Oracle FLEXCUBE Machine Learning User Guide

Oracle FLEXCUBE Universal Banking

Release 14.3.0.0.0

Part No. F18207-01

May 2019

ORACLE

Asset Management User Guide
Oracle Financial Services Software Limited

Oracle Park

Off Western Express Highway
Goregaon (East)
Mumbai, Maharashtra 400 063
India
Worldwide Inquiries:
Phone: +91 22 6718 3000
Fax: +91 22 6718 3001
https://www.oracle.com/industries/financial-services/index.html

Copyright © 2007, 2017, Oracle and/or its affiliates. All rights reserved.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

U.S. GOVERNMENT END USERS: Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are “commercial computer software” pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate failsafe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

This software or hardware and documentation may provide access to or information on content, products and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services.

Contents

1. Preface 1-1
1.1 Introduction 1-1
1.2 Audience 1-1
1.3 Organization 1-1
1.4 Glossary of Icons 1-2
2. Machine Learning - An Overview 2-1
2.1 Introduction 2-1
2.2 Machine Learning in Oracle FLEXCUBE 2-1
2.3 Pre-requisites 2-1
3. Model Building Routine 3-1
3.1 Contextual Information 3-1
3.2 Model Building 3-1
4. Model Execution Routine 4-1
4.1 Contextual Information 4-1
4.2 Model Execution 4-1
5. Enterprise Dashboard 5-1
5.1 Enterprise Customer Attrition 5-1
5.2 Enterprise Customer Segmentation 5-1
6. Branch Dashboard 6-1
6.1 Branch Customer Attritions 6-1
6.2 Branch Customer Segmentation 6-1
7. Customer Query Board 7-1

1. Preface

1.1 Introduction

This manual is designed to assist you in getting acquainted with the Oracle FLEXCUBE Machine Learning framework.

It has detailed stepwise instructions to help you build Oracle FLEXCUBE Machine Learning models and process their execution.

The manual also outlines how to access and interpret the model outcomes for augmented decision making.

1.2 Audience

This manual is intended for the following User/User Roles:

Role	Function
Branch Managers	Overall Branch Perspective
Account Managers/ Relationship Managers	Customer Relationship Management
Head Office Managers	Overall Bank Perspective
FLEXCUBE Admin / IT support	Application Administration and Support

1.3 Organization

This manual is organized into the following chapters:

Chapter Number	Title	Description
Chapter 1	Preface	Information about this manual. It covers intended audiences and lists chapter information
Chapter 2	Machine Learning - An Overview	It introduces the Machine Learning context and specifically the Oracle FLEXCUBE framework
Chapter 3	Model Building Routine	This chapter contains instructions on how to build Machine Learning Models using historical Oracle FLEXCUBE data
Chapter 4	Model Execution Routine	This chapter explains how to apply Machine Learning Models on Oracle FLEXCUBE data

Chapter 5	Enterprise Dashboard	This section helps you interpret information collated across the enterprise and present a consolidated perspective of the bank
Chapter 6	Branch Dashboard	This screen helps you interpret information from the current branch perspective
Chapter 7	Customer Query Board	This allows you to query customers across the bank based on attrition Risk profile, branch code and/or segment

1.4 Glossary of Icons

This User Manual may refer to all or some of the following icons:

Icons	Function
	Exit
	Add row
	Delete row
	Option List

2. Machine Learning - An Overview

2.1 Introduction

Machine Learning is heavily dependent on historical data to build models and use the models to predict outcomes for better decision making

The following points encompasses contextual information to help you get familiarized with the subject.

- Machine learning model building is dependent on historical data, spread across dates
- Model building will take time. It may range from couple of minutes to hours, sometime days, depending on the algorithm complexity
- Model has to be built for each bank. It cannot be pre-shipped not it can be re-used across banks.
- Model is ONLY as good as the data used to build it
- Built Model are valid only for the data used to build the model
- The pre-shipped ORE code is designed to work with the data model provided as part of the release
- *The modelling code may need to be modified under the following circumstances*
  - *The underlying data limits model performance and mandates modifying the pre-shipped ORE code*
  - *Data Model is altered, on business demand*

This chapter contains the following section:

- Section 2.2, "Machine Learning in Oracle FLEXCUBE"
- Section 2.3, "Pre-requisites"

2.2 Machine Learning in Oracle FLEXCUBE

The machine learning framework is embedded within Oracle FLEXCUBE. It is built using Oracle R Enterprise, which is separately licensed.

