Acquire Valued Customers

Predicting repeat customers

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Project

➢ Predicting Repeat Customer

- Businesses run discounts on select items to increase sales and make the customers repeat their purchase.
- Data used in this project is of customers transactions, history and offers.
- Original data comprises of almost 350 million rows of completely anonymized transactional data from over 300,000 shoppers.
- This project deals with subset of original dataset with randomly chosen 16000 customer records.

➢ Outcome from this Project

- Provide insights into shopping patterns of customers.
- Predict the repeat buyers based on different features.

Clients

- Subscription Businesses
  - Companies with Business Model revolving around Subscriptions/renewals
  - Companies interested in building customer base

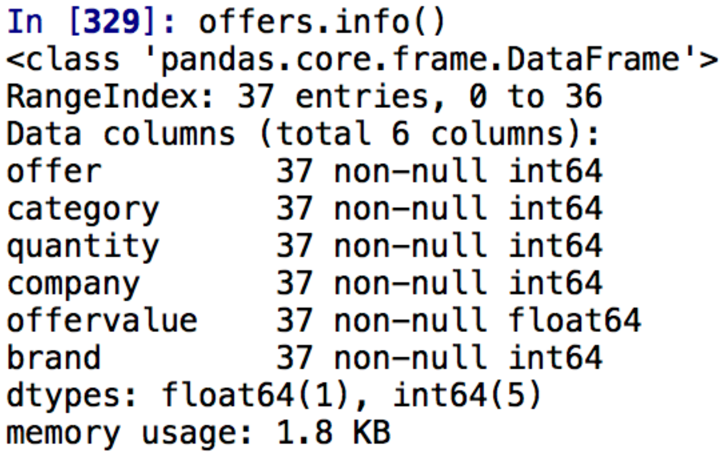
- Grocery Stores
  - To be able to convert customers to repeat buyers
  - Retain existing customers

Data Acquisition

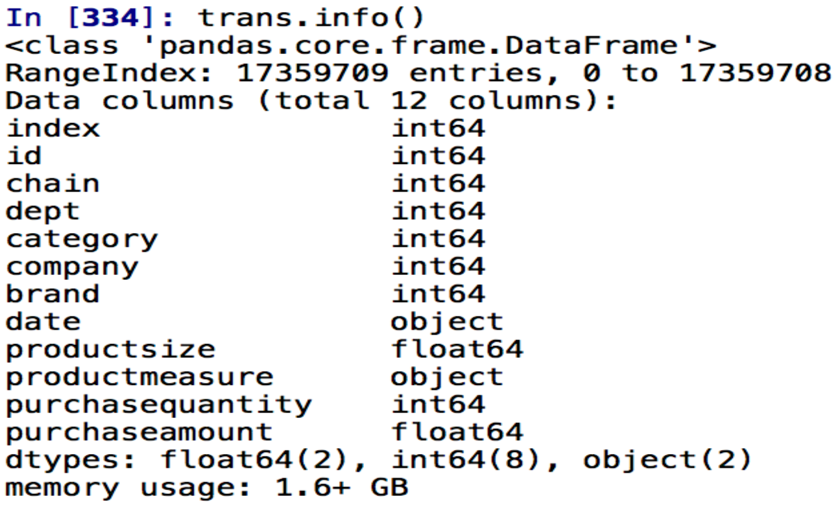
- Retrieved dataset from https://www.kaggle.com/c/acquire-valued-shoppers-challenge/data
- This data comprises anonymized fields with transactions for 1 year along with Offer and Offer History information.
- Acquired dataset of 300K customer is reduced to manageable size of randomly picked 16000 customer records for EDA and Model building.

