

Oracle® Cloud

Oracle Machine Learning AutoML UI



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Primary Author: Moitreyee Hazarika

Contributors: Mark Hornick, Denny Wong, Marat Spivak

Contributors: Charlie Berger

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Preface

This document describes how to use Oracle Machine Learning and provides references to related documentation.

- [Audience](#)
This document is intended for data scientists, developers, and business users.
- [Conventions](#)
- [Documentation Accessibility](#)
- [Related Resources](#)
For more information, see these related resources.

Audience

This document is intended for data scientists, developers, and business users.

Conventions

The following text conventions are used in this document.

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Access to Oracle Support

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Related Resources

For more information, see these related resources.

- *Getting Started with Oracle Cloud* [Getting Started with Oracle Cloud](#)
- *Accessibility Guide for Oracle Cloud Services* [Accessibility Guide for Oracle Cloud Services](#)

1

What's New in Oracle Machine Learning on Autonomous Database


Provides a summary of the latest enhancements and features for Oracle Machine Learning Notebooks on Autonomous Database.

Table 1-1 New Feature

Feature	Description
Support for cross-region Oracle Data Guard	Oracle Machine Learning Notebooks provides cross-region Oracle Data Guard support in newly provisioned and migrated databases.

Table 1-1 (Cont.) New Feature

Feature	Description
Oracle Machine Learning repository migrated from shared database to each respective Autonomous Database instance.	<p>The Oracle Machine Learning (OML) repository has been migrated from shared database to each respective Autonomous Database instance.</p> <p>The migration of the Oracle Machine Learning repository ensures:</p> <ul style="list-style-type: none"> • That all OML objects such as tables, jobs, store procedures, and metadata are moved to the appropriate Autonomous database instance. • Provides support for Refreshable Clones, which enables cloning of the Oracle Machine Learning metadata as well.




Note:

The migration of the Oracle Machine Learning (OML) repository is expected to be completed over a period of 30 days. In case you are not able to view the expected behavior after you clone your Oracle Autonomous Database, check again in a few days. Otherwise, you may contact [Oracle Support](#) for more information

The OML repository version is mentioned in **About** in the <user> drop-down list on the top right corner of your Oracle Machine Learning Notebooks page. If the version is 1.0.0.0.0, it indicates that the OML metadata is still in the shared database. If the version is 22.x, it indicates that the OML repository has been migrated to your Autonomous Database instance.

Table 1-1 (Cont.) New Feature

Feature	Description
Oracle Machine Learning Notebooks supported on all Oracle Autonomous Database clones	<p data-bbox="781 338 1377 390">Oracle Machine Learning Notebooks is supported on all types of Oracle Autonomous Database clones, including:</p> <ul data-bbox="781 394 1377 632" style="list-style-type: none"><li data-bbox="781 394 1377 447">• Full Clone: a new database is created with the data in the source database and metadata.<li data-bbox="781 451 1377 537">• Refreshable Clone: a read-only full clone is created that can be easily refreshed with the data from the source database<li data-bbox="781 541 1377 632">• Metadata Clone: a new database is created that includes all of the source database schema metadata, but not the source database data.

 **Note:**

For a metadata clone, the Example Template notebooks are not supported.

2

Known Issues for AutoML UI

Learn about the issues you may encounter when using the Automated Machine Learning UI (AutoML UI) feature in Oracle Machine Learning on Autonomous Database and how to work around them.

- [Deleted Workspace Remains in the Manage Workspace Dialog Initially](#)
- [Entries to Projects and Workspace are Reflected after Session is Refreshed](#)
- [Resize your Database to Handle Large Data](#)
- [AutoML UI Experiments and Maximum Run Duration Setting](#)
- [Incorrect Status of Experiments may be Displayed if an Experiment is Stopped Manually](#)

Deleted Workspace Remains in the Manage Workspace Dialog Initially

After you delete a workspace in the **Manage Workspace** dialog, the deleted workspace still remains in the dialog. You must close the **Manage Workspace** dialog, and open it again to see the refreshed list without the deleted workspace.

Entries to Projects and Workspace are Reflected after Session is Refreshed

Edits done to project and workspaces in the **Select Project** or **Manage Workspace** dialogs are not reflected immediately. The edits are reflected after you refresh the page.

Resize your Database to Handle Large Data

AutoML UI experiments with very large data may not work correctly if the database is not sufficiently sized. The status is displayed as `Failed` or `Stopped` for a specific failed stage. The detailed information about experiment stage failures is not available at this point in time.

Workaround

- Increase the compute resource on Compute Resources page. See [Oracle Resources](#).
- Use Medium or High Resource Service Level for an experiment with large data.

AutoML UI Experiments and Maximum Run Duration Setting

AutoML UI experiments may run past the time entered in the `Maximum Run Duration` setting.

Workaround

Use Medium or High Resource Service Level for an experiment with large data.

Incorrect Status of Experiments may be Displayed if an Experiment is Stopped Manually

If you stop an experiment manually while it is running, then the status of the experiment may be displayed incorrectly in the detailed progress dialog.

3

Get Started with AutoML UI

AutoML User Interface (AutoML UI) is an Oracle Machine Learning interface that provides you no-code automated machine learning modeling. When you create and run an experiment in AutoML UI, it performs automated algorithm selection, feature selection, and model tuning, thereby enhancing productivity as well as potentially increasing model accuracy and performance.

The following steps comprise a machine learning modeling workflow and are automated by the AutoML user interface:

1. **Algorithm Selection:** Ranks algorithms likely to produce a more accurate model based on the dataset and its characteristics, and some predictive features of the dataset for each algorithm.
2. **Adaptive Sampling:** Finds an appropriate data sample. The goal of this stage is to speed up Feature Selection and Model Tuning stages without degrading the model quality.
3. **Feature Selection:** Selects a subset of features that are most predictive of the target. The goal of this stage is to reduce the number of features used in the later pipeline stages, especially during the model tuning stage to speed up the pipeline without degrading predictive accuracy.
4. **Model Tuning:** Aims at increasing individual algorithm model quality based on the selected metric for each of the shortlisted algorithms.
5. **Feature Prediction Impact:** This is the final stage in the AutoML UI pipeline. Here, the impact of each input column on the predictions of the final tuned model is computed. The computed prediction impact provides insights into the behavior of the tuned AutoML model.