The business cases are limited to retail customers.

2.3 Pre-requisites

The following Pre-requisites are mandatory for the Machine Learning Framework.

Environmental

- Separate instance of Machine Learning Server.

> **Note**
>
> ORE database MUST be a separate instance from Oracle FLEXCUBE Instance. This is to ensure that the machine learning algorithmic processing workload is not on the critical path of banking operations and consume critical FLEXCUBE server memory

- Machine Learning Database is Oracle 18c

- Oracle R Enterprise is installed in the Machine Learning Server

Historical Data

- Date wise transaction history in Oracle FLEXCUBE is mandatorily required for building machine learning models.
- Consulting/Solution team to consider extracting legacy transaction history as part of migration strategy

Oracle FLEXCUBE Data Replication

- Data replication from FLEXCUBE to the Machine learning server is outside the purview of this manual.
- *Any data replication software could be deployed to replicate Oracle FLEXCUBE data to the Machine Learning database Instance*
- *It is left to the bank/solution team to decide on the data Replication Software including the mode of replication and frequency of replication*

Refer to the Installation Guide for completing the installation, prior to initiating the model building routine.

3. Model Building Routine

Refer to the “Pre-requisites” prior to proceeding with the next section.

This is the first step to be executed

This chapter contains the following sections:

- Section 3.1, "Contextual Information"
- Section 3.2, "Model Building"

3.1 Contextual Information

This is the first time the Machine Learning is being setup for Oracle FLEXCUBE.

As part of this process, historical FLEXCUBE data will be referenced and requisite data transformation routine will be called. Customer attrition model is the only one that will be built. The customer life time value and segmentation do not have a persistent model object and gets executed runtime.

3.2 Model Building

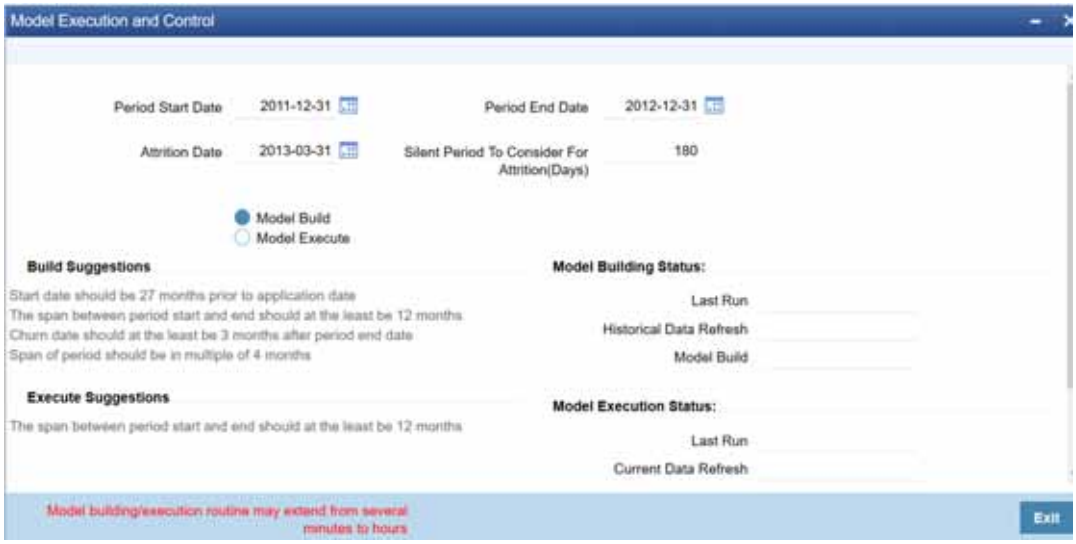
User(s)

It is suggested that only the FLEXCUBE user with admin rights should have access to the model building screens

Launch ‘Model Execution and Control’ screen from the menu

Machine Learning Retail -> Model Administration -> Model Execution and Control

.



