Capstone Project

Customer Segmentation

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Problem Statements

Identify major customer segments on a transnational dataset which contains all the transactions occurring between 01/12/2010 and 09/12/2011 for a UK-based and registered non-store online retail.

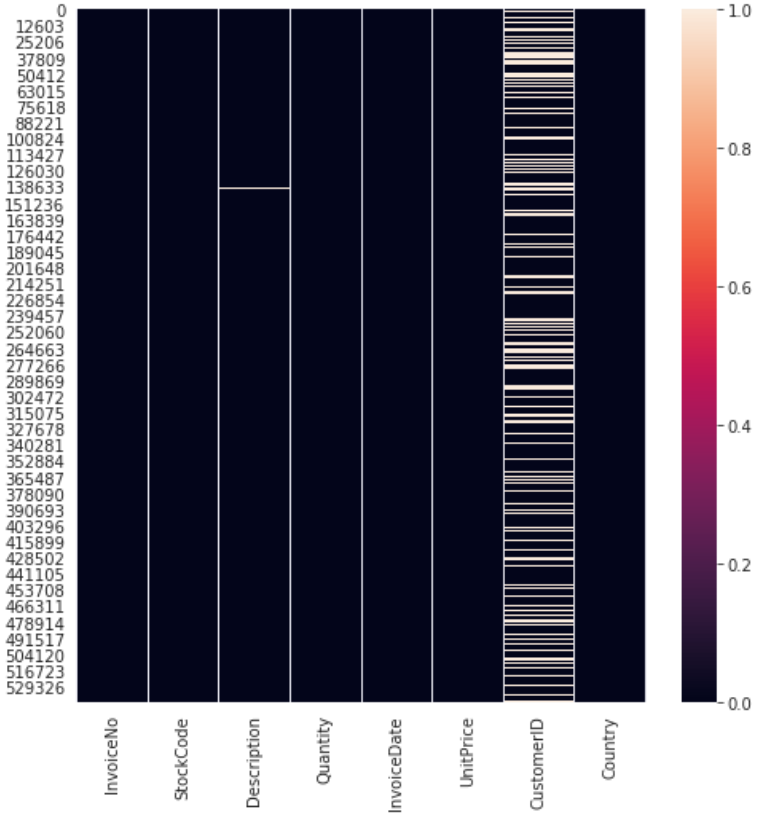
What is Customer Segmentation?

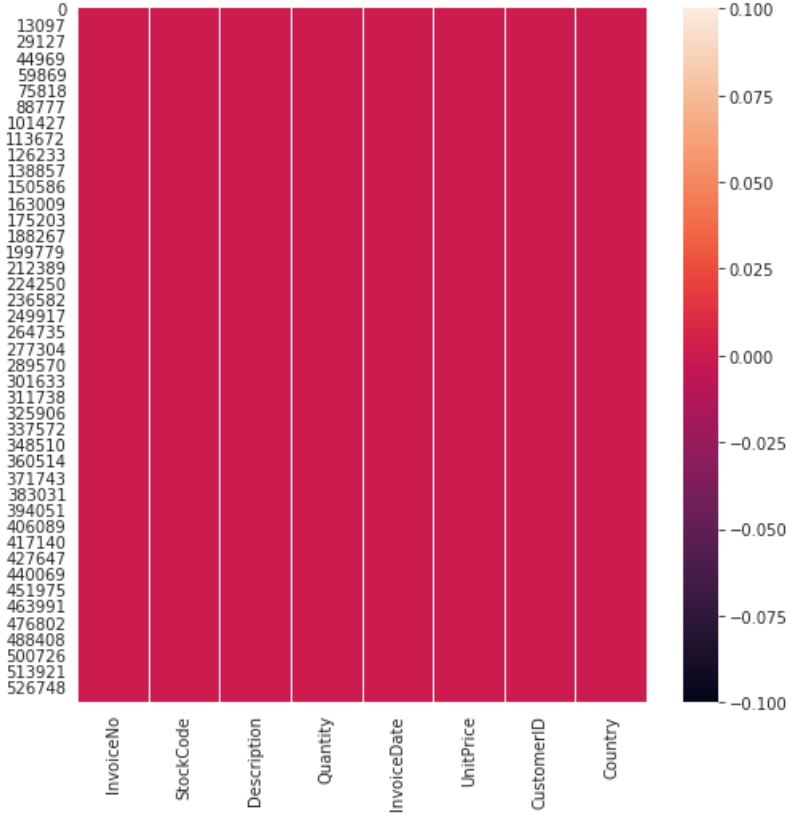
- Customer segmentation is the process of separating customers into groups based on their shared behavior or other attributes. The groups should be homogeneous within themselves and should also be heterogeneous to each other.
- The main goal is to identify customers that are most profitable and the ones who churned out to prevent further loss of customer by redefining company policies.
- Having large number of customers, each with different needs it is crucial to find which customer are most important for business and target them with appropriate strategy.

