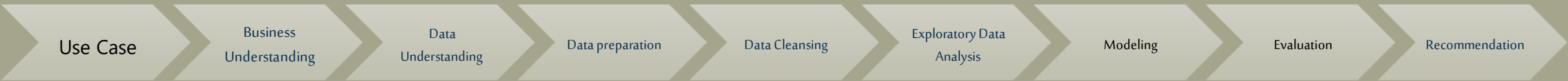


Customer Segmentation

Mind Map Customer Segmentation



Use Case: Customer Segmentation

Use Case Summary

Objective Statement:

- ▣ Get business insight about how many product sold every month.
- ▣ Get business insight about how much customer spend their money every month.
- ▣ To reduce risk in deciding where, when, how, and to whom a product, service, or brand will be marketed.
- ▣ To increase marketing efficiency by directing effort specifically toward the designated segment in a manner consistent with that segment's characteristics.

Source Data: Online retail dataset by UCI Machine Learning Library. Customer Segmentation

Challenges:

