicable, enter some invalid characters. They should be discarded automatically.
 - If applicable, enter some characters in the wrong case. They should be converted automatically.
 - If possible, enter some input that is invalid and try a forced validation by pressing ENTER three times. If this is permitted, a message box should be displayed. Select No to interrupt the forced validation.
- 4) Without validating the field, use the TAB key to move to the next field and test their validation rules as well.

12.2.9. Testing Smart Indexing

Miscellaneous preparations:

- You should manually test whether the feature is working as expected. To do this, turn off automatic smart indexing while you're testing.
- You should have access to the database used for the lookup.

Prepare as document input:

- Extracted documents which have been generated with the automatic lookup turned off. In order to work with documents that do not cause particular problems, you can for instance take the documents from the Learn Set. Test each class concerned separately.

Use the default toolbar settings in Verifier Test Mode:

To run a test:

- 1) Load the documents and switch to Verifier Test mode. Because the current document is classified with an invalid extraction result, the extraction / indexing user interface is displayed.
- 2) Activate a smart index field that can be used to start a lookup. The arrow icon, the key icon, and the database icon appear next to the field. All other fields that can be filled using database lookup are marked with a database icon.

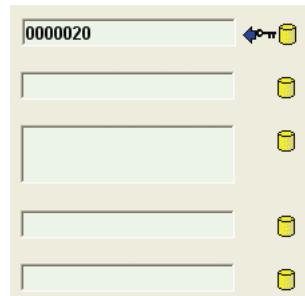


Figure 12-22: Smart indexing fields (before lookup)

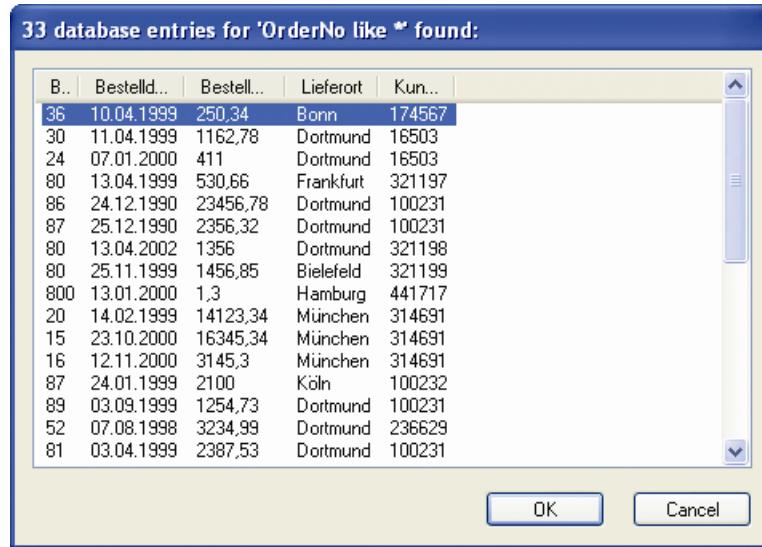
- 3) Run a search with the value that has been extracted, or enter a value that should return a single result. Then press ALT+F12 to trigger the lookup. This should fill the lookup fields.



A screenshot of a user interface showing five input fields with yellow lookup icons to the right. The fields contain the following values:
 1. 20
 2. 14.02.1999
 3. 14123,34
 4. Munich
 5. 314691

Figure 12-23: Smart indexing fields (single result returned.)

- 4) Run a search that should return multiple results. This can, for instance, be a wildcard search, using the * to represent multiple characters, or the ? to represent a single character. Two different results are acceptable in this case.
- If multiple results are forbidden, a dialog box should be displayed where you can select the appropriate record. The lookup fields are then filled accordingly.



A screenshot of a dialog box titled "33 database entries for 'OrderNo like * found:'". The dialog contains a table with 33 rows of data, each representing a database entry. The columns are labeled: B.., Bestelld..., Bestell..., Lieferort, Kun... . The data includes various dates, order numbers, and locations like Bonn, Dortmund, Frankfurt, etc. At the bottom of the dialog are "OK" and "Cancel" buttons.

B..	Bestelld...	Bestell...	Lieferort	Kun...
36	10.04.1999	250,34	Bonn	174567
30	11.04.1999	1162,78	Dortmund	16503
24	07.01.2000	411	Dortmund	16503
80	13.04.1999	530,66	Frankfurt	321197
86	24.12.1990	23456,78	Dortmund	100231
87	25.12.1990	2356,32	Dortmund	100231
80	13.04.2002	1356	Dortmund	321198
80	25.11.1999	1456,85	Bielefeld	321199
800	13.01.2000	1,3	Hamburg	441717
20	14.02.1999	14123,34	München	314691
15	23.10.2000	16345,34	München	314691
16	12.11.2000	3145,3	München	314691
87	24.01.1999	2100	Köln	100232
89	03.09.1999	1254,73	Dortmund	100231
52	07.08.1998	3234,99	Dortmund	236629
81	03.04.1999	2387,53	Dortmund	100231

Figure 12-24: Selection list with multiple results

- If multiple results are allowed, the lookup fields will be filled with multiple values. In this case, you need multiline fields to display the results properly.
- 5) Run a search that should yield no results. You should see a corresponding error message.