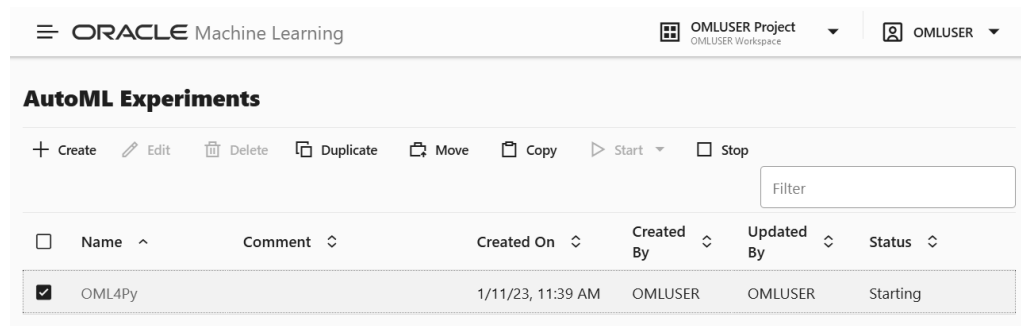
Business users without extensive data science background can use AutoML UI to create and deploy machine learning models. Oracle Machine Learning AutoML UI provides two functional features:

- Create machine learning models
- Deploy machine learning models

AutoML UI Experiments

When you create an experiment in AutoML UI, it automatically runs all the steps involved in the machine learning workflow. In the Experiments page, all the experiments that you have created are listed. To view any experiment details, click an experiment. Additionally, you can perform the following tasks:

Figure 3-1 Experiments page



- **Create:** Click **Create** to create a new AutoML UI experiment. The AutoML UI experiment that you create resides inside the project that you selected in the Project under the Workspace.
- **Edit:** Select any experiment that is listed here, and click **Edit** to edit the experiment definition.
- **Delete:** Select any experiment listed here, and click **Delete** to delete it. You cannot delete an experiment which is running. You must first stop the experiment to delete it.
- **Duplicate:** Select an experiment and click **Duplicate** to create a copy of it. The experiment is duplicated instantly and is in Ready status.
- **Move:** Select an experiment and click **Move** to move the experiment to a different project in the same or a different workspace. You must have either the Administrator or Developer privilege to move experiments across projects and workspaces.

 **Note:**

An experiment cannot be moved if it is in RUNNING, STOPPING or STARTING states, or if an experiment already exists in the target project by the same name.

- **Copy:** Select an experiment and click **Copy** to copy the experiment to another project in the same or different workspace.
- **Start:** If you have created an experiment but have not run it, then click **Start** to run the experiment.
- **Stop:** Select an experiment that is running, and click **Stop** to stop the running of the experiment.
- [Access AutoML UI](#)
You can access AutoML UI from Oracle Machine Learning Notebooks.
- [Create AutoML UI Experiment](#)
To use the Oracle Machine Learning AutoML UI, you start by creating an experiment. An experiment is a unit of work that minimally specifies the data source, prediction target, and prediction type. After an experiment runs successfully, it presents you a list of machine learning models in order of model quality according to the metric selected. You can select any of these models for

deployment or to generate a notebook. The generated notebook contains Python code using OML4Py and the specific settings AutoML used to produce the model.

- [View an Experiment](#)
In the AutoML UI Experiments page, all the experiments that you have created are listed. Each experiment will be in one of the following stages: Completed, Running, and Ready.

Related Topics

- Automatic Machine Learning

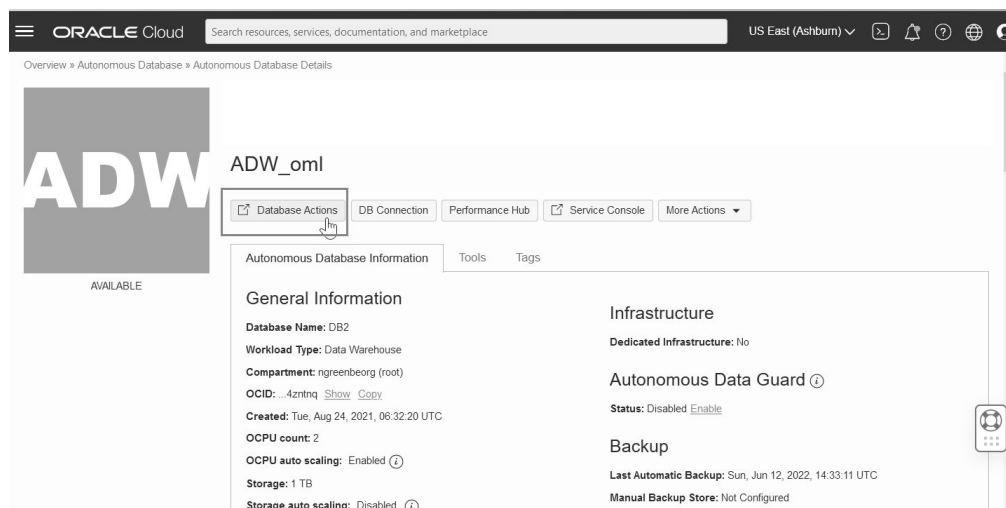
Access AutoML UI

You can access AutoML UI from Oracle Machine Learning Notebooks.

To access AutoML UI, you must first sign in to Oracle Machine Learning Notebooks from Autonomous Database:

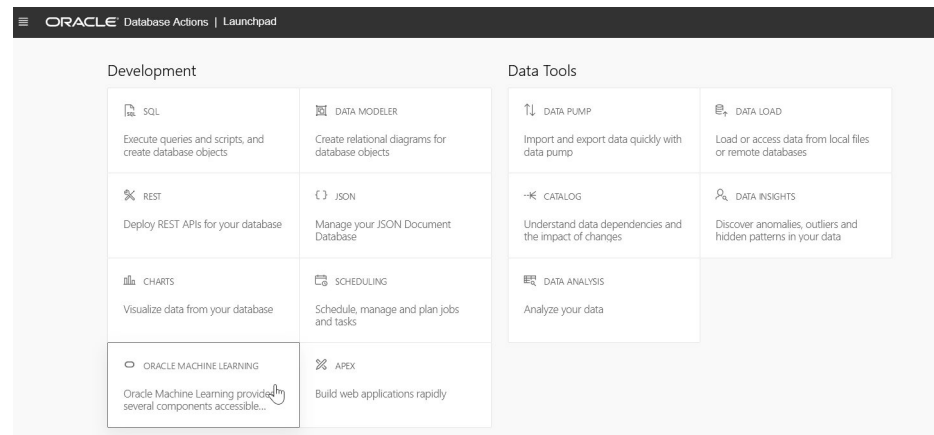
1. To sign in to Oracle Machine Learning Notebooks from the Autonomous Database:
 - a. Select an Autonomous Database instance and on the Autonomous Database details page click **Database Actions**.