Dataset Exploration

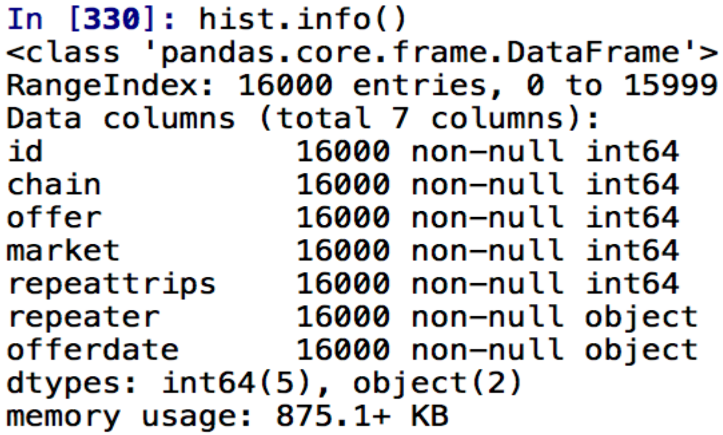
- 16000 Customer records
- 1.6 GB (transactions)
- 875 KB (history)
- 1.8KB (offers)



```
In [329]: offers.info()
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 37 entries, 0 to 36
Data columns (total 6 columns):
offer         37 non-null int64
category      37 non-null int64
quantity      37 non-null int64
company       37 non-null int64
offervalue    37 non-null float64
brand         37 non-null int64
dtypes: float64(1), int64(5)
memory usage: 1.8 KB
```



```
In [334]: trans.info()
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 17359709 entries, 0 to 17359708
Data columns (total 12 columns):
index                int64
id                   int64
chain                int64
dept                 int64
category             int64
company              int64
brand                int64
date                 object
productsize          float64
productmeasure       object
purchasequantity     int64
purchaseamount       float64
dtypes: float64(2), int64(8), object(2)
memory usage: 1.6+ GB
```



```
In [330]: hist.info()
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 16000 entries, 0 to 15999
Data columns (total 7 columns):
id             16000 non-null int64
chain          16000 non-null int64
offer          16000 non-null int64
market         16000 non-null int64
repeattrips    16000 non-null int64
repeater       16000 non-null object
offerdate      16000 non-null object
dtypes: int64(5), object(2)
memory usage: 875.1+ KB
```

Data Dictionary

- ***transactions***
  id - A unique id representing a customer
  chain - An integer representing a store chain dept - An aggregate grouping of the Category (e.g. water)
  category - The product category (e.g. sparkling water)
  company - An id of the company that sells the item
  brand - An id of the brand to which the item belongs
  date - The date of purchase
  productsize - The amount of the product purchase (e.g. 16 oz of water)
  productmeasure - The units of the product purchase (e.g. ounces)
  purchasequantity - The number of units purchased
  purchaseamount - The dollar amount of the purchase

Data Dictionary

- ***offers***
  offer - A unique id representing an offer
  category - The product category (e.g. sparkling water)
  quantity - The number of units one must purchase to get the discount
  company - An id of the company that sells the item
  offervalue - The dollar value of the offer
  brand - An id of the brand to which the item belongs

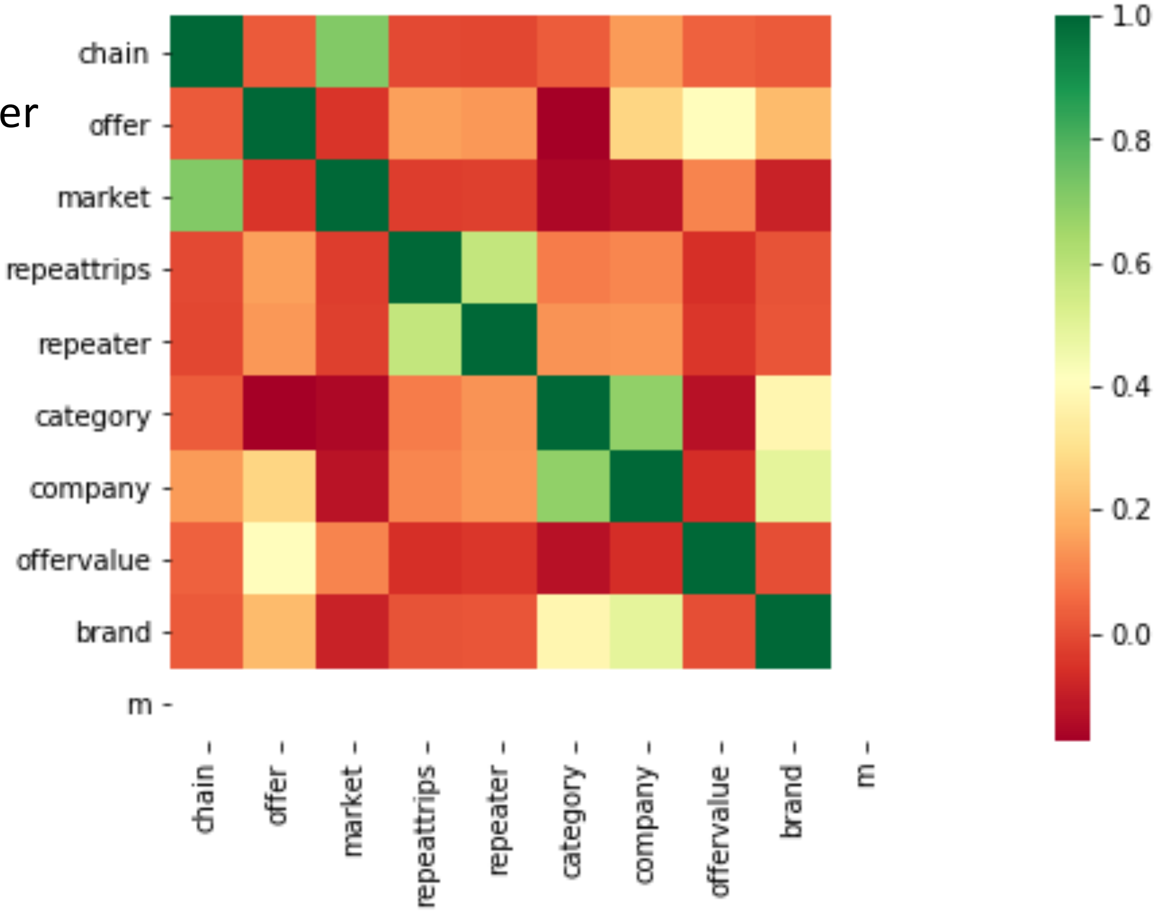
- ***history***
  id - A unique id representing a customer
  chain - An integer representing a store chain
  offer - An id representing a certain offer
  market - An id representing a geographical region
  repeattrips - The number of times the customer made a repeat purchase
  repeater - A boolean, equal to repeattrips > 0
  offerdate - The date a customer received the offer