If you need automatic smart indexing, do not forget to change the settings again when your tests are finished.

12.2.10. Testing Table Analysis and Correction

The preparations for table analysis test are essentially the same as for general extraction tests. The list below provides an overview of possible limitations concerning table content:

- Default columns.
- Cells with required entries.
- Valid column formats.
- Handling of forced validation.
- Custom validation rules implemented as Sax Basic or WinWrap Basic scripts.

Prepare as document input:

- Classified or extracted documents.
- Create separate batches for all document classes that use common table settings.

Use the following toolbar settings in Verifier Test Mode:

- Default settings.

To run a test:

- 1) Load the documents and switch to Verifier Test Mode. Since the current document is classified, the extraction / indexing user interface is displayed.
- 2) The most basic test checks the presence of the table field. If some table fields are missing, you will have to improve the table analysis settings, or provide a mechanism how these cases are handled. A simple method to make sure that table fields exist (which can then be corrected) is the use of default columns.
- 3) The table field provides additional highlighting options:

	Description	Single Price	Quantity	Total Price
1	Adapted 872400	1,102.98	1	1,102.98
2	Adapted 872500	865.87	1	865.87
3	Emulex LP9802 ...	1,486.22	1	1,486.22

Figure 12-25: Table field example.

- Clicking the button in the upper-left corner of the field highlights the entire document table.
 - Clicking a column label in the field area highlights the document column.
 - Clicking a row label in the field area highlights the document row.
 - Clicking a cell in the field area highlights the document cell.
 - Valid areas appear in green, invalid areas in red.
- 4) Use the highlighting options for the following tests:
 - Check whether table tops and bottoms have been detected correctly.
 - Check for default columns. They must be available in valid tables. If a default column is missing, the corresponding table must be invalid.

- Check for mandatory cells. They must be filled in valid tables. If a mandatory cell is empty, the corresponding table, column, and row must be invalid.
 - Check whether column formats have been applied correctly. If cells have an incorrect format, the corresponding table, column, and row must be invalid.
- 5) Check whether forced validation of invalid tables is possible.
- 6) The column labels' shortcut menu allows you to correct the column structure of tables. It contains the following commands:

Command	Description
Unmap Column	Removes the current column.
Swap Column	Exchanges the position of the current column and the one selected from the drop-down menu.

Table 12-7: Table column shortcut menu

- 7) The row labels' shortcut menu allows you to correct the row structure of tables. It contains the following commands:

Command	Description
Insert Row	Inserts an empty row above the current one.
Delete Row	Deletes the current row.
Duplicate Row	Duplicates the current row.
Append Row	Appends an empty row at the bottom of the table.

Table 12-8: Table row shortcut menu

- 8) Fill the cells with correct values and validate the table by pressing ENTER.

Chapter 13 Printing

You can print documents from Oracle Forms Recognition Designer, including pages with highlights.

To print a document:

- 1) On the Main Menu, click “File” and then “Print”.
- 2) On the Print dialog box, select Settings and click OK.

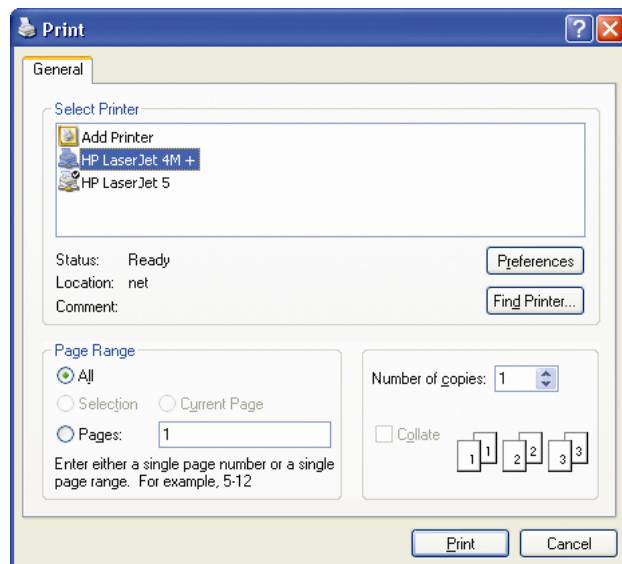


Figure 13-1: Typical print dialog box.