Figure 3-2 Database Actions



- b. On the Database Actions page, go to the Development section and click **Oracle Machine Learning**.

Figure 3-3 Oracle Machine Learning



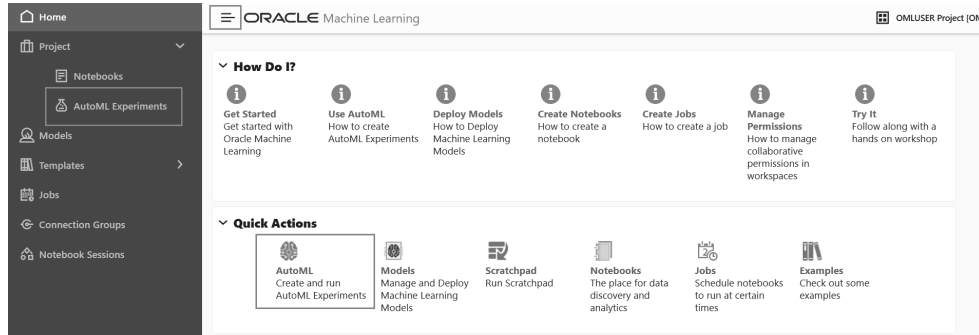
The Oracle Machine Learning sign in page opens.

- c. Enter your username and password, and click **Sign in**.

This opens the Oracle Machine Learning Notebooks homepage.

2. On your Oracle Machine Learning Notebooks homepage, click **AutoML**.

Figure 3-4 AutoML options



Alternatively, you can click the hamburger menu and click **AutoML** under Projects.

Create AutoML UI Experiment

To use the Oracle Machine Learning AutoML UI, you start by creating an experiment. An experiment is a unit of work that minimally specifies the data source, prediction target, and prediction type. After an experiment runs successfully, it presents you a list of machine learning models in order of model quality according to the metric selected. You can select any of these models for deployment or to generate a notebook. The generated notebook contains Python code using OML4Py and the specific settings AutoML used to produce the model.

When creating an experiment, you must specify the data source and the target of the experiment. An AutoML experiment can process columns with data type `VARCHAR2`

greater than 4K , CHAR, CLOB, BLOB, and BFILE as text. Note that columns with data type VARCHAR2 less than 4K are considered as categorical.

To create an experiment, specify the following:

1. In the **Name** field, enter a name for the experiment.

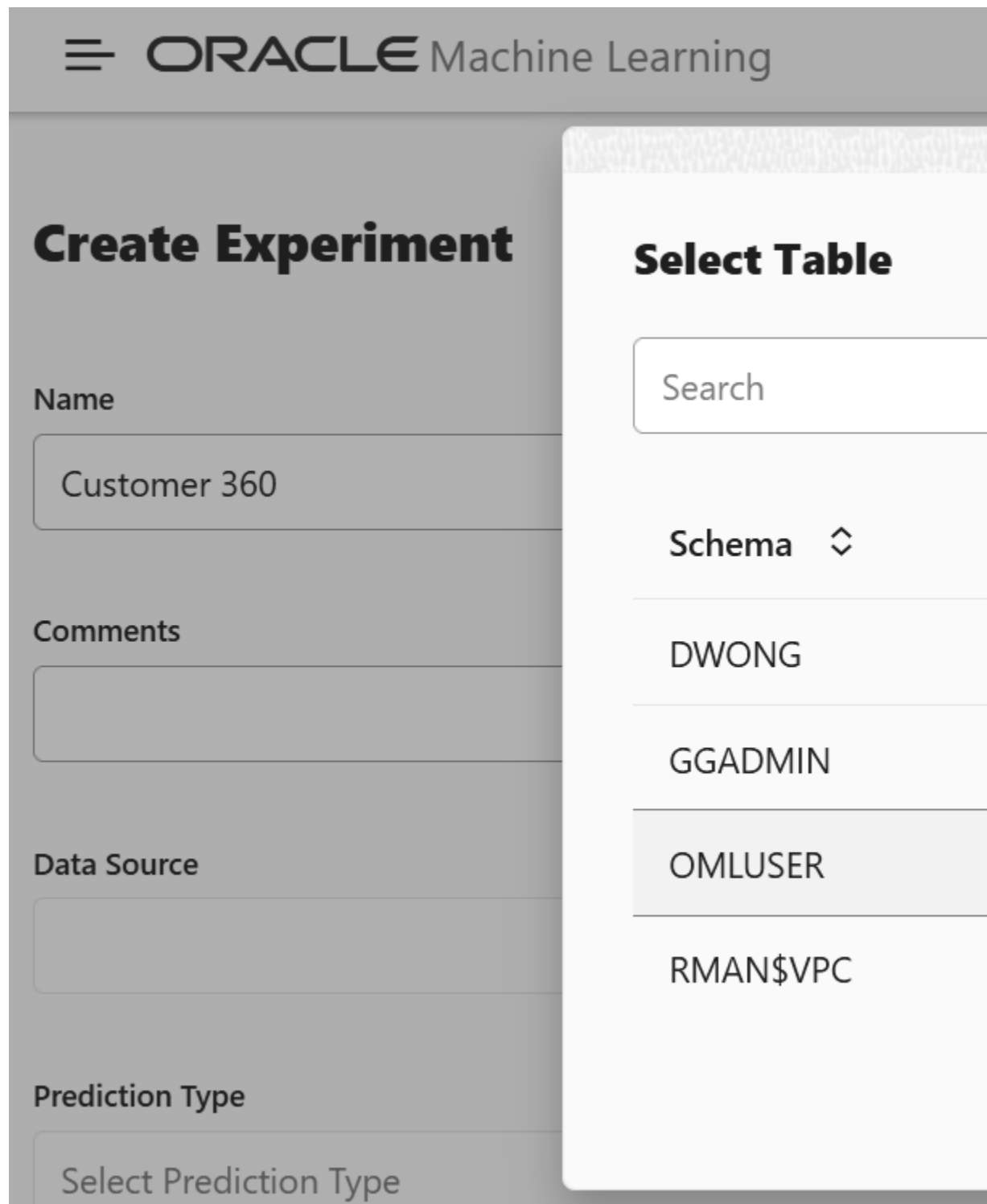
Figure 3-5 Create an AutoML Experiment

The screenshot shows the 'Create Experiment' form in the Oracle Machine Learning interface. The form is titled 'Create Experiment' and has a 'Start' button, 'Cancel' button, and 'Save' button. The form fields are:

- Name:** A text input field containing 'CUSTOMERS360'.
- Comments:** A text input field.
- Data Source *:** A text input field containing 'OMLUSER.CUSTOMERS360' with a search icon.
- Predict *:** A dropdown menu with 'AFFINITY_CARD' selected.
- Prediction Type *:** A dropdown menu with 'Classification' selected.
- Case ID:** A text input field containing 'CUST_ID' with a trash icon.