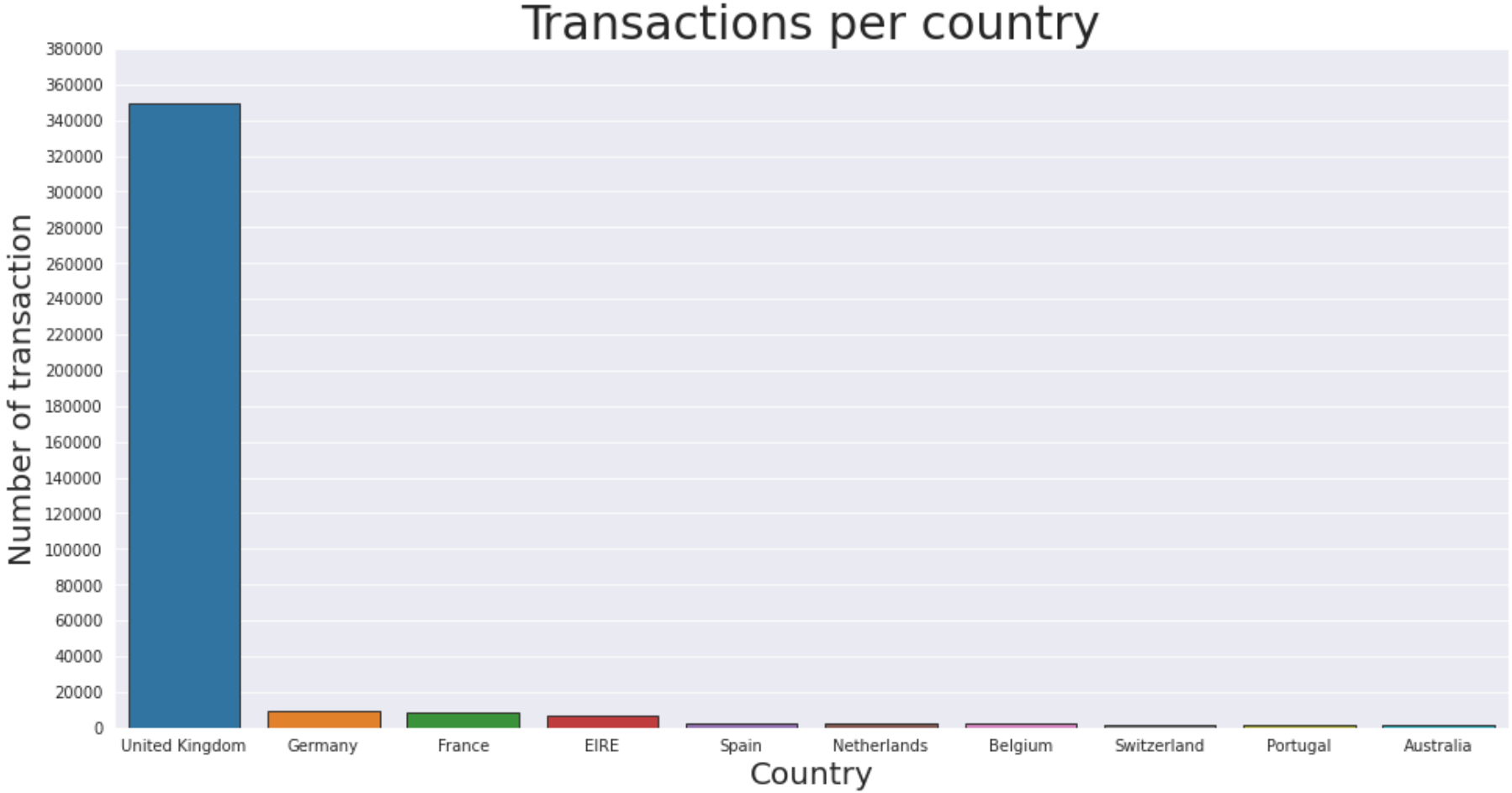
Data Description

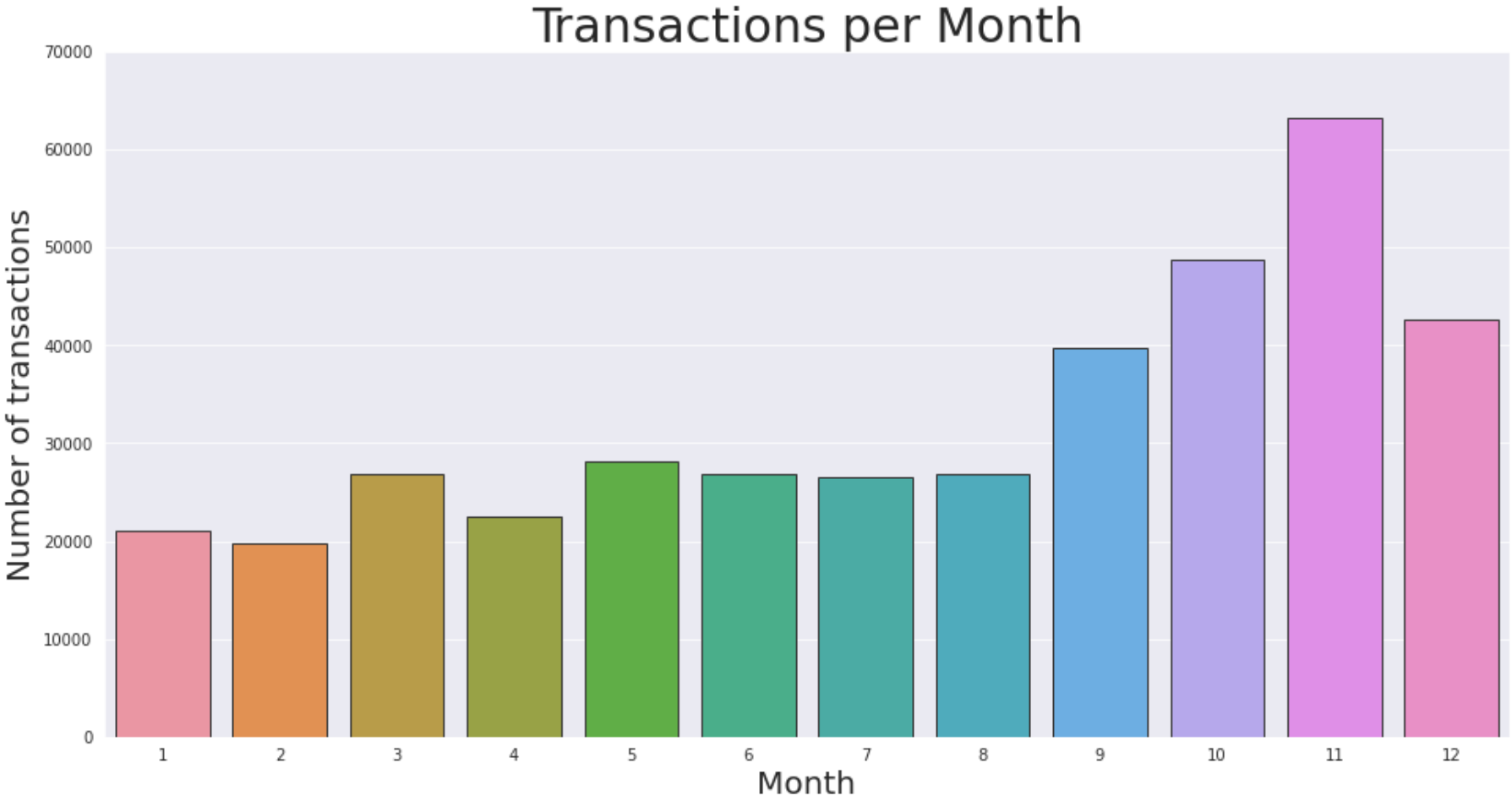
InvoiceNo: Nominal, 6-digit integral number uniquely assigned to each transaction
StockCode: Nominal, 5-digit integral number uniquely assigned to each distinct product
Description: Nominal, product(item) name
Quantity: Numeric, quantities of each product per transaction
InvoiceDate: Numeric, the day and time when each transaction was generated
UnitPrice: Numeric, product price per unit in sterling
CustomerID: Nominal, 5-digit integral number uniquely assigned to each customer
Country: Nominal, name of the country where each customer resides