Data Aggregation & Feature Selection

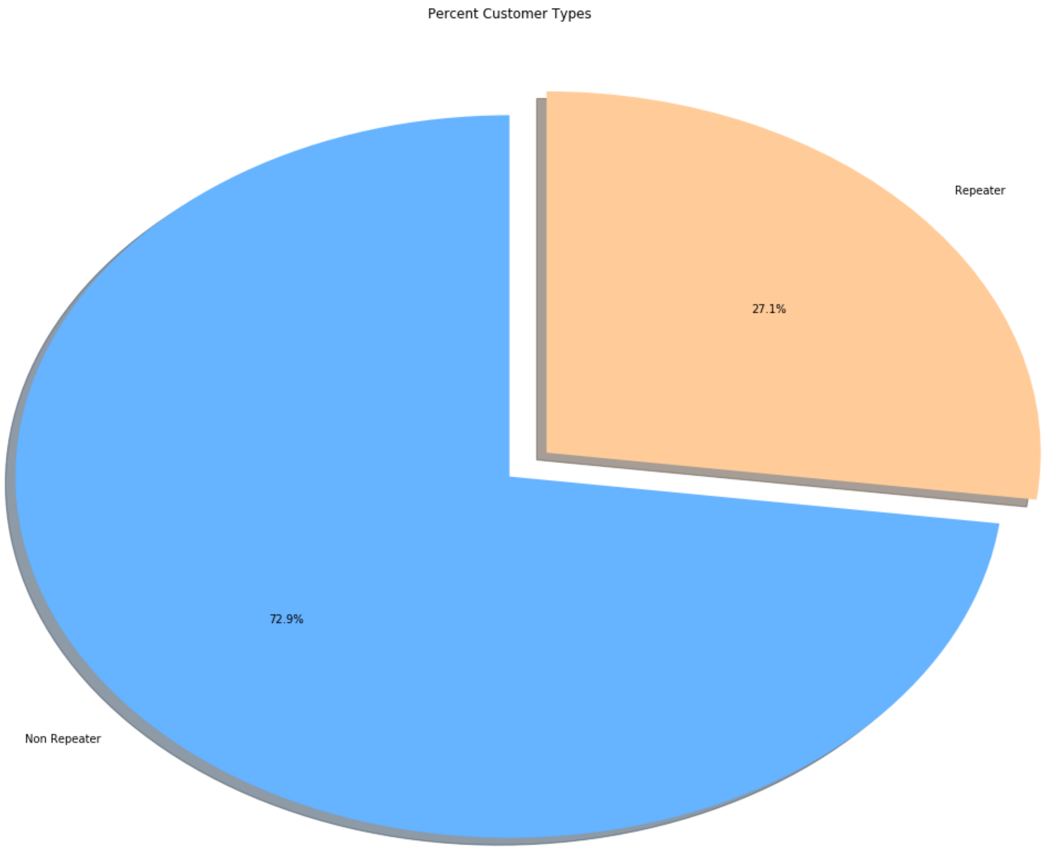
- ➢ Merge Offers and History data with OfferId into Hist_Offer

- ➢ Category, Company, Offer and Brand are correlated to target variable ‘repeater’