Chapter 14 Reusing Project Settings with Templates

In data extraction, once your analysis and evaluation settings for a field are working, you can reuse them elsewhere within or outside your project. For example, if the format analysis has been configured to find a date, it could be useful to take the same definition at any other place where dates have to be extracted. Therefore, in Oracle Forms Recognition Designer, analysis and evaluation settings can be saved as templates. You can also create templates for table definitions.

To learn how to work with Validation templates, please see [Chapter 6](#).

14.1 Creating Templates

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected for which settings have been defined that will be reused.
- On the right side of the window, the tabs with class/field properties are visible.

To create analysis templates: The Analysis tab is displayed in the foreground.

To create evaluation templates: The Evaluation tab is displayed in the foreground.

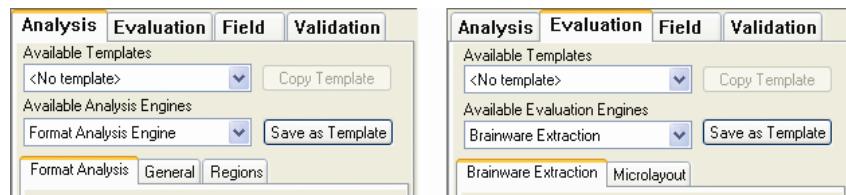


Figure 14-1: Analysis & Evaluation Tab

Creating Templates

To create templates:

- 1) Click the Save as Template button. The New Template dialog box is displayed.
- 2) Enter a name for the template and click OK. The template is saved internally within the project.

14.2 Using Evaluation and Analysis Templates Within Projects

There are two ways to use a template within a project:

- As defined.
- As a starting point for further adjustments.

Task Prerequisites

The prerequisites for both methods are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Fields tab in the foreground.
- A field is selected.
- On the right side of the window, the tabs with class/field properties are visible.
- To use an existing analysis template: The Analysis tab is displayed in the foreground.
- To use an existing evaluation template: The Evaluation tab is displayed in the foreground.

Using Existing Templates

To use an existing template as defined:

- Select it from the Available Templates list box. This overwrites all previous settings. In addition, the tabs for analysis and evaluation settings will be hidden.

To use an existing template and adjust it:

- 1) Select it from the Available Templates list box.
- 2) Click the Copy Template button. This updates the tabs for analysis or evaluation settings below with the settings from the template. You can modify the settings. However, this will not be reflected within the template.

14.3 Editing Analysis and Evaluation Templates

In Oracle Forms Recognition Designer, templates are stored and managed on the project level. To edit them, you need to display the project properties.

Task Prerequisites

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

Viewing Templates

To view the templates:

- 1) In the Classes tab, right-click the entry representing your project to display a shortcut menu.
- 2) Do one of the following:
 - Select Show Analysis Templates to display the tab of analysis templates.
 - Select Show Evaluation Templates to display the tab of evaluation templates.

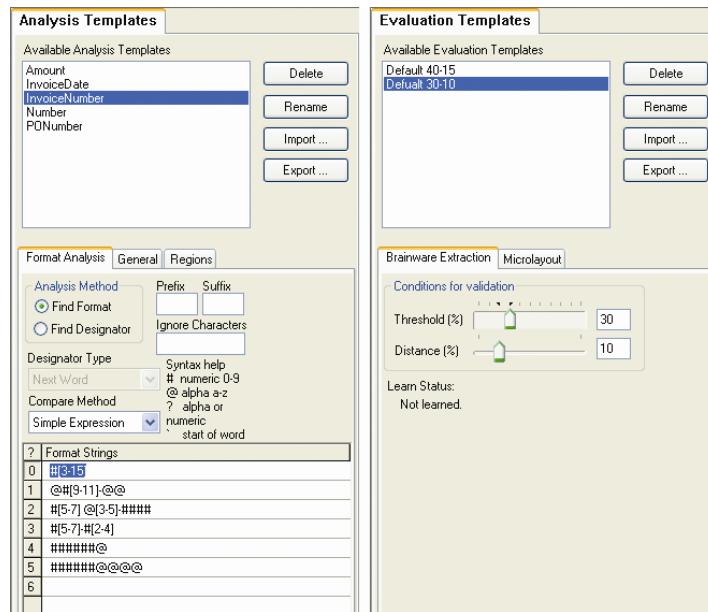


Figure 14-2: Overview of analysis and evaluation templates

Options for Editing

Three editing options are available within these tabs: Renaming, Deleting, and Changing the Settings.

