Instacart Market Basket Analysis

An edWisor.com's project

Submitted by: Sandhya Parkar

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1.Problem Statement:

To predict which products customer will buy again.

2.Business understanding:

Instacart, a grocery ordering and delivery app, aims to make it easy to fill your refrigerator and pantry with your personal favorites and staples when you need them. After selecting products through the Instacart app, personal shoppers review your order and do the in-store shopping and delivery for you.

In this competition, Instacart is challenging the Kaggle community to use this anonymized data on customer orders over time to predict which previously purchased products will be in a user's next order.

3.Data Understanding:

We have six sets of data of which are as described below:

1. aisles : This data set contains aisle_id and aisle variables.

2. departments : It contains department_id and department variables.

3. order_products_prior : It contains 4 variables and 32434489 observations.

4. order_products_train : It contains 1384617 observations and 4 variables.

5. orders : It contains 3421083 observations and 7 variables.

6. products : It contains 49688 observations and 4 variables.

4. Data Preprocessing:

Our data contains six tables on which we performed some preprocessing like some of the variables are reshaped using as.factor like variables aisle, department, eval_set of orders table and products_name variable of products table.Here eval_set of orders table contains train set , test set and prior set of data. We also performed some visualization to look at the proportion of data to these particular sets. To get train and test data separately we merged related tables with unique key like products table is joined with aisle and departments table. Similarly orders table is joined with order_product_prior table.

5. Feature Engineering:

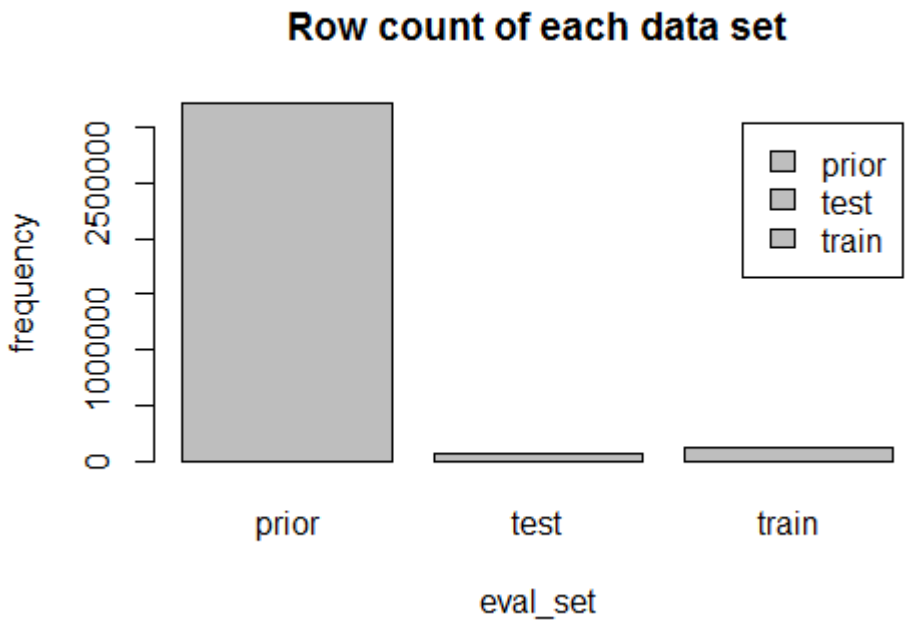
The predictive power of a model can be increased significantly if supplied with the right feature engineered variable inputs. Here we have huge data sets and a lot of scope to create new features and also some new tables which are later merged in a single table on the basis of unique key.

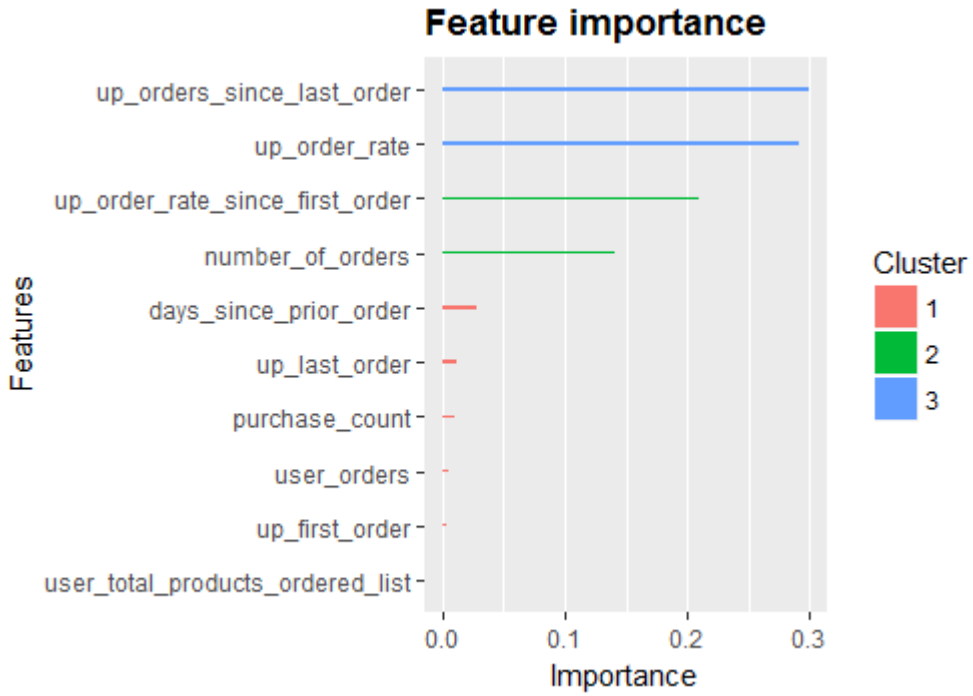
We created new features like number_of_orders, user_order, up_first_order, up_last_order, purchase_count of a particular user_id, user_total_products_ordered_list, uniq_prod etc. and similarly some new tables like user_summ, products, orders_products, user_prod_list , prd and many more. Lastly we combined all of these tables into a single table users table which then splitted into train data set and test data set on the basis of eval_set type provided.

After splitting into test and training frame we removed some unimportant variables.

6. Visualization:

We performed visualization using bar plot to view the row count of eval_set type in orders data set and also for looking at the important feature we plot a graph between various features used in our modelling process.




Feature importance
up_orders_since_last_order
up_order_rate
up_order_rate_since_first_order
number_of_orders
days_since_prior_order
up_last_order
purchase_count
user_orders
up_first_order
user_total_products_ordered_list
Features
0.0
0.1
0.2
0.3
Importance
Cluster
1
2
3

7. Predictive Modelling:

We used xgboost (Extreme Gradient Boosting) for predictive modelling.

Our model was able to predict target variable with logloss of 0.248771.

We also find the importance of features using xgboost.ggplot.importance() method.

7. Conclusion:

To predict whether two questions are duplicate or not we performed various techniques on our data. We have performed preprocessing and feature engineering on our data. We tested various models for our data to provide better accuracy and our finalized model is Binomial logistic regression using tf-idf transformation.

Applying this model we obtained a mean accuracy of 85%.

Thank You