- ➢Chain and Market have little correlation to target variable

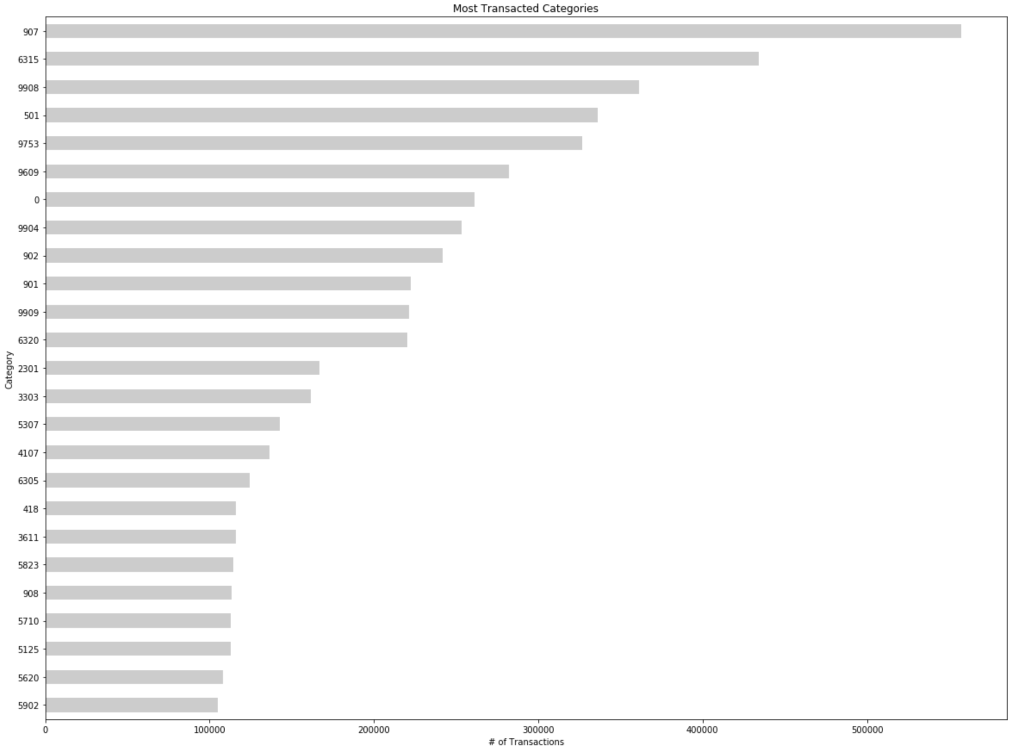


Explanatory Data Analysis



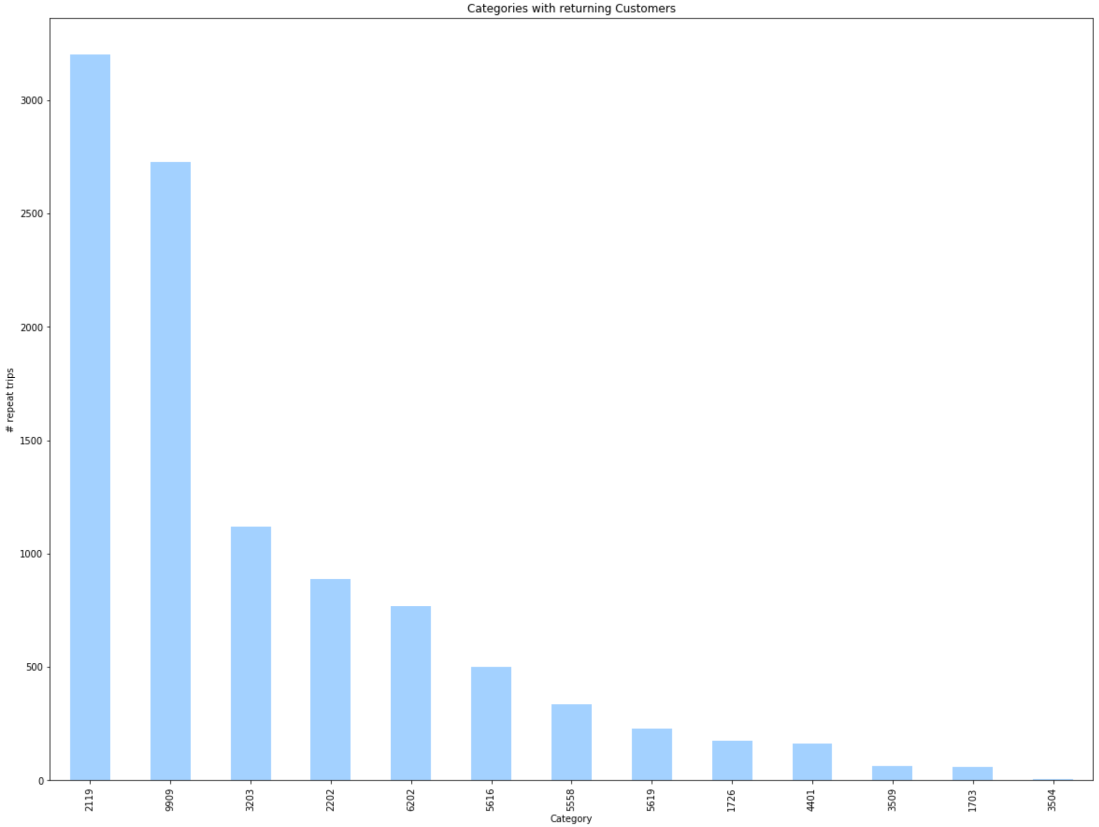
- 27 % of Customers repeat purchase when Offered discount coupon