- Renaming: To rename a template, select it from the Available Templates list box and click Rename. Enter the new name in the following dialog box. You can only rename templates that are currently not in use.
- Deleting: To delete a template, select it from the Available Templates list box and click Delete. Confirm in the following dialog box. You can only delete templates that are currently not in use.
- Changing the settings: You can change all settings that are saved with the template. To change the template settings, select it from the Available Templates list box and edit in the tabs that are displayed below. All fields using a template will immediately work with the new settings.

14.4 Exchanging Analysis Templates Between Projects

You can save analysis templates as files and use them in other projects. This feature is not supported for evaluation templates.

The prerequisites for this task are:

- The program is in Definition Mode.
- The pane on the left side of the window displays the Classes tab in the foreground.
- On the right side of the window, the tabs with class/field properties are visible.

14.4.1. Exporting Templates to Another Project

To export templates:

- 1) In the Classes tab, right-click the entry representing your project to display a shortcut menu.
- 2) Select Show Analysis Templates to display the tab of analysis templates.
- 3) In the Analysis Templates tab on the right side of the window, click Export. The Export Analysis Templates dialog box is displayed.

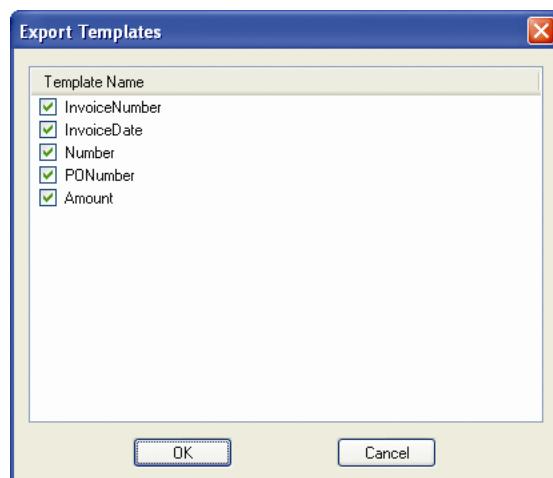


Figure 14-3: Exporting templates

- 4) To exclude templates from the export, clear the corresponding check boxes and click OK to start the export. The Save File As dialog box is displayed.
- 5) Enter a file name and click Save. The template export file is written to the file system with the extension *.exp.

14.4.2. Importing Templates from Another Project

To import templates:

- 1) In the Classes tab, right-click the entry representing your project to display a shortcut menu.
- 2) Select Show Analysis Templates to display the tab of analysis templates.
- 3) In the Analysis Templates tab on the right side of the window, click Import. The Open dialog box is displayed.
- 4) Select a template export file with the extension *.exp and click Open. The templates from the file are imported and displayed in the Available Analysis Templates list box. The program automatically recognizes the template type contained in the export file. If it is the wrong type, template will not be imported.

Chapter 15 Setting Up the Document Export

Without a connector or an export script, the documents are written to the Runtime Export directory after processing.

Individual document export options need to be implemented using WinWrap Basic scripts. Please refer to the **Oracle Forms Recognition Scripting Documentation** for detailed information about the available options.

Example:



The following export script writes classified images to subdirectories within the export directory. Each subdirectory holds documents from one class only; the subdirectory name corresponds to the class name.

To implement the script:



- 1) If required, switch to Definition Mode.
- 2) In the toolbar, click on Script button to open the Sax Basic or WinWrap Basic IDE.
- 3) From the list box to the left, select ScriptModule.
- 4) From the list box to the right, select ExportDocument. This generates the outline of a Sax Basic or WinWrap Basic subroutine.
- 5) Add the following code:

```
Dim sNewPath As String
Dim MyImage As SCBCroImage
Dim NewFileName As String
sNewPath=ExportPath & "\" & pWorkdoc.DocClassName 'Set
directory name
Set MyImage=pWorkdoc.Image(0) 'Access the image file to the
current WorkDoc
On Error GoTo Skip 'Skip next step if directory exists
MkDir sNewPath 'Create directory
Skip:
NewFileName=Mid(MyImage.Filename,
InStrRev(MyImage.Filename,"\")) 'Set file name
MyImage.SaveFile sNewPath & NewFileName 'Save file to
directory
```

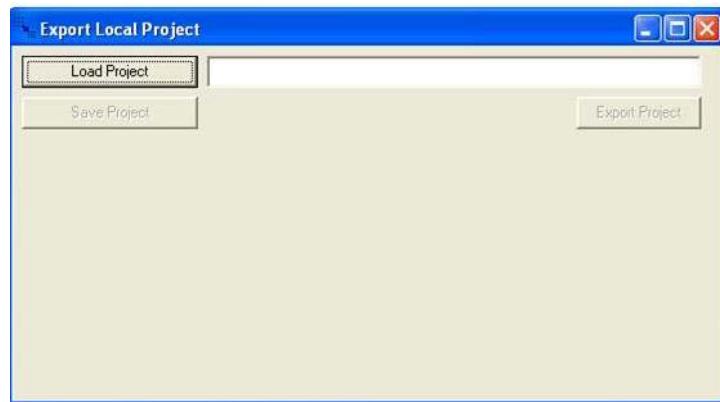
- 6) Close the dialog box.
- 7) Test the export script in Runtime Mode.