2. In the **Comments** field, enter comments, if any.
3. In the **Data Source** field, select the schema and a table or view in that schema. Click the search icon to open the Select Table dialog box. Browse and select a schema, and then select a table from the schema list, which is the data source of your AutoML UI experiment.

Figure 3-6 Select Table dialog



- a. In the Schema column, select a schema.

 **Note:**

While you select the data source, statistics are displayed in the Features grid at the bottom of the experiment page. Busy status is indicated until the computation is complete. The target column that you select in Predict is highlighted in the Features grid.

- b. Depending on the selected schema, the available tables are listed in the Table column. Select the table and click **OK**.

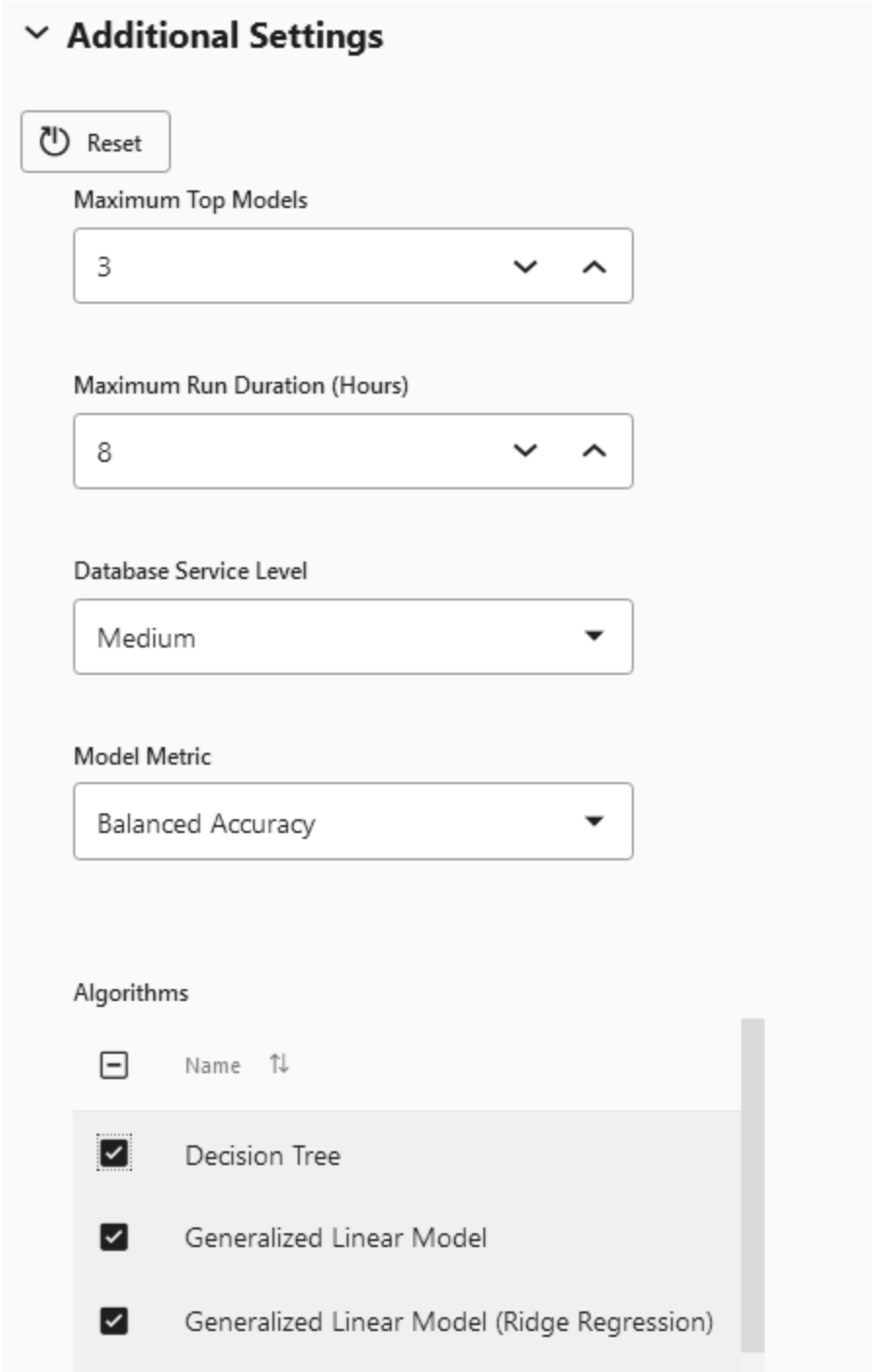
 **Note:**

To create an AutoML experiment for a table or view present in the schema of another user, ensure that you have explicit privileges to access that table or view in the schema. Request the Database Administrator or the owner of the schema to provide you with the privileges to access the table or view. For example:

```
grant select on <table> to <user>
```

4. In the **Predict** drop-down list, select the column from the selected table. This is the target for your prediction.
5. In the **Prediction Type** field, the prediction type is automatically selected based on your data definition. However, you can override the prediction type from the drop-down list, if data type permits. Supported Prediction Types are:
 - **Classification:** For non-numeric data type, Classification is selected by default.
 - **Regression:** For numeric data type, Regression is selected by default.
6. The **Case ID** helps in data sampling and dataset split to make the results reproducible between experiments. It also aids in reducing randomness in the results. This is an optional field.
7. In the **Additional Settings** section, you can define the following:

Figure 3-7 Additional Settings of an AutoML Experiment



Additional Settings

Maximum Top Models

3

Maximum Run Duration (Hours)

8

Database Service Level

Medium

Model Metric

Balanced Accuracy

Algorithms

<input type="checkbox"/>	Name
<input checked="" type="checkbox"/>	Decision Tree
<input checked="" type="checkbox"/>	Generalized Linear Model
<input checked="" type="checkbox"/>	Generalized Linear Model (Ridge Regression)

- Reset:** Click **Reset** to reset the settings to the default values.
- Maximum Top Models:** Select the maximum number of top models to create. The default is 5 models. You can reduce the number of top models to 2 or 3 since tuning models to get the top one for each algorithm requires additional time. If you want to get the initial results even faster, consider the top

recommended algorithm. For this, set the **Maximum Top Models** to 1. This will tune the model for that algorithm.