Explanatory Data Analysis

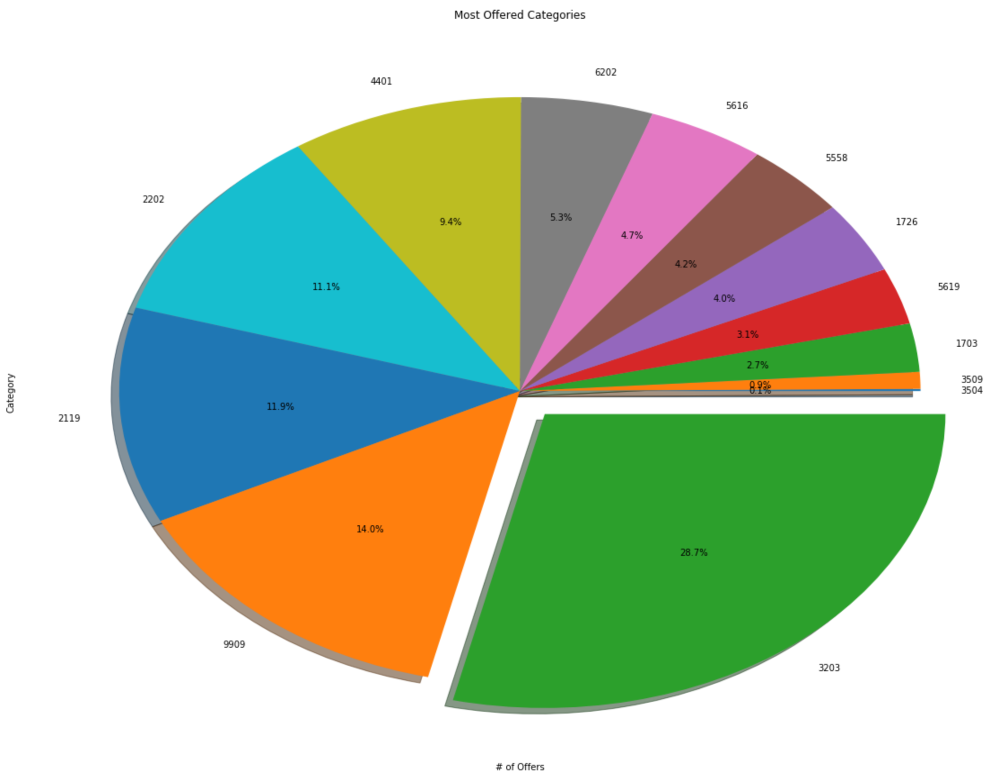


- ➢ Top 25 highly transacted Categories which could have impact on prediction

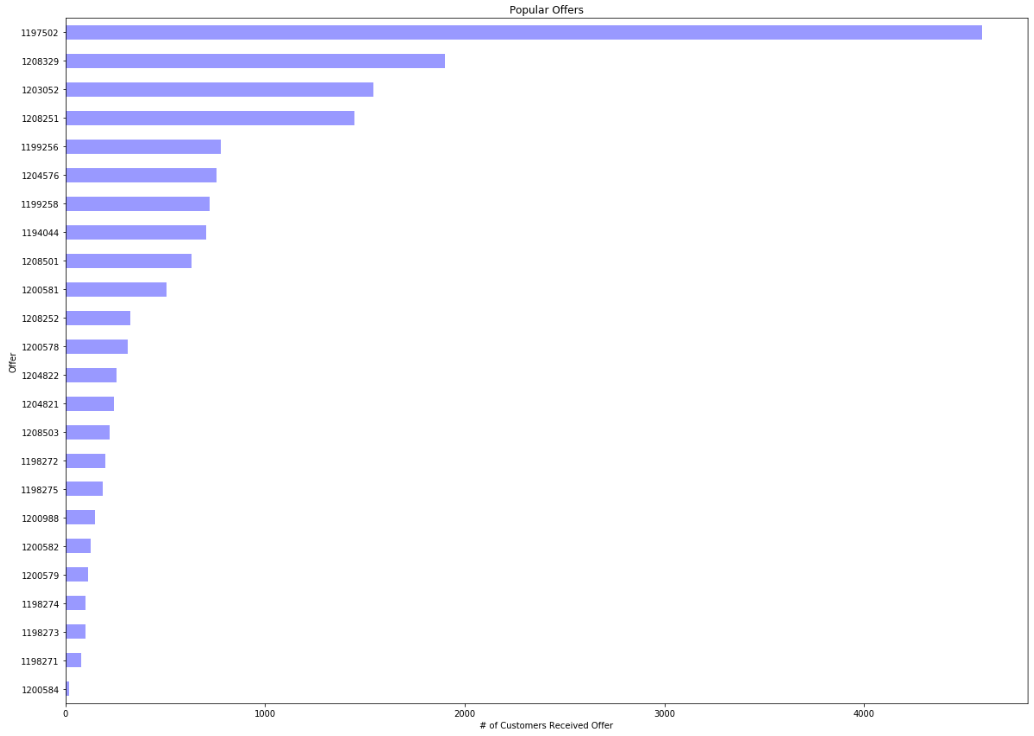
- ➢ Returntrip count for each category



Explanatory Data Analysis