Appendix A Auxiliary Tools

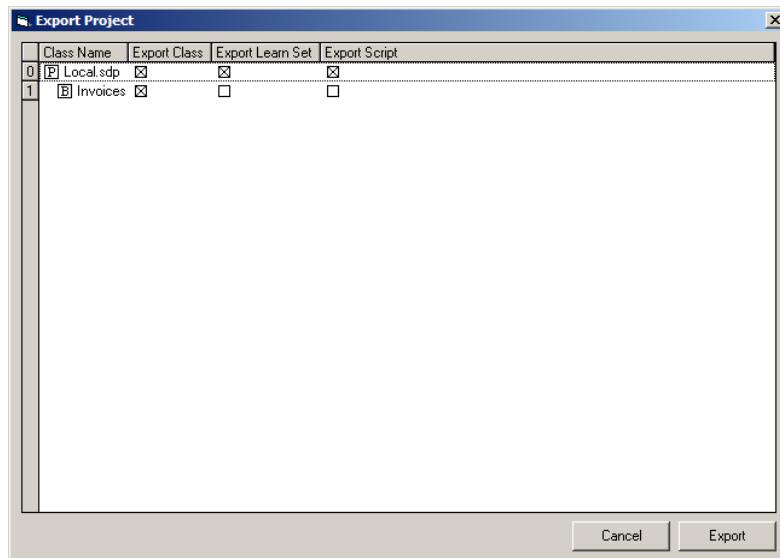
Auto-Generation of Template Local Projects in SLW

Administrators may wish to create a new Local Project based on an existing Global project, keeping some or all settings of base class, your learn set and script. This task can be performed using a new “SLW Export Local Project” tool that can be launched via Windows Start \ Programs \ Oracle Forms Recognition \ Tools \ SLW Export Local Project Tool menu item.

The first dialog allows you to search and choose a Project, to be used as source:



The next dialog is an internal structure (P - as project, B - as base class) of the selected project and provides a possibility to select (check/uncheck) the desirable Settings to be exported.



“Cancel” will quit this step. “Export” gives, as usual, a possibility to name a Target Project and Save it for future use. While Exporting, the tool automatically analyzes and creates the corresponding learnset directories and learnsets, based on a new name of the Target Project, or prompts for a replacement, if a name of the Target Project already exists.

“Save Project” saves the entire export project configuration as a part of the global project’s stream and exits.

Usage:

This tool can be used for automation of manual creation of template local projects (to be used by Advanced Verifier workstations) out of the primary global one in content of supervised learning workflow. As a result, it will minimize the effort required each time a new local project is supposed to be created.

Appendix B Oracle Forms Recognition Designer – Quick reference

Project Manipulation		Document Processing		Miscellaneous	
	Load Project		Classify/Analize		Show/Hide Script
	Save Project		Execute and debug		Pagedesigner
	Show Settings		Execute and Export		Show/Hide classification Matrix
Mode Selection		OCR and Execute		Show Properties	
	Document Input (Batch)		Process next document		Adjust documents display to Height
	Document Input (Directory)		Process multiple documents		Adjust documents display to Width
	Document Input (Learnset)		Wait at current position		Fit page into window
	Definition Mode		Stop processing		Zoom in
	Train Mode				Zoom out
	Runtime Mode				Selection tool
	Verifier Test/Design Mode				Insert OCR Zone
Document Highlighting		Verifier Design Mode			Insert OMR Zone
	Highlight Nothing		Create a form for all classes		Insert Barcode Zone
	Highlight Words		Create a form for current class		Insert Anchor
	Highlite Blocks		Delete all forms		Previous page
	Highlite candidates		Delete current form		Next page
	Highlite Fields		Maximize form view		
Document Navigation		Verifier Test Mode			
	First document		Keep focus on Field		
	Previous document		Keep zoom on Browsing		
	Last document		Next document on validate		
	Next document		Validate with selected form		
Learning					
			Learn documents		
			Add document to Learnset		

Appendix C Regional and Currency Settings

This appendix lists settings for region and currencies used in Validation and Output Formatting