Data Exploration





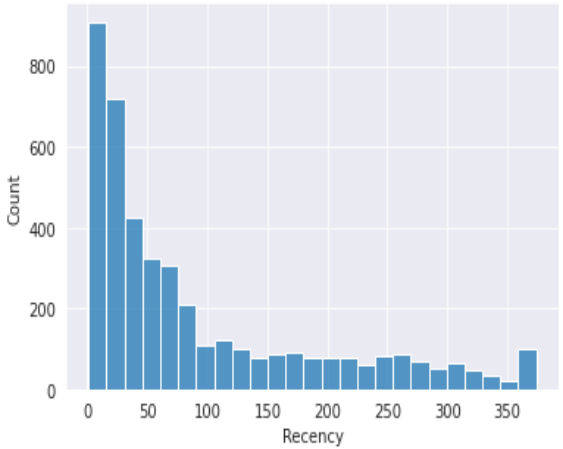

Transactions per country
Number of transaction
380000
360000
340000
320000
300000
280000
260000
240000
220000
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
United Kingdom
Germany
France
EIRE
Spain
Netherlands
Belgium
Switzerland
Portugal
Australia
Country

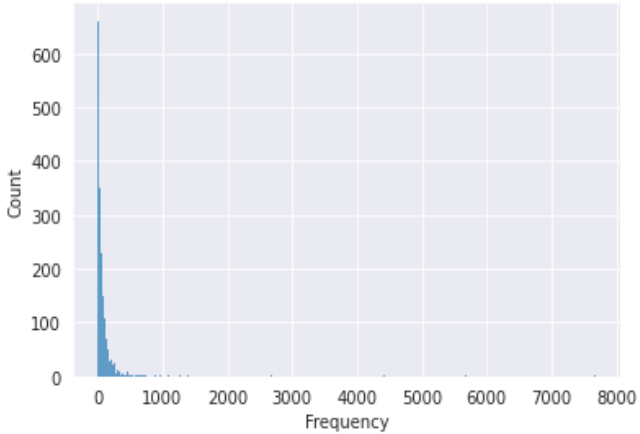

Transactions per Month
Number of transactions
70000
60000
50000
40000
30000
20000
10000
0
1
2
3
4
5
6
7
8
9
10
11
12
Month

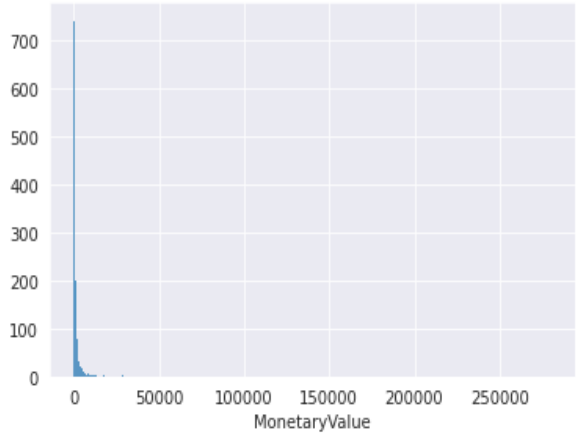
RFM Segmentation

- RFM stands for Recency, Frequency and Monetary
- RFM analysis is commonly used technique to generate and assign a score to each customer based on:
  - How recent their last transaction was (Recency)
  - How many transactions they have made in the last year (Frequency)
  - What monetary value of their transaction was (Monetary)