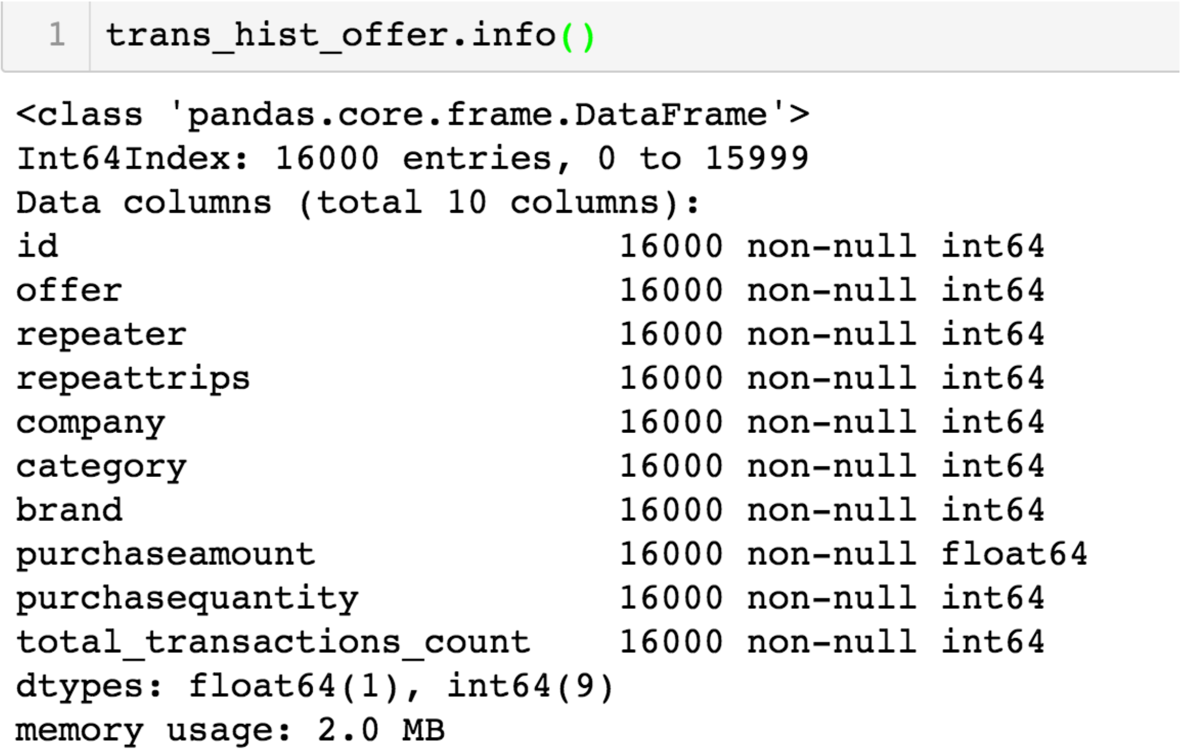
- Category 3203 was offered to 27 % Customers
- Nearly 5000 customers were Offered coupon 1197502



Data Aggregation

- ➢ Aggregate purchase amount and quantity of transactions data for each customer.