Region	Currency	Supported Symbols
Dutch	Euro, Guilder	NLG, fl, €
Dutch-Belgium	Euro, Franc	BEF, BF, €
English	Euro, Dollar	USD, \$, €
English-Australia	Euro, Dollar	AUD, \$, €
English-Canada	Euro, Dollar	CAD, \$, €
English-New Zealand	Euro, Dollar	NZD, \$, €
English-United Kingdom	Euro, Pound	GBP, €
English-United States	Dollar	USD, \$, €
French	Euro, Franc	FRF, F, €
French-Belgium	Euro, Franc	BEF, BF, €
French-Canada	Euro, Dollar	CAD, \$, €
French-Switzerland	Euro Franc	CHF, SFR, €
German	Deutsche Mark, Euro	DEM, DM, €
German-Liechtenstein	Deutsche Mark, Euro	DEM, DM, €
German-Luxembourg	Deutsche Mark, Euro	DEM, DM, €
German-Swiss	Euro, Franc	CHF, SFr, €
Italian	Euro Lira	ITL, L, €
Italian-Swiss	Euro, Franc	CHF, SFr, €
Neutral	Euro	€
Norwegian	Euro, Kroner	NOK, k
Polish	Euro Zloty	€
Russian	Euro	€
Spanish	Peseta	ESP, pta
Spanish-Mexico	Peso	MXN, ls
Spanish-Modern	Peseta	\$, ESP, pta
Swedish	Euro, Krona	SEK, KR, €

Appendix D Project Structure and Files Extension

This appendix illustrates a typical project's folder structure and the types of files and file extensions in use. If you installed Oracle Forms Recognition as recommended, projects are stored under...\\program files\\Oracle\\Forms Recognition\\projects. Each project has its own folder structure. The root folder for the project carries the same name as the project name (the *.sdp file you created for the project.) Folder structures for projects that did not use associative learning differ from those that do use associative learning.

Non-Associative Projects

In non-associative projects, the project file (*.sdp) templates and comma-delimited reference files (*.csv), such as vendor pools, are stored at the project root. Below the project root, all projects have Batch folders, Export folders and Learn folders. The primary batch folder holds batch state files, batch control files, lock files, sdb files and sdl files. Batch folders contain secondary folders for each batch in the project. These folders hold the Workdocs and image files for each document in the batch. The learn folder contains all the Learn Sets for the project. Each of these Learn Set folders contains the images and workdocs in the Learn Set. The Export folder contains exported files.

Associative Learning Projects

The folder structure of Associative Learning Projects is more granular. As with the project root for non-associative projects, the project root contains the project file, the export files, templates, and *.csv files.

The project root also should consist of the following folders:

- Batches
- Common Learn Set
- Export
- Global Project
- Input
- Local Project
- Misc.
- Vendor Pool

File Extensions

Region	Currency	Supported Symbols
SDP	Project file	project root
EXP	Exported templates	project root
CSV	Comma-delimited reference files	project root
DAT		batch folder
500 (or some other number)	Batch state files with the state of the number assigned	batch folder
SDB		batch folder
SDL		batch folder, learn folder
WDC	WorkDocs	specific batch folder, learn folder
TIF	Tagged Image Format Files	specific batch folder
ID0	Learned image files	Learn folder
STS	Project Status Information	Vendor pool folder

Region	Currency	Supported Symbols
TMP	Temp File	Vendor pool folder
ATT		Vendor pool folder
DCT		Vendor pool folder
DFF		Vendor pool folder
DLY		Vendor pool folder

Glossary

Address pool	Special database format that stores address entries that can be used during the analysis step to obtain candidates.
Administrator	In Oracle Forms Recognition, an administrator is a power user who creates user accounts, passwords, and groups, and assigns users to groups.
Analysis	In this processing step, the document content is analyzed and a set of possible values for a field is generated. These values are called candidates.
Anchor	Anchors are special types of reading zones. They look for prominent geometric features on documents, such as page corners. Once these features are found, anchors can provide a fixed coordinate system for the reading zones. Position for reading zones are determined relative to anchor positions. This can overcome fluctuations in the page position of scanned images.
ASSA	Retrieves text from a document block by block and generates a query string from the results, and then searches for that query.
Classification Engine	Uses a reference field to extract results.
Associative Search Engine	Automatically corrects distortion of a scanned image.
Auto-deskew	Automatically makes a scanned image less crooked.
Auto-orientation	Uses the Associative Search Engine to process, classify, and extract vendor information.
Automatic Supervised Learning	A pattern of vertical black bars separated by spaces. Bars of varying thickness represent different characters. In document management, barcode recognition can be used to uniquely identify or to separate documents.
Barcode	The highest level of a classification
Base class	A logical organizational structure to control a set of documents during a process. A batch is normally created during the scan process from a batch of paper. The status of a batch is used to manage the input flow.
Batch	Oracle provides the core classification and extraction technology for Oracle Forms Recognition. It uses artificial neural network techniques to automatically classify structured and unstructured documents and extract meaningful information from them. A neural network must be trained before you can use its ability to categorize at high speed – it must learn. The method of learning is similar to the way humans learn: It is purely sample-based. The major benefit is that, after being trained, Oracle can handle information that is similar to the samples without programming or extensive rule setting.
Oracle	Set of possible values for a field.
Candidate	Allows you to indicate valid and invalid characters and characters that should be removed or replaced during validation.
Character filtering	A class spawned by a parent class. See also base class and parent class.
Child class	A set of documents that are grouped by common content. Each class usually has a mnemonic name that describes its contents from the user's point of view.
Class	The process of assigning one or more classes and corresponding confidence values to one or more unknown documents.
Classification	Set of sample documents needed for Brainware classification.
Classification Learn Set	In OCR, classifiers are specialized algorithms that cast their votes in favor of one character over another. OCR accuracy and performance can be improved if only a subset of classifiers needs to be involved in character recognition.
Classifier	In classification, the confidence level indicates the degree of similarity between a document to be processed and the documents in the Learn Set of
Confidence	