- c. **Maximum Run Duration:** This is the maximum time for which the experiment will be allowed to run. If you do not enter a time, then the experiment will be allowed to run for up to the default, which is 8 hours.
- d. **Database Service Level:** This is database connection service level and query parallelism level. Default is `Low`. This results in no parallelism and sets a high runtime limit. You can create many connections with `Low` database service level. You can also change your database service level to `Medium` or `High`.
 - `High` level gives the greatest parallelism but significantly limits the number of concurrent jobs.
 - `Medium` level enables some parallelism but allows greater concurrency for job processing.

 **Note:**

Changing the database service level setting on the *Always Free Tier* will have no effect since there is a 1 OCPU limit. However, if you increase the OCPUs allocated to your autonomous database instance, you can increase the **Database Service Level** to `Medium` or `High`.

 **Note:**

The **Database Service Level** setting has no effect on AutoML container level resources.

- e. **Model Metric:** Select a metric to choose the winning models. The following metrics are supported by AutoML UI:
 - For Classification, the supported metrics are:
 - Balanced Accuracy
 - ROC AUC
 - F1 (with weighted options). The weighted options are weighted, binary, micro and macro.
 - Precision (with weighted options)
 - Recall (with weighted options)
 - For Regression, the supported metrics are:
 - R2 (default)
 - Negative mean squared error
 - Negative mean absolute error
 - Negative median absolute error
- f. **Algorithm:** The supported algorithms depend on **Prediction Type** that you have selected. Click the corresponding checkbox against the algorithms to select it. By

default, all the candidate algorithms are selected for consideration as the experiment runs. The supported algorithms for the two Prediction Types:

- For Classification, the supported algorithms are:
 - Decision Tree
 - Generalized Linear Model
 - Generalized Linear Model (Ridge Regression)
 - Neural Network
 - Random Forest
 - Support Vector Machine (Gaussian)
 - Support Vector Machine (Linear)
- For Regression, the supported algorithms are:
 - Generalized Linear Model
 - Generalized Linear Model (Ridge Regression)
 - Neural Network
 - Support Vector Machine (Gaussian)
 - Support Vector Machine (Linear)

 **Note:**

You can remove algorithms from being considered if you have preferences for particular algorithms, or have specific requirements. For example, if model transparency is essential, then excluding models such as Neural Network would make sense. Note that some algorithms are more compute intensive than others. For example, Naïve Bayes and Decision Tree are normally faster than Support Vector Machine or Neural Network.

8. Expand the **Features** grid to view the statistics of the selected table. The supported statistics are Distinct Values, Minimum, Maximum, Mean, and Standard Deviation. The supported data sources for Features are tables, views and analytic views. The target column that you selected in Predict is highlighted here. After an experiment run is completed, the Features grid displays an additional column **Importance**. Feature Importance indicates the overall level of sensitivity of prediction to a particular feature.

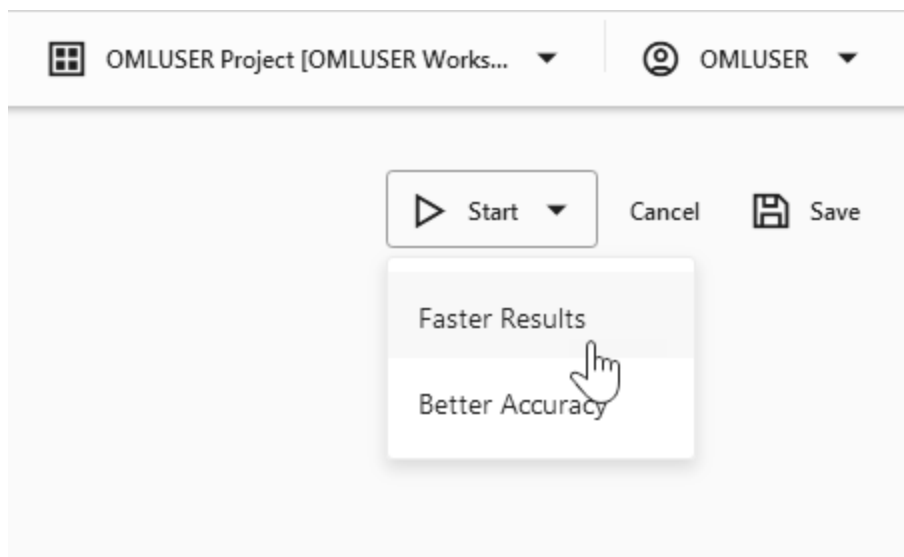
Figure 3-8 Features

Name	Importance	Type	Distinct Values	Min	Max	Mean	Std Dev
HOUSEHOLD_SIZE	0.23	VARCHAR2	6				
OCCUPATION		VARCHAR2	15				
CUST_MARITAL_STATUS		VARCHAR2	7				
YRS_RESIDENCE		NUMBER	15	0	14	4.02	1.97
CUST_YEAR_OF_BIRTH		NUMBER	67	1913	1986	1964.62	13.78
Y_BOX_GAMES		NUMBER	2	0	1	0.31	0.66
EDUCATION		VARCHAR2	16				
CUST_GENDER		CHAR	2				
CUST_CREDIT_LIMIT		NUMBER	8	1500	15000	7924.22	4264.23

You can perform the following tasks:

- **Refresh:** Click Refresh to fetch all columns and statistics for selected data source.
 - **View Importance:** Hover your cursor over the horizontal bar under Importance to view the value of Feature Importance for the variables. The value is always depicted in the range 0 to 1, with values closer to 1 being more important.
9. When you complete defining the experiment, the **Start** and **Save** buttons are enabled.

Figure 3-9 Start Experiment Options



- Click **Start** to run the experiment and start the AutoML UI workflow, which is displayed in the progress bar. Here, you have the option to select:
 - Faster Results:** Select this option if you want to get candidate models sooner, possibly at the expense of accuracy. This option works with a smaller set of the hyperparameter combinations, and hence yields faster result.

- b. **Better Accuracy:** Select this option if you want more pipeline combinations to be tried for possibly more accurate models. A pipeline is defined as an algorithm, selected data feature set, and set of algorithm hyperparameters.