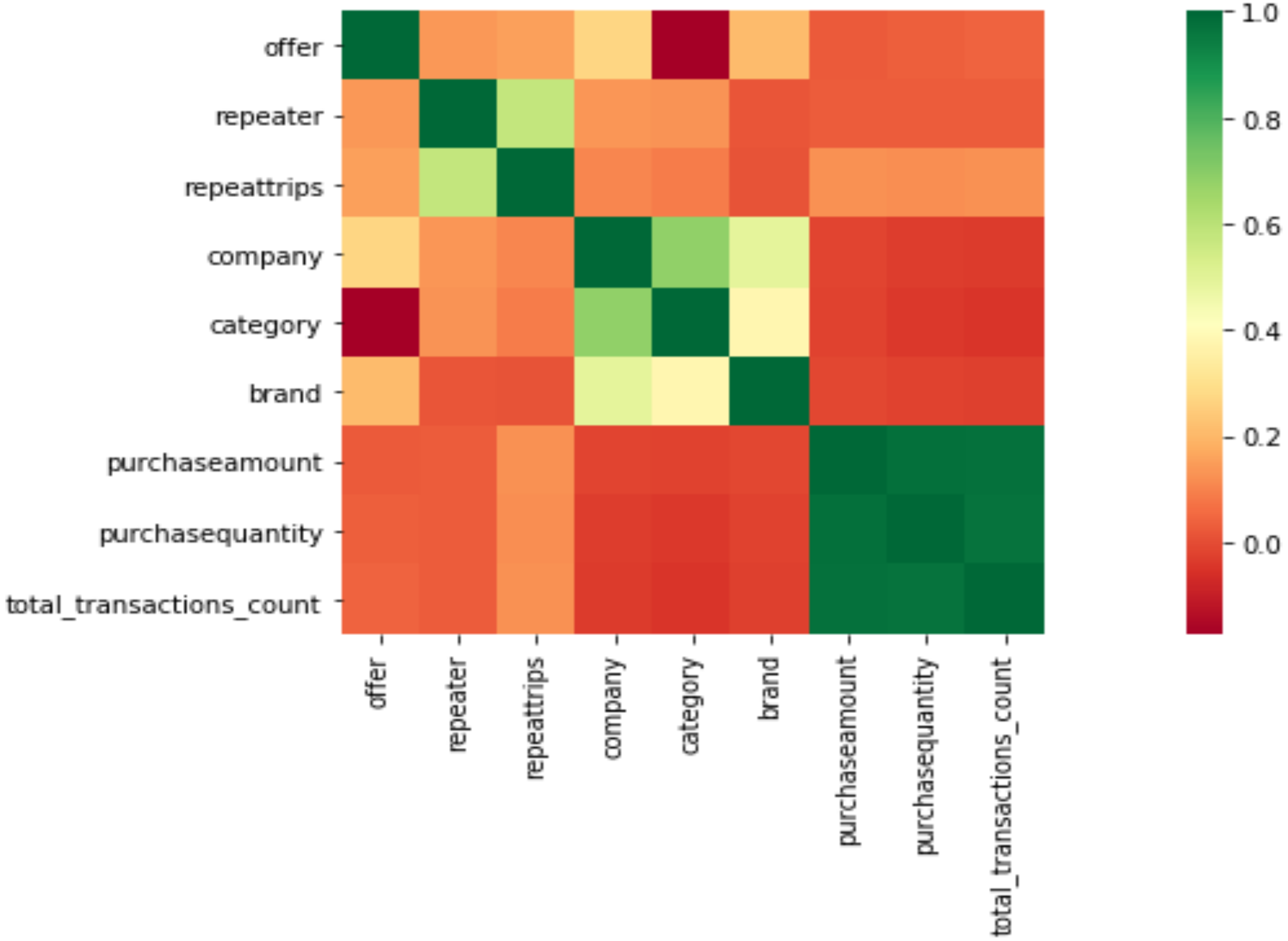
- ➢ Merge aggregated transactions and Hist_Offer.



```
trans_hist_offer.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 16000 entries, 0 to 15999
Data columns (total 10 columns):
id                            16000 non-null int64
offer                         16000 non-null int64
repeater                      16000 non-null int64
repeattrips                   16000 non-null int64
company                       16000 non-null int64
category                      16000 non-null int64
brand                         16000 non-null int64
purchaseamount                16000 non-null float64
purchasequantity              16000 non-null int64
total_transactions_count      16000 non-null int64
dtypes: float64(1), int64(9)
memory usage: 2.0 MB
```

Explanatory Data Analysis



- ➢ purchaseamount, purchasequantity and total_transaction_count is found correlated to repeattrips

Feature Extraction

- offer
  repeater
  repeattrips
  offer_company
  offer_category
  offer_brand
- offervalue
  offeredmonth
  quantity
- total_purchaseamount
  total_urchasequantity
- total_trans_purchaseamount_avg
  purchaseamount_category_avg
- total_transactions_count
- total_purcahse_company_count
  total_purcahse_category_count
  total_purcahse_brand_count

- [1,3,6,9,12]_month_total_purchase_amt
- category_purchased_amt_[30,90,180,270]days
  category_purchased_qty_[30,90,180,270]days
- company_purchased_amt_[30,90,180,270]days
  company_purchased_qty_[30,90,180,270]days
- brand_purchased_amt_[30,90,180,270]days
  brand_purchased_qty_[30,90,180,270]days
- purchased_company_category_brand_count
  purchased_company_category_count