	a given class.
Definition Mode	Used to design classification, extraction, validation, verification, and export.
Derived Validation	Tells a child field, document, or class to inherit all validation settings from its parent.
Designer Test Mode document routing	A way to test export scripts
Document Selection Mode	Used to select documents to be used in learning and testing
Deskewning	Because of the mechanical feeding action of scanners, documents may get out of alignment during scanning. Deskewning is the process used to remove skew or distortion from scanned images through a small angle rotation.
Despeckle	Process used to remove speckles from scanned images. Speckles are made up of groups of black pixels surrounded by white pixels or vice versa.
Dictionary	The documents from each Learn Set must be preprocessed before classification. All documents in the set are filtered and statistically analyzed. Their wording patterns are used to create a dictionary that is required by the neural network for learning.
Distance	In classification evaluation, the distance is the difference between the confidence level of the best and the second-best class. In extraction evaluation, the distance is the difference between the weight of the best and the second-best candidate. It is a measure of how clearly the winner of the evaluation can be distinguished from the runner-up.
DPI	Dots per inch. Affects the size and clarity of an image file.
Document	Any electronic file mainly consisting of ASCII text. If this is not the case in the first place, OCR or filtering must be applied to create the text representation. A document can be classified, a document can have fields used for extraction, and a document can have one or more images attached.
DocClass	A parent Document Class.
Evaluation	The process of determining a class or the contents of a field from confidence levels, weights or distances for classes or candidates.
Export	In Oracle Forms Recognition, document export releases the documents so that they are no longer managed by the software.
Extraction	The process of automatically finding specified information within the contents of a document and writing the information to data fields associated with the document. Extraction is used for automatic indexing.
Folder	A logical structure inside a batch for coherent documents. A folder may for example consist of all pages of a correspondence with many folders inside one batch.
Forced validation	Means that a document or field is valid regardless of whether it would normally be invalid, based on its contents or assigned validation settings.
Form	(1) A structured, standardized document that is used to support business processes. (2) A custom dialog box in a software application.
Format Analysis	Uses a formal description of a character string to define a set of search strings.
Forms Classification Engine	Can identify forms or other structured documents that have an identifier of the document class printed on them. If the identifier is placed at a fixed position on the document, reading this zone can quickly provide a classification result. Not a first choice for a single classification method.
Global Learn Set	A general Learn Set that encompasses similar classes or projects. See also Local Learn Set
ICR	Intelligent Character Recognition. Special type of OCR that is used to process handwriting.
Image	A digital raster image normally created during scanning. The image is compressed and stored in a specific format. Internally, Oracle Forms Recognition uses a structure called Image that represents the raster image.