 **Note:**

This option works with the broader set of hyperparameter options recommended by the internal meta-learning model. Selecting **Better Accuracy** will take longer to run your experiment, but may provide models with more accuracy.

Once you start an experiment, the progress bar appears displaying different icons to indicate the status of each stage of the machine learning workflow in the AutoML experiment. The progress bar also displays the time taken to complete the experiment run. To view the message details, click on the respective message icons.

- Click **Save** to save the experiment, and run it later.
- Click **Cancel** to cancel the experiment creation.

View an Experiment

In the AutoML UI Experiments page, all the experiments that you have created are listed. Each experiment will be in one of the following stages: Completed, Running, and Ready.

To view an experiment, click the experiment name. The Experiment page displays the details of the selected experiment. It contains the following sections:

Edit Experiment

In this section, you can edit the selected experiment. Click **Edit** to make edits to your experiment.

 **Note:**

You cannot edit an experiment that is running.

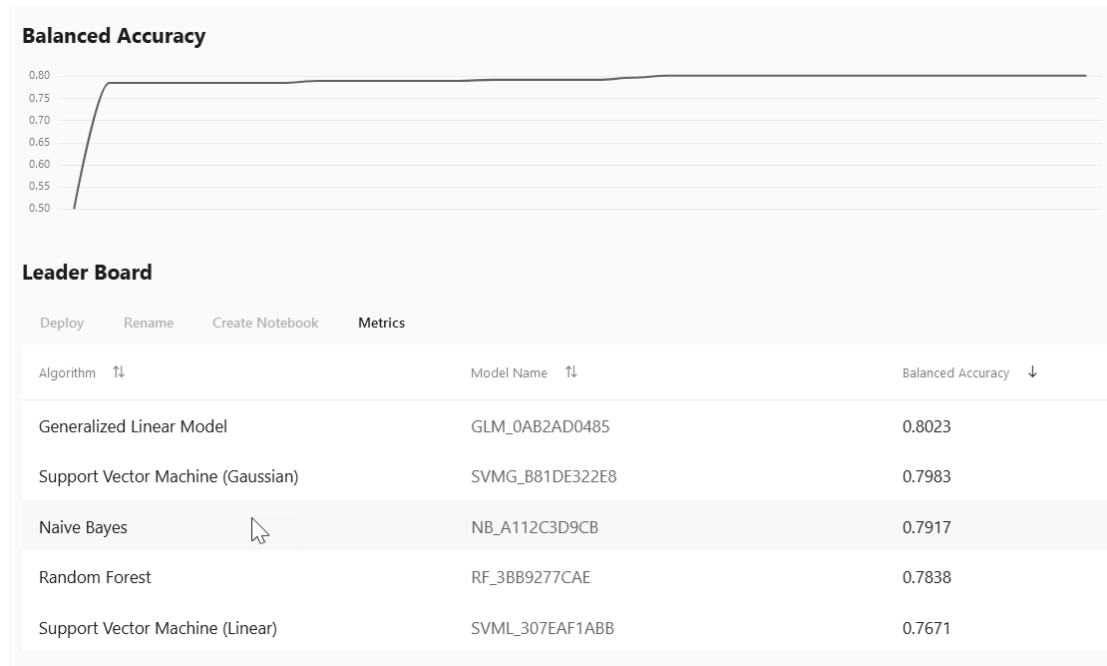
Metric Chart

The Model Metric Chart depicts the best metric value over time as the experiment runs. It shows improvement in accuracy as the running of the experiment progresses. The display name depends on the selected model metric when you create the experiment.

Leader Board

When an experiment runs, it starts to show the results in the Leader Board. The Leader Board displays the top performing models relative to the model metric selected along with the algorithm and accuracy. You can view the model details and perform the following tasks:

Figure 3-10 Leader Board



- **View Model Details:** Click on the **Model Name** to view the details. The model details are displayed in the Model Details dialog box. You can click multiple models on the Leader Board, and view the model details simultaneously. The Model Details window depicts the following:
 - **Prediction Impact:** Displays the importance of the attributes in terms of the target prediction of the models.
 - **Confusion Matrix:** Displays the different combination of actual and predicted values by the algorithm in a table. Confusion Matrix serves as a performance measurement of the machine learning algorithm.
- **Deploy:** Select any model on the Leader Board and click **Deploy** to deploy the selected model. [Deploy Model](#).
- **Rename:** Click **Rename** to change the name of the system generated model name. The name must be alphanumeric (not exceeding 123 characters) and must not contain any blank spaces.
- **Create Notebook:** Select any model on the Leader Board and click [Create Notebooks from AutoML UI Models](#) to recreate the selected model from code.
- **Metrics:** Click **Metrics** to select additional metrics to display in the Leader Board. The additional metrics are:
 - For Classification
 - * **Accuracy:** Calculates the proportion of correctly classifies cases - both Positive and Negative. For example, if there are a total of TP (True Positives)+TN (True Negatives) correctly classified cases out of TP+TN+FP+FN (True Positives+True Negatives+False Positives+False Negatives) cases, then the formula is:

$$\text{Accuracy} = \frac{(TP+TN)}{(TP+TN+FP+FN)}$$

- * **Balanced Accuracy:** Evaluates how good a binary classifier is. It is especially useful when the classes are imbalanced, that is, when one of the two classes appears a lot more often than the other. This often happens in many settings such as Anomaly Detection etc.
 - * **Recall:** Calculates the proportion of actual Positives that is correctly classified.
 - * **Precision:** Calculates the proportion of predicted Positives that is True Positive.
 - * **F1 Score:** Combines precision and recall into a single number. F1-score is computed using harmonic mean which is calculated by the formula: $F1\text{-score} = 2 \times (\text{precision} \times \text{recall}) / (\text{precision} + \text{recall})$
- For Regression:
- * **R2 (Default):** A statistical measure that calculates how close the data are to the fitted regression line. In general, the higher the value of R-squared, the better the model fits your data. The value of R2 is always between 0 to 1, where:
 - * 0 indicates that the model explains none of the variability of the response data around its mean.
 - * 1 indicates that the model explains all the variability of the response data around its mean.
 - * **Negative Mean Squared Error:** This is the mean of the squared difference of predicted and true targets.
 - * **Negative Mean Absolute Error:** This is the mean of the absolute difference of predicted and true targets.
 - * **Negative Median Absolute Error:** This is the median of the absolute difference between predicted and true targets.