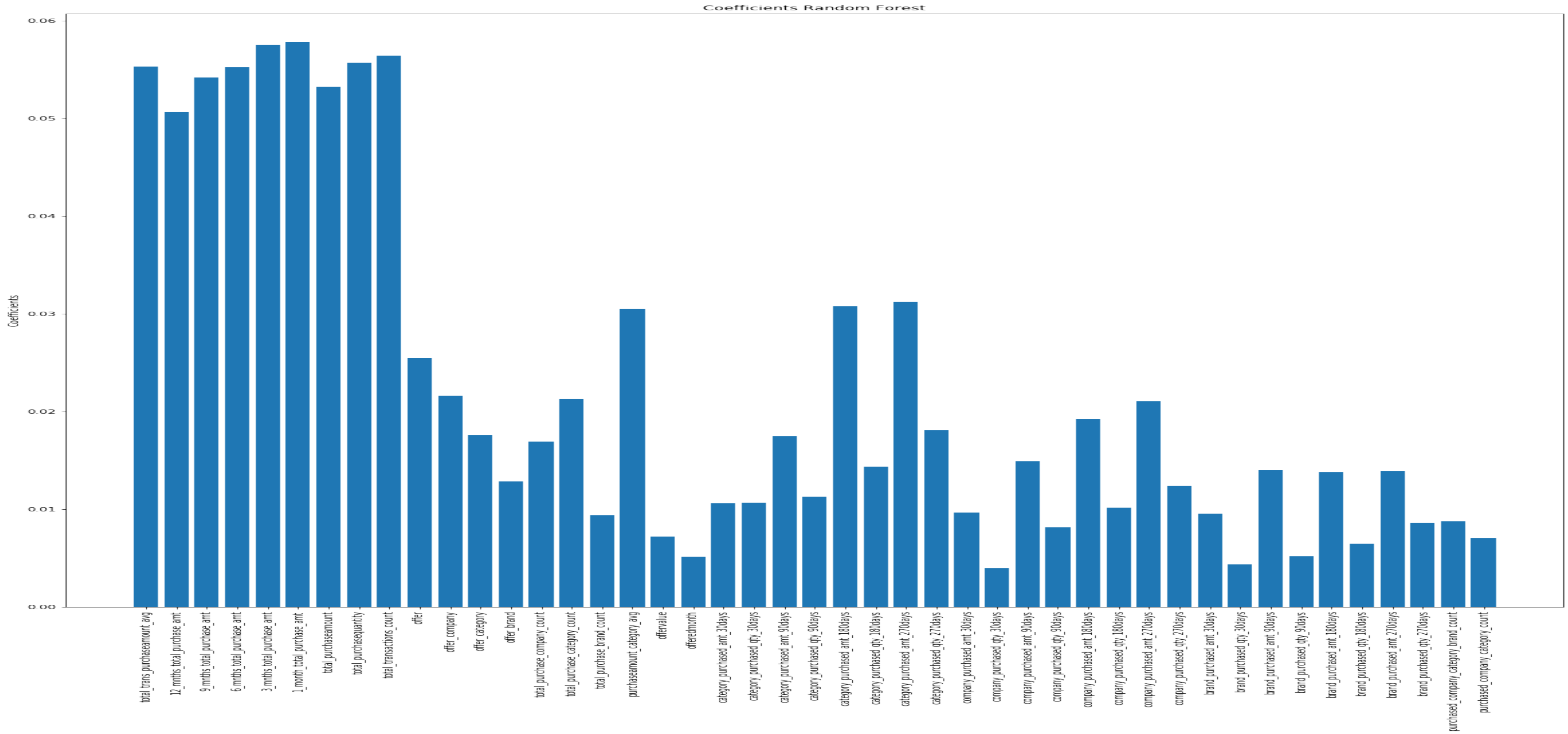
Model Evaluation & Selection

- Evaluated below 3 Classification Models

	Logistic Regression	Decision Tree	Random Forest
AUC Score	0.5290	0.5621	0.6599 ←

- Its evident from above metrics, that logistic regression is not the best model for this project
- Random Forest have produced better results for n_estimators = 20

Model Evaluation & Selection



Recommendations to Clients

- Factors Influencing customers purchases
  - Average spending of Customer over a period of time
  - Recent Purchase trends of Customer (1-3 months of purchases)
  - Total transactions by a Customer
  - History of Category, Company, Brand purchases by customer

- Recommendations to Companies
  - Offers are found to be an effective way of improving sales and retaining customers
  - Choose right Offer on products belonging to Category, Company, Brand

Thank You.