Select "Model Build" radio button

Data Fields	Remarks
Period Start Date	Models get built on historical data. This is the historical period start date to be considered
Period End Date	Models get built on historical data. This is the historical period end date to be considered
Attrition Date	This field represents the future prediction window. E.g. if we want to have a prediction window of 3 months, this would be Period End Date + 3 months
Silent Period to consider for attrition identification	While closed customers are considered as churned, for open customers having sufficiently long silent period of no transaction can also be considered as churned. This is the field that determines the number of silent days, to be considered for open customers to be tagged as churned.

Suggestions:

- PERIOD START DATE and PERIOD END DATE to cover a span of 12 Months back period
- ATTRITION DATE to be at least 3 months into the future from the PERIOD END DATE

Process 'Model Build' routine

Click 'process' button to trigger model building

Note

- Model building time may extend from several minutes to few hours
- Models once built can be re-used each time the data is refreshed
- Models are usually re-built, if the underlying data has undergone drastic change in pattern and triggers a decrease in model performance

4. Model Execution Routine

Refer to the “Pre-requisites” prior to proceeding with the next section.

This is the second step to be executed. It is assumed that model building routine mentioned in the previous section is already processed.

This chapter contains the following sections:

- Section 4.1, "Contextual Information"
- Section 4.2, "Model Execution"

4.1 Contextual Information

As part of this process, data will be refreshed as of the current date. The customer attrition model that has been built in the previous step will be loaded and executed. As part of this routine the customer life time value and segmentation models will get built and executed runtime.

4.2 Model Execution

User(s)

It is suggested that only the FLEXCUBE user with admin rights should have access to the model execution screens

Launch ‘Model Execution and Control’ screen from the menu

Machine Learning Retail -> Model Administration -> Model Execution and Control

.

Select "Model Execute" radio button

Data Fields	Remarks
Period Start Date	Will get defaulted to 12 months prior to Period End date. User can modify.
Period End Date	Will get defaulted to the latest date across branches. Not allowed to modify
Attrition Date	Will get defaulted to Period End date. Not allowed to modify
Silent Period to consider for attrition identification	Will get defaulted to 180 days. Not allowed to modify

Suggestions:

- PERIOD START DATE and PERIOD END DATE to cover a span of 12 Months

Process 'Model Execute' routine

Click 'Process' button to trigger model execution.

Periodic Model Execution

- Model execution frequency will be decided by business

Note

– Model execution time may extend from several minutes to few hours

– Built Models are re-used each time the data is refreshed

5. Enterprise Dashboard

This screen displays model outcomes collated across the enterprise to present a consolidated perspective of the bank

Only customers with at least one transaction are being displayed

The screen can be accessed at:

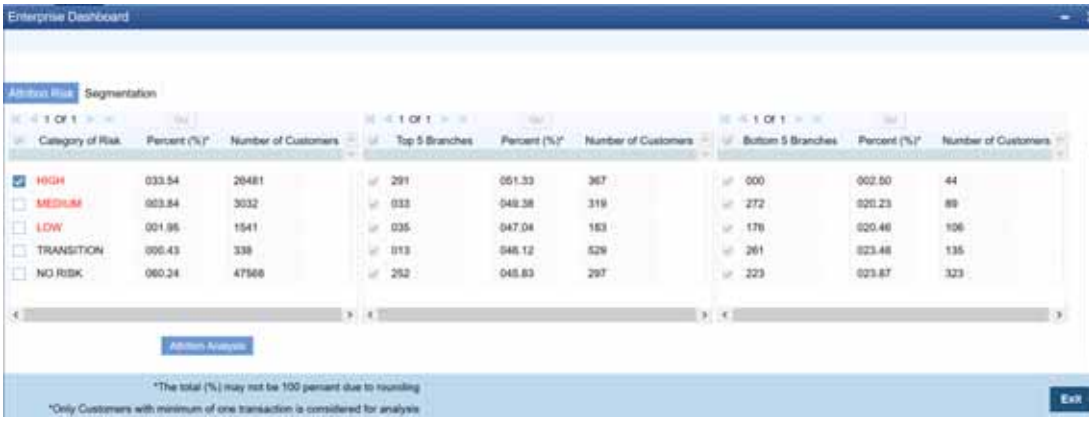
Machine Learning Retail -> Customer -> Enterprise Dashboard