Features

The **Features** grid displays the statistics of the selected table for the experiment. The supported statistics are Distinct Values, Minimum, Maximum, Mean, and Standard Deviation. The supported data sources for Features are tables, views and analytic views. The target column that you selected in Predict is highlighted here. After an experiment run is completed, the Features grid displays an additional column **Importance**. Feature Importance indicates the overall level of sensitivity of prediction to a particular feature. Hover your cursor over the graph to view the value of **Importance**. The value is always depicted in the range 0 to 1, with values closer to 1 being more important.

Figure 3-11 Features

Name	Importance	Type	Distinct Values	Min	Max	Mean	Std Dev
HOUSEHOLD_SIZE	0.23	VARCHAR2	6				
OCCUPATION		VARCHAR2	15				
CUST_MARITAL_STATUS		VARCHAR2	7				
YRS_RESIDENCE		NUMBER	15	0	14	4.02	1.97
CUST_YEAR_OF_BIRTH		NUMBER	67	1913	1986	1964.62	13.78
Y_BOX_GAMES		NUMBER	2	0	1	0.31	0.66
EDUCATION		VARCHAR2	16				
CUST_GENDER		CHAR	2				
CUST_CREDIT_LIMIT		NUMBER	8	1500	15000	7924.22	4264.23

- [Create Notebooks from AutoML UI Models](#)
You can create notebooks using OML4Py code that will recreate the selected model using the same settings. It also illustrates how to score data using the model. This option is helpful if you want to use the code to re-create a similar machine learning model.

Create Notebooks from AutoML UI Models

You can create notebooks using OML4Py code that will recreate the selected model using the same settings. It also illustrates how to score data using the model. This option is helpful if you want to use the code to re-create a similar machine learning model.

To create a notebook from an AutoML UI model:

1. Select the model on the Leader Board based on which you want to create your notebook, and click **Create Notebook**. The Create Notebook dialog opens.

Figure 3-12 Create Notebook

×
Create Notebook

Create a notebook based on selected model and this experiment's settings. Use a generated notebook to further tune your approach using Python.

Notebook Name:

NN_iris

?
OK
Cancel

- In the **Notebook Name** field, enter a name for your notebook.

The REST API endpoint derives the experiment metadata, and determines the following settings as applicable:

- Data Source of the experiment (schema.table)
 - Case ID. If the Case ID for the experiment is not available, then the appropriate message is displayed.
 - A unique model name based on the current model name is generated
 - Information related to scoring paragraph:
 - Case ID: If available, then it merges the Case ID column into the scoring output table
 - Generate unique predict output table name based on build data source and unique suffix
 - Prediction column name: PREDICTION
 - Prediction probability column name: PROBABILITY (applicable only for Classification)
- Click **OK**. The generated notebook is listed in the Notebook page. Click to open the notebook

The generated notebook displays paragraph titles for each paragraph along with the python codes. Once you run the notebook, it displays information related to the notebook as well as the AutoML experiment such as the experiment name, workspace and project in which the notebook is present, the user, data, prediction type and prediction target, algorithm, and the time stamp when the notebook is generated.

Oracle Machine Learning AutoML UI - Experiment - Generated Notebook FINISHED

Experiment name: test
 Workspace: TEST Workspace
 Project: TEST Project
 User: TEST
 Data: SH.PROMOTIONS
 Prediction type: regression
 Predict: PROMO_SUBCATEGORY_ID
 Algorithm: Neural Network
 Timestamp: 2021-04-28 06:40:06

This notebook was automatically generated by Oracle Machine Learning AutoML UI

Took 3 secs. Last updated by TEST at April 28 2021, 12:12:44 PM.

Get proxy object for selected data READY

```
%python
import os1

columns = ["PROMO_ID", "PROMO_CATEGORY", "PROMO_CATEGORY_ID", "PROMO_COST", "PROMO_NAME", "PROMO_TOTAL",
           "PROMO_TOTAL_ID", "PROMO_SUBCATEGORY_ID"]
schema = "SH"
table = "PROMOTIONS"
```

4

Get Started with Models

The Models page displays the user models and the list of deployed models. User Model lists the models in a user's schema, and Deployments lists the models deployed to Oracle Machine Learning Services.

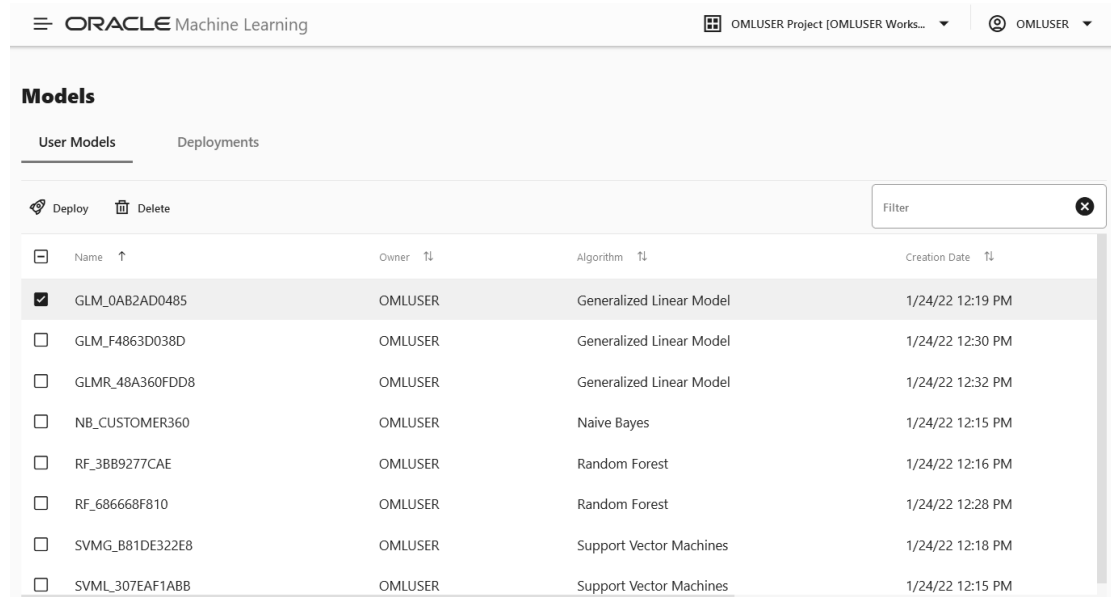
Under Models, the model information and model deployment are available under:

- **User Models:** Lists all the models that are created in a database schema. In the Models view, you can browse, view, deploy and delete models.
- **Deployments:** Lists all the deployed models. In the Deployments view, you can view the model metadata and the REST API URI of the deployed models.