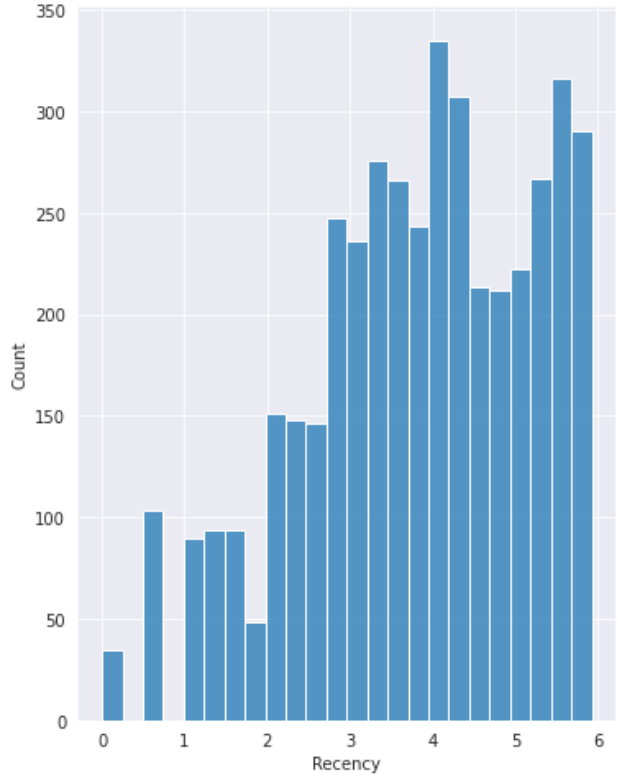
Feature Extraction

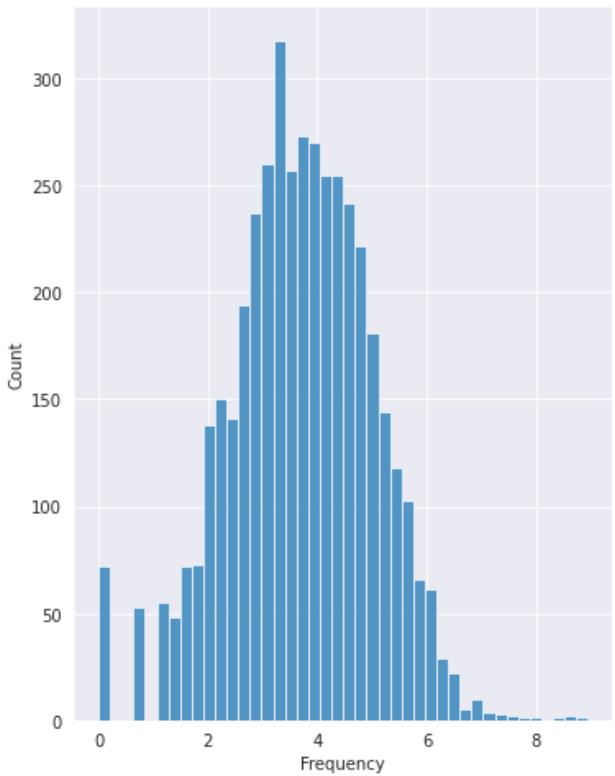


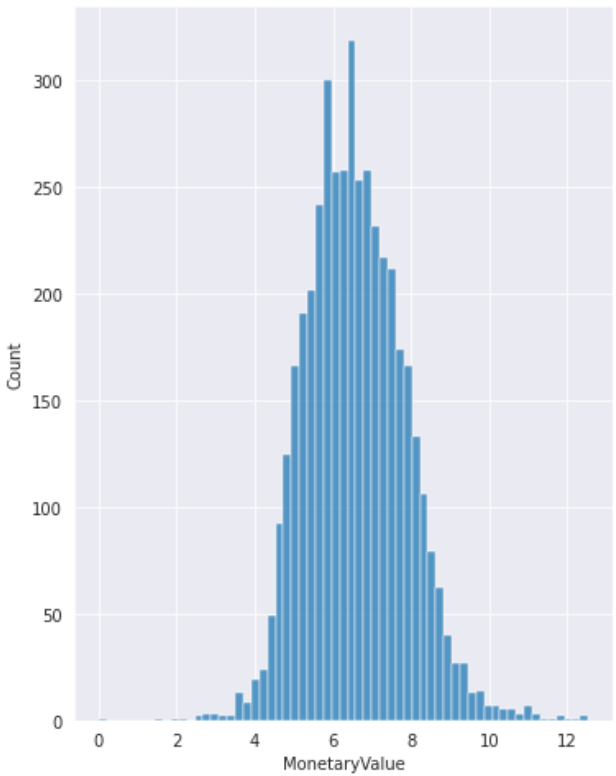




Data distribution after log transform

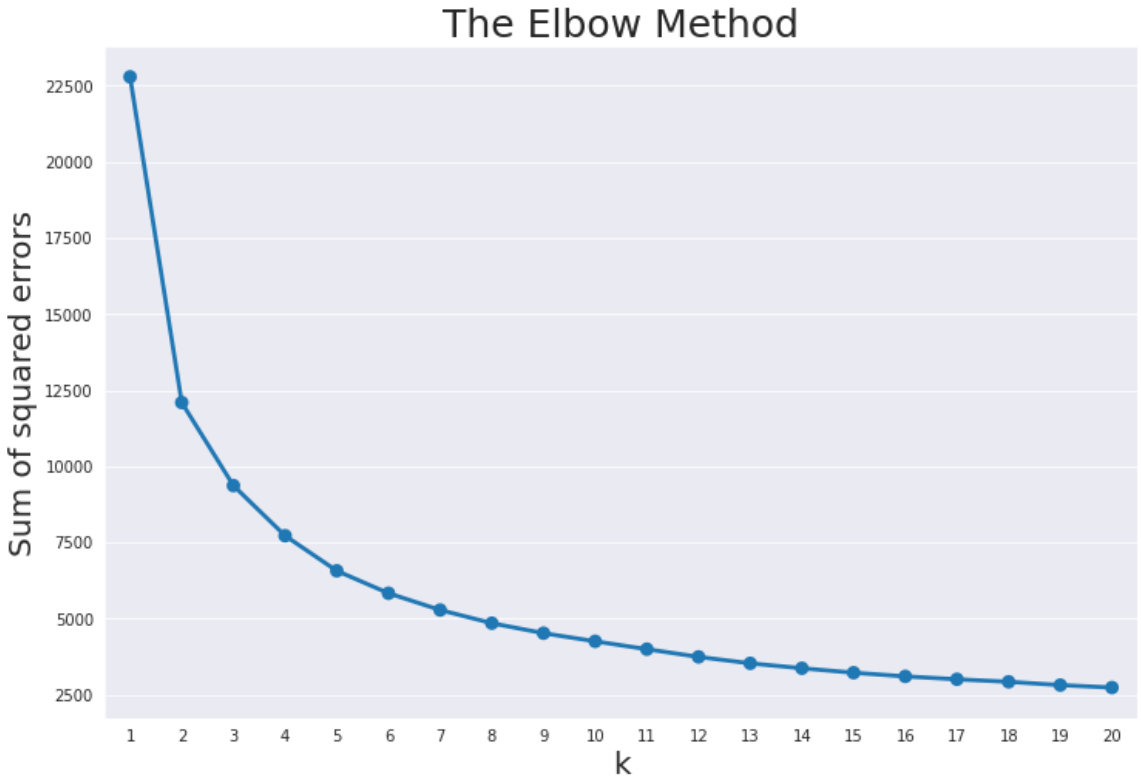


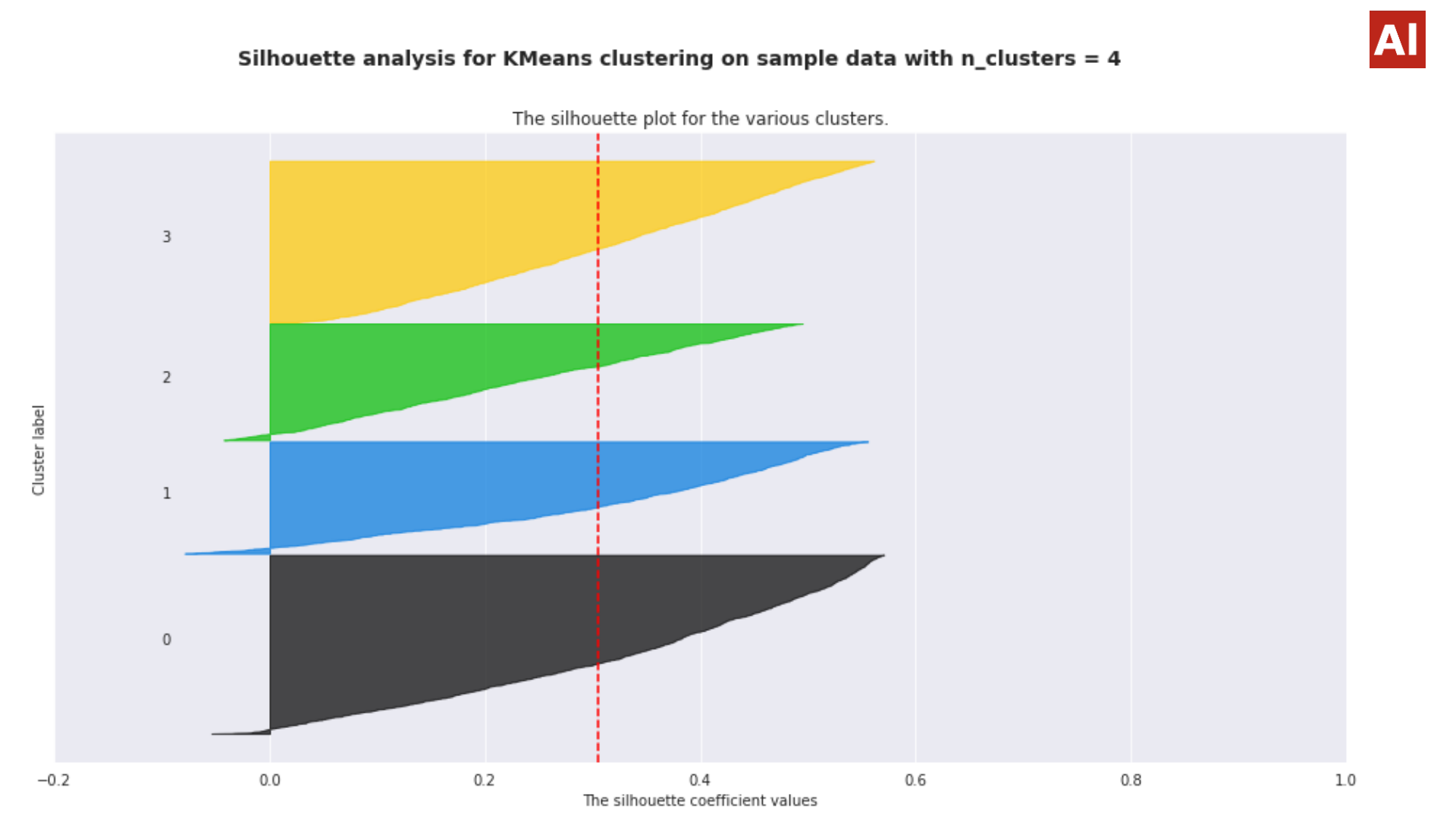


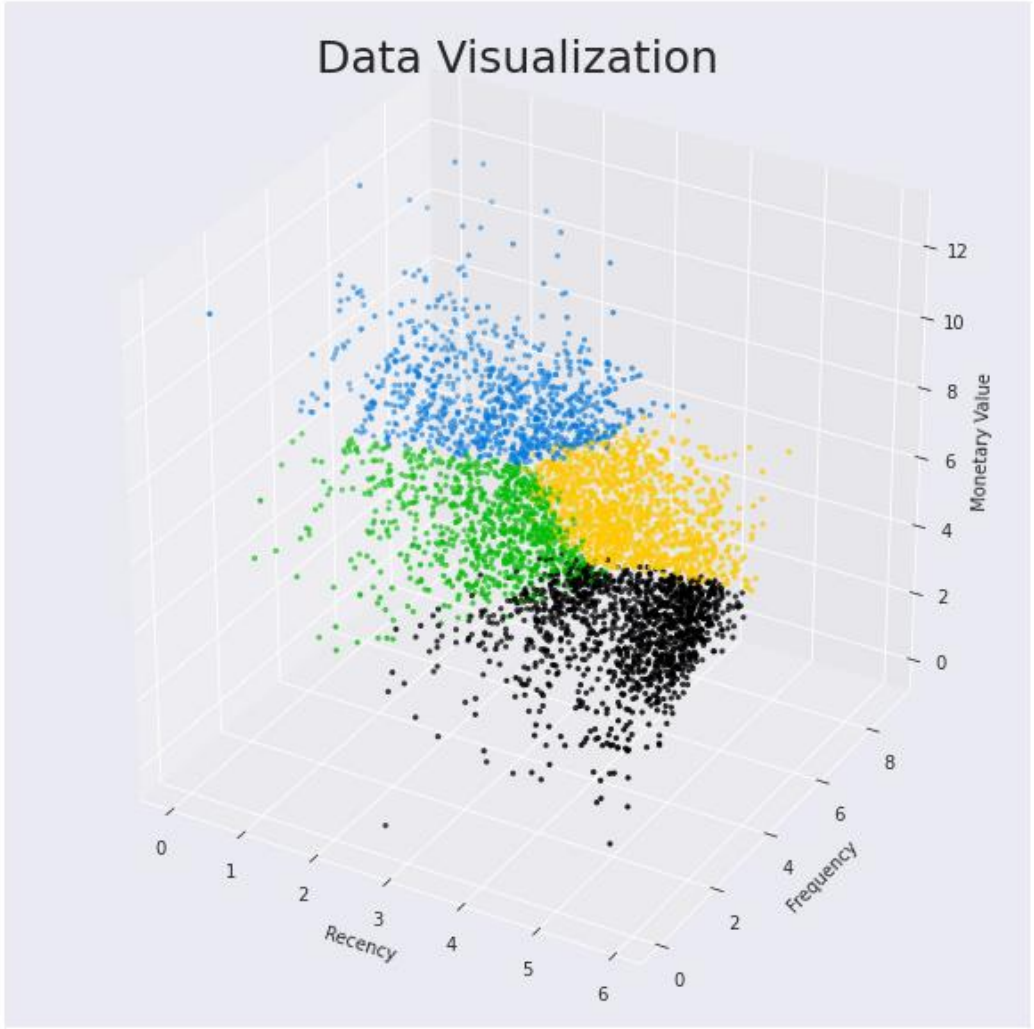


- Each transaction is assigned values based on Recency, Frequency and Monetary
- Each point in plot represent a Transaction

K-Means Clustering




Silhouette analysis for KMeans clustering on sample data with n_clusters = 4
The silhouette plot for the various clusters.
Cluster label
3
2
1
0
−0.2
0.0
0.2
0.4
0.6
0.8
1.0
The silhouette coefficient values



- Each transaction is assigned a cluster based on Recency, Frequency and Monetary
- Optimal number of cluster by silhouette analysis is four
- Each color in plot represent a Cluster

Mean value of each feature

Cluster	Recency	Frequency	Monetary Value
0	150	10	228
1	8	197	3697
2	15	30	486
3	77	65	1123

Conclusion

Cluster	RFM Interpretation	Type of Customer
0	Last purchase long ago, Least number of transactions, Least monetary spending	Churned
1	Recent transaction, Most frequent transactions, Highest monetary spending	Best (target)
2	Recent transaction, Low purchase frequency Low monetary spending	New
3	Last purchase while ago, Less frequent transactions Low monetary spending	At Risk