This chapter contains the following sections:

- Section 5.1, "Enterprise Customer Attrition"
- Section 5.2, "Enterprise Customer Segmentation"

5.1 Enterprise Customer Attrition

This screen displays the risk profile of the entire customer base of the bank

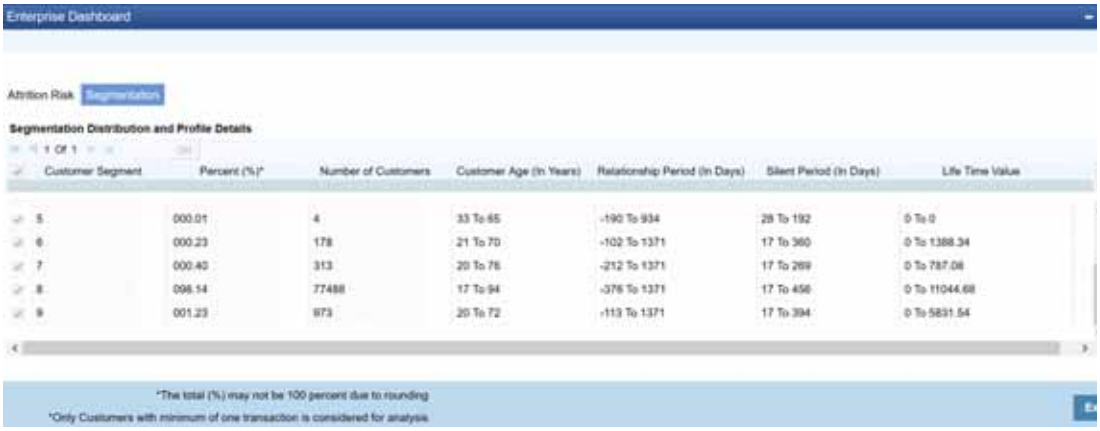


- Top 5 and bottom 5 branches can be queried on the basis of attrition risk profile.
- Default query is HIGH Risk
- Select single or a combination of Risk categories and click on the button “Attrition Analysis” to get the top 5 and bottom 5 for the queried combination of risk categories

5.2 Enterprise Customer Segmentation

This screen displays the segmentation of the entire customer base of the bank and the segment Details.

This is a view only screen.


Enterprise Dashboard
Attrition Risk
Segmentation
Segmentation Distribution and Profile Details
1 Of 1
Customer Segment
Percent (%)*
Number of Customers
Customer Age (In Years)
Relationship Period (In Days)
Silent Period (In Days)
Life Time Value
5 000.01 4 33 To 65 -190 To 934 28 To 192 0 To 0
6 000.23 178 21 To 70 -102 To 1371 17 To 360 0 To 1388.34
7 000.40 313 20 To 76 -212 To 1371 17 To 269 0 To 787.08
8 096.14 77488 17 To 94 -376 To 1371 17 To 456 0 To 11044.68
9 001.23 973 20 To 72 -113 To 1371 17 To 394 0 To 5831.54
*The total (%) may not be 100 percent due to rounding
*Only Customers with minimum of one transaction is considered for analysis

6. Branch Dashboard

This screen displays model outcome for the current logged-in branch. Only customers with at least one transaction are being displayed.

The screen can be accessed at:

Machine Learning Retail -> Customer -> Branch Dashboard

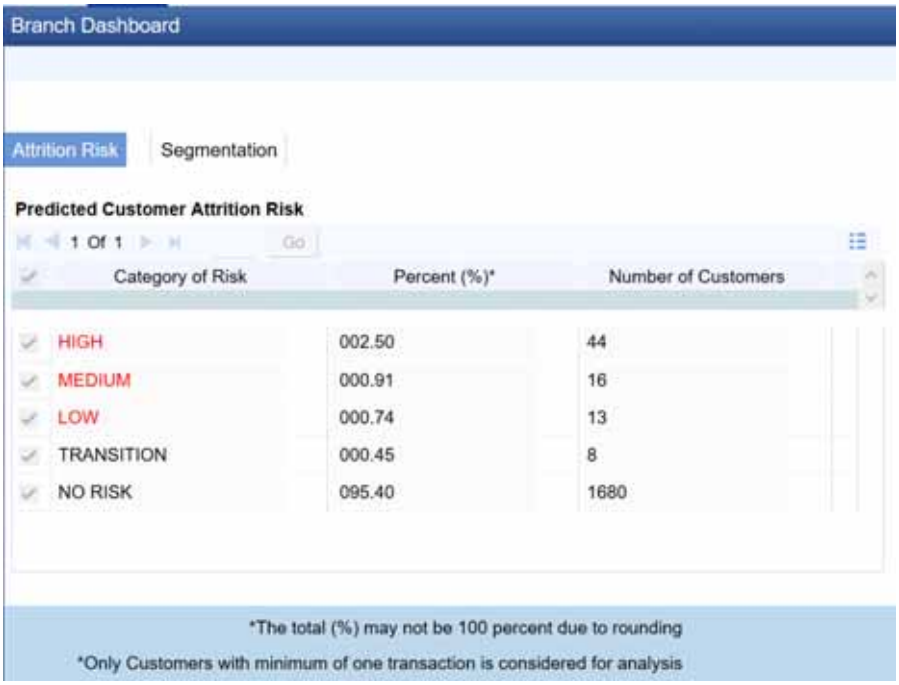
This chapter contains the following sections:

- Section 6.1, "Branch Customer Attritions"
- Section 6.2, "Branch Customer Segmentation"

6.1 Branch Customer Attritions

This screen displays the customer attrition risk profile of the current branch.

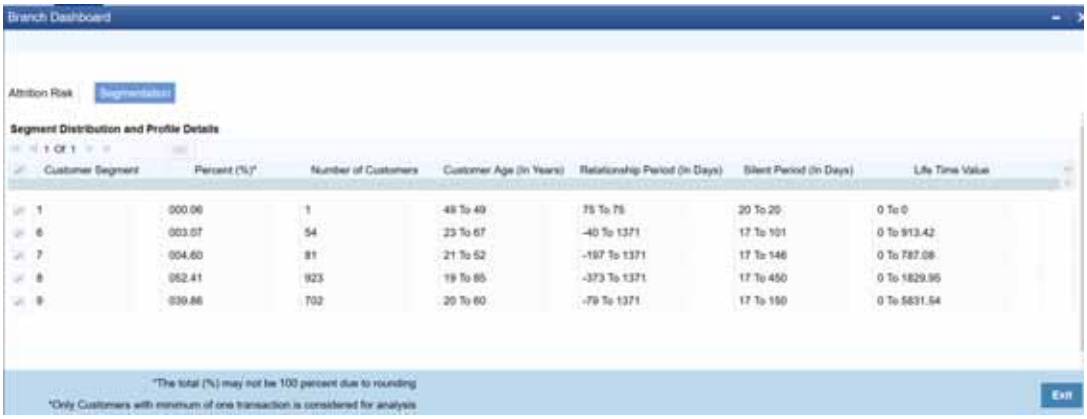
It is a view only screen.



6.2 Branch Customer Segmentation

This screen displays the segmentation of the customer base of the current branch and the segment details.

This is a view only screen.


Branch Dashboard
Attrition Risk
Segmentation
Segment Distribution and Profile Details
1 Of 1
Customer Segment
Percent (%)*
Number of Customers
Customer Age (in Years)
Relationship Period (in Days)
Silent Period (in Days)
Life Time Value
1 000.06 1 48 To 49 75 To 75 20 To 20 0 To 0
6 003.07 54 23 To 67 -40 To 1371 17 To 101 0 To 913.42
7 004.60 81 21 To 52 -197 To 1371 17 To 146 0 To 787.08
8 052.41 923 19 To 85 -373 To 1371 17 To 450 0 To 1829.95
9 039.86 702 20 To 60 -79 To 1371 17 To 150 0 To 5831.54
*The total (%) may not be 100 percent due to rounding
*Only Customers with minimum of one transaction is considered for analysis
Exit

7. Customer Query Board

This screen can be assessed at:

Machine Learning Retail -> Customer -> Customer Query Board

It allows user to query customers based on the following filters:

- Attrition Risk profile
- Branch code
- Customer Segment

However, Individual customer IDs can also be queried. In that case, it will display the customer's corresponding risk and segment.

Select the query combination and click on "Analysis".

The default query at screen launch is,

- Attrition Risk profile: HIGH
- Branch code: current logged-in branch
- Customer Segment: 1

The displayed information for each customer has been collated across,

- Risk Profiles
- Segment to which the customer belongs
- Life time Value, should the customer continue the relationship till perpetuity

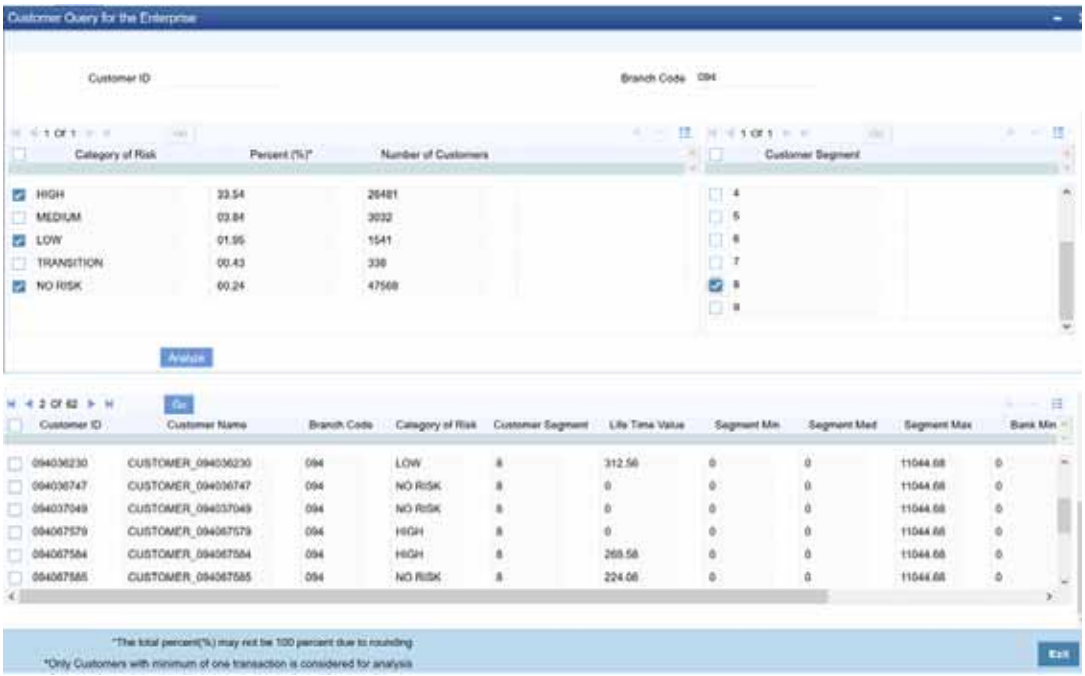
Further, to assist in decision making and identify relative positioning, comparative life time value information is presented across the perspectives of,

Segment Life Time Value

- Segment Minimum
- Segment Median
- Segment Maximum

Bank Life Time Value

- Segment Minimum
- Segment Median
- Segment Maximum


Customer Query for the Enterprise
Customer ID
Branch Code 094
Category of Risk
Percent (%)*
Number of Customers
HIGH 33.54 26481
MEDIUM 03.84 3032
LOW 01.95 1541
TRANSITION 00.43 338
NO RISK 60.24 47568
Customer Segment
Analyze
Customer ID
Customer Name
Branch Code
Category of Risk
Customer Segment
Life Time Value
Segment Min
Segment Med
Segment Max
Bank Min
094036230 CUSTOMER_094036230 094 LOW 8 312.56 0 0 11044.68 0
094036747 CUSTOMER_094036747 094 NO RISK 8 0 0 0 11044.68 0
094037049 CUSTOMER_094037049 094 NO RISK 8 0 0 0 11044.68 0
094067579 CUSTOMER_094067579 094 HIGH 8 0 0 0 11044.68 0
094067584 CUSTOMER_094067584 094 HIGH 8 268.58 0 0 11044.68 0
094067585 CUSTOMER_094067585 094 NO RISK 8 224.08 0 0 11044.68 0
*The total percent(%) may not be 100 percent due to rounding
*Only Customers with minimum of one transaction is considered for analysis
Exit