User Models

In the User Models view, you can browse, view, and deploy models. The User Models view lists the models that are available in the database schema:

Figure 4-1 User Models



The screenshot shows the Oracle Machine Learning interface. At the top, there is a navigation bar with the Oracle logo and 'Machine Learning' text. On the right, there are dropdown menus for 'OMLUSER Project [OMLUSER Works...]' and 'OMLUSER'. Below the navigation bar, the 'Models' section is active, with 'User Models' and 'Deployments' tabs. The 'User Models' tab is selected. There are 'Deploy' and 'Delete' icons, and a 'Filter' input field. A table lists the models with columns for Name, Owner, Algorithm, and Creation Date. The first model, GLM_0AB2AD0485, is selected with a checkbox.

Name	Owner	Algorithm	Creation Date
<input checked="" type="checkbox"/> GLM_0AB2AD0485	OMLUSER	Generalized Linear Model	1/24/22 12:19 PM
<input type="checkbox"/> GLM_F4863D038D	OMLUSER	Generalized Linear Model	1/24/22 12:30 PM
<input type="checkbox"/> GLMR_48A360FDD8	OMLUSER	Generalized Linear Model	1/24/22 12:32 PM
<input type="checkbox"/> NB_CUSTOMER360	OMLUSER	Naive Bayes	1/24/22 12:15 PM
<input type="checkbox"/> RF_3BB9277CAE	OMLUSER	Random Forest	1/24/22 12:16 PM
<input type="checkbox"/> RF_686668F810	OMLUSER	Random Forest	1/24/22 12:28 PM
<input type="checkbox"/> SVMG_B81DE322E8	OMLUSER	Support Vector Machines	1/24/22 12:18 PM
<input type="checkbox"/> SVML_307EAF1ABB	OMLUSER	Support Vector Machines	1/24/22 12:15 PM

- **Name:** Displays the model name. Model names can be any valid database object name.
- **Owner:** Displays the user who built the model.
- **Algorithm:** Displays the name of the algorithm used.
- **Creation Date:** Displays the date on which the model is built.
- **Target:** Displays the prediction target selected when the experiment is created.

You can perform the following tasks:

- **Deploy:** To deploy a model, select the model and click **Deploy**.
- **Delete:** To delete a model, select the model and click **Delete**.

Deployments

In the Deployments view, you can view the list of all the deployed models. Here, you can view the model metadata, view the REST API URI of the deployed models, and also delete any deployed model.

To delete a deployed model, select the model and click **Delete**.

Figure 4-2 Deployed Models

Name	Shared	Version	Namespace	Owner	Deployed Date	URI
NaiveBayes_CUST360	☑	1.0	DEMO	OMLUSER	1/24/22 11:46 ...	nb_cust360

The following information are displayed for each deployed model:

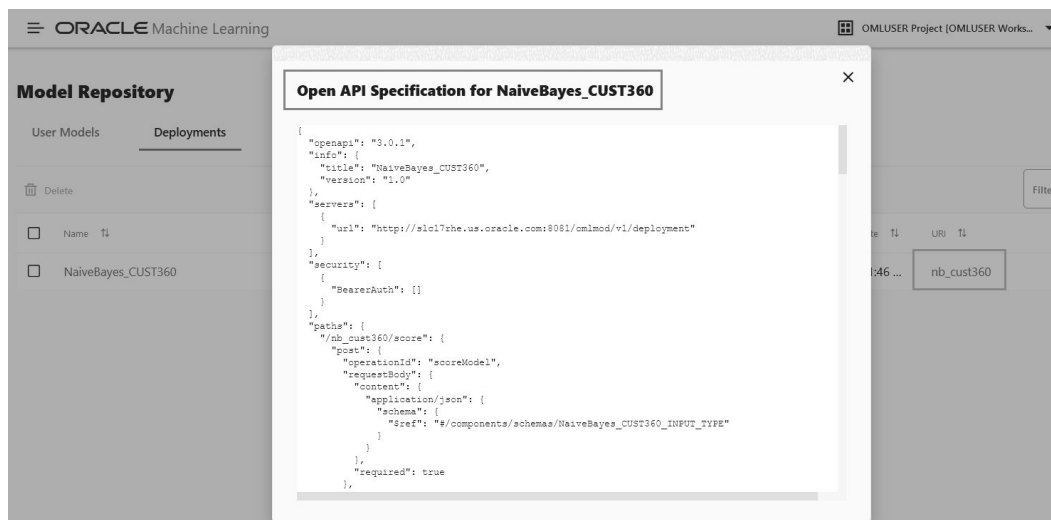
- **Name:** The name of the deployed model.
- **Shared:** Allows users in the same PDB to use the model.
- **Version:** Displays the model version.
- **Namespace:** Displays the model namespace.
- **Owner:** The name of the user who deployed the model.
- **Deployed Date:** Displays the date of model deployment.

Note:

You cannot re-deploy the same model. However, you can create a new version of the model and deploy it. You can then track the model based on the version.

- **URI:** Displays the URI name. Click on the URI link to view the REST API URI of the model.

Figure 4-3 REST API Specifications of a Deployed Model



- [Deploy Model](#)
When you deploy a model, you create an Oracle Machine Learning Services endpoint for scoring.

Deploy Model

When you deploy a model, you create an Oracle Machine Learning Services endpoint for scoring.

In the Deploy Model dialog box, you can define the model deployment in the context of your AutoML UI experiment. To deploy a model, define the following:

Figure 4-4 Deploy Model

Deploy Model

Name *

nn_e05246b433

URI *

iris_1

Version *

1.0

Namespace

Flower

Shared

?

OK Cancel

1. In the **Name** field, the system generated model name is displayed here by default. You can edit this name. The model name must be a unique alphanumeric name with maximum 50 characters.
2. In the **URI** field, enter a name for the model URI. The URI must be alphanumeric, and the length must be max 200 characters.
3. In the **Version** field, enter a version of the model. The version must be in the format `xx.xx` where `x` is a number.
4. In the **Namespace** field, enter a name for the model namespace.
5. Click **Shared** to allow users with access to the database schema to view and deploy the model.
6. Click **OK**. After a model is successfully deployed, it is listed in the Deployments page.
7. You can view the following details:
 - Model Metadata - Select a deployed model and click the model name to view model metadata such as the model name, mining function, algorithm, attributes and so on.
 - REST API - Select a deployed model and click the link under URI to view the REST API URI of the model.