Image	The image contains methods to load, store and manipulate it. The image can be displayed in the viewer.
Image Size	Uses the physical dimensions of a document to classify it. Often used to rule out a document's membership in a certain class, rather than to confirm it.
Classification	
Engine	
Importing	Bringing documents into Oracle Forms Recognition for management and processing
Indexing	The process of assigning attributes to a document. This can either be done manually semi-automatically (Smart Indexing), or entirely automatically (Extraction).
Inheritance	
Chronology	
Learn Set	The order in which validation, analysis, or extraction characteristics are passed between parent and child. Can be top-to-bottom or bottom-to-top. In classification, a Learn Set is a set of documents whose class assignments are specified by the user. For each view and each class, the user must provide a sufficient number of representative documents. Similarly, in extraction, a Learn Set is a set of documents whose field contents are selected by the user from a set of candidates.
Learning	Given a view with a set of documents in vector representation and their class assignments, a neural network is created, so that the so-defined classes can be reproduced without error. This neural network is then used in all subsequent classification tasks.
Levenshtein search	Error-tolerant search method that finds each literal occurrence of a specified string, but also strings that can be derived from the specified one by inserting, interchanging or deleting single characters. The number of key operations required to derive the erroneous string determines whether there is still a match. Accounts for typing errors.
Literal character	Normal alphanumeric characteristics that are not used as operators.
Local Learn Set	Learn Set specific to a document class.
Matrix	
Recognition	
Neural network	The ability to read documents created on a dot-matrix printer.
ODBC	An artificial neural network is an application that in some ways works like a human brain. This includes the ability to learn. It consists of artificial neurons that are linked into a network of layers. The neural network can receive signals through an input layer, process it within the internal layers and send signals through the output layer. During learning, a specified input (a so-called teacher signal, such as documents from a Learn Set) and the desired output (such as the corresponding classes) are presented to the network together. Processing is then adjusted until the desired output can be produced from the teacher signal.
OCR	Open Database Connectivity. Enables you to access files from an external database.
OMR	Optical Character Recognition. The reading and recognition of symbols of text from a piece of paper or a scanned image. OCR detects the symbols and converts them into characters and words that can be read electronically.
OMR	Optical Mark Recognition. The sensing of marks on a document. OMR might be used to collate questionnaires or multiple-choice examinations where a student marks certain boxes on an answer sheet. OMR detects the marks and converts them into electronic signals.
On demand	A process that is performed whenever requested, not just once.
Output	Enables you to standardize the appearance of data exported from Oracle Forms Recognition.
Formatting	
Parent class	A class with derived classes, called children.
Patchcode	A pattern of horizontal black bars separated by spaces and typically placed near the leading edge of a paper document. Patchcodes can be used to separate documents.
Persistent	Permanent; something that is saved persistently is save permanently, unless

Phrase	the user deletes it.
Classification Engine	Uses words or phrases to identify a document class.
Project	Project files are used to persistently save custom settings for Oracle Forms Recognition applications. They are created in Oracle Forms Recognition Designer and handed over to Oracle Forms Recognition Runtime for productive operation.
Project Settings Tree	Acts as a registry for Oracle Forms Recognition.
Reading zone	Fixed areas on documents that contain information that is to be extracted.
Regular expression	Generalized pattern language used to search strings that match a specified pattern.
Runtime Mode	Used to testing classification, extraction, and export scripts. Can also be used to perform OCR.
Simple expression	Simple pattern language used to search strings that match a specified pattern.
Smart Indexing	Smart indexing uses a database lookup to determine document attributes. It can be used for automatic indexing and to support manual indexing.
Special character	Characters that can be used as operators.
Standard Validation Engine	Automatic interface used to enhance Oracle Forms Recognition's tradition script-based validation capabilities.
Stretching	Used with other classification engines, improves the results of Brainware classification by increasing the distance (in confidence levels) between results.
Sub-class	A derivative class.
Supervised-Learning Manager	A user who designs, modifies, and maintains Learn Sets.
Supervised-Learning Verifier	A user who collects and maintains local training data.
Table Analysis.	Extracts records organized in columns and rows on a document.
Template	A named set of settings used in data extraction. Via templates, the same set of settings can be reused within projects and exchanged between projects.
Template Classification Engine	Can identify forms and documents that have characteristic pre-printed information on them, such as a company logo.
Train Mode	Used to train classification and extraction. Can also be used to create Learn Sets.
Trigram search	Error-tolerant search method for strings. To compare two words, they are fragmented into groups of three characters called trigrams. The number of identical groups determines whether there is still a match. Accounts for OCR errors.
Typewriter Recognition Validation	Reads output from documents that were created on a typewriter.
Verification	A quality assurance task that involves confirming whether a processing result is correct. This can be done at several levels: for the class or a field associated with a document, for the document as a whole or for an entire batch.
Verifier	A quality assurance task that involves checking and correcting processing results.
Verifier Design Mode	Oracle Forms Recognition's QA application.
Verifier Test Mode	Used to create forms that will be used in Verifier for data correction and manual indexing.
	Used for simulation in Verifier Design Mode and to test verification.

Verifier Train Mode	Uses Automatic Supervised Learning to extract meaningful supplier information.
View	A set of documents that represent at least two classes. A view is usually defined using a small set of documents that represent the domain of interest. In a view, classes compete for documents; that is, a document may only be assigned to one class within the view.
Weight	In extraction, indicates the degree of similarity between candidates on a document that is to be processed and the candidates in the Learn Set of a given field.
Word strength	Refers to the number of typos that a word can contain before losing significance. The stronger the word, the more error it can have and still be significant.
Workdoc	An internal structure representing the logical structure of a document. The Workdoc represents the data created during processing of a single document and is stored in a file with the extension *.wdc. Since the Workdoc includes all OCR and analysis results it may exceed the document file by size.

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