

Financial Markets Customer Offer Affinity

Introduction

The Financial Markets Customer Offer Affinity accelerator predicts which products the customer is most likely to consider or require next to purchase.

Tip: Download the PDF of these instructions from the Data assets section on the **Assets** page so you can keep these instructions open while you work.

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Instructions

Follow these steps to implement the industry accelerator:

1. Navigate to the **Assets** tab and scroll to the **Notebooks** section.
2. Edit the **1-data-preprocessing** notebook by clicking the edit icon that looks like a vertical ellipsis next to the notebook name. This notebook loads the data and creates and saves the `offer_affinity_prep.py` script to prepare and clean data for model training. It also analyses correlations in the data set. Follow the instructions in the notebook to step through running it. Alternatively, you can run the notebook from the `Jobs` tab by executing **1-data-preprocessing-notebook-job**.
3. Edit and run the **2-model-training** notebook. This notebook transforms the data, builds machine learning models, and deploys a model. Alternatively, you can run the notebook from the `Jobs` tab by executing **2-model-training-notebook-job**.
4. Edit and run the **3-model-scoring-and-app-deployment** notebook. This notebook deploys data assets, a model scoring function and the r-shiny dashboard. It also generates a URL to launch the r-shiny dashboard. Alternatively, you can run the notebook from the `Jobs` tab by executing **3-model-scoring-and-app-deployment-notebook-job**.

5. Launch the r-shiny dashboard from one of the following ways.

- Open the URL generated by deploying r-shiny dashboard in **3-model-scoring-and-app-deployment** notebook.
- Navigate to **Deployments -> Spaces -> Customer Offer Affinity Space -> Deployments -> Customer-Offer-Affinity-Shiny-App** to find the URL of deployed r-shiny dashboard and open it in a new tab.
- Run the dashboard from RStudio console by completing these steps:
 - i. Download the `customer-offer-affinity-analytics-dashboard.zip` file from the Data assets section of the **Assets** page. If you don't see the file, click **View All** to display the full list of assets.
 - ii. Click **Launch IDE > RStudio** on the menu bar.
 - iii. In the **Files** pane, select the **Upload** toolbar button and upload the `customer-offer-affinity-analytics-dashboard.zip` file into RStudio.
 - iv. Select the `app.R` file, and click the **Run App** toolbar button to launch the dashboard. If you see a warning message that certain packages are not installed, you can ignore it because the packages will be installed first time you run the app.

5. Once the app has launched, you can perform model scoring in real time by entering your username and password on the **Client View** tab.

6. Optional. To connect the data assets used in this accelerator to the business terms in Watson Knowledge Catalog, you can edit and run the **0-map-business-terms-to-data-headers** notebook. Enter the authentication details required in the first few cells.

Sample data assets

These sample data files that act as dimensional and fact tables are included in the project on the **Assets** page:

- `customer.csv` : Contains customer data, demographic data, temporal data.
- `customer_product_summary.csv` : Contains combinations and interactions data for each client and product group of interest.
- `customer_summary.csv` : Contains detailed customer transaction data, business metrics, investment and income statistics.
- `customerProductHistory.csv` : Contains a join of the previous three data sets based on Customer ID, Effective Date and Customer Summary End Date. This data set is used as raw data input for the data preparation in the **1-data-preprocessing** notebook. The data set has multiple records per customer, one for each month of summary data and multiple columns for each product, which can be used for modeling purposes. See the `CUSTOMER_PRODUCT_HISTORY.sql` file for the

SQL query used to merge the tables.

Notebooks

Follow the instructions in the notebooks to step through the execution.

- **1-data-preprocessing:** This notebook performs the following functions:
 - Load data
 - Create and save script `offer_affinity_prep.py` to prepare and clean data for model training
 - Analyze correlations
- **2-model-training:** This notebook performs the following functions:
 - Build ML models
 - Analyze and visualize the data
 - Select the best performing ML model and save it
 - Store the model in the deployment space and deploy the model
- **3-model-scoring-and-app-deployment:** This notebook performs the following functions:
 - Get the deployment space and deployments
 - Deploy the data assets
 - Create and deploy a pipeline function for model scoring
 - Predict offer affinity
 - Store and deploy R Shiny app
 - Generate URL to view the app.
- **0-map-business-terms-to-data-headers:** This optional notebook performs the following functions:
 - Publish the files `customerProductHistory.csv` , `customer_product_summary.csv` , `customer.csv` , `customer_summary.csv` into a specified catalog.
 - Read mappings from **offer-affinity-map-terms.csv** and applies business terms to the published dataset headers.

Jobs

Navigate to **Jobs** tab to execute following jobs in sequence.

1-data-preprocessing-notebook-job: Runs the `1-data-preprocessing` notebook end to end.

2-model-training-notebook-job: Runs the `2-model-training` notebook end to end.

3-model-scoring-and-app-deployment-notebook-job: Runs the `3-model-scoring-and-app-deployment` notebook end to end.

R Shiny dashboard

The R Shiny dashboard displays product statistics and customer summaries, and scores new data. The dashboard has the following tabs:

- **Dashboard View:** Shows top action clients, trend of the number of offers for each product available, such as cash, education, and brokerage. Provides the percentage statistics of the purchased products that were originally offered.
- **Client View:** Targets individual client information, depicts the top business metrics, provides an option to run the Model Scoring Web service, predicts and ranks offer affinity, and visualizes the influential factors.

Business glossary for use with Watson Knowledge Catalog

Optionally, you can import the glossary of business terms into Watson Knowledge Catalog to get started on data governance using the below files available in the project tar file.

The `customer-offer-affinity-glossary-categories.csv` file defines the main and sub categories for the business terms.

The `customer-offer-affinity-glossary-terms.csv` file defines the business terms, category of the business terms and their Related Terms/Part of Terms, if applicable.

Once the glossary is imported into Watson Knowledge Catalog, Navigate to **Governance > Categories > Industry Accelerator > Customer Offer Affinity** to explore the glossary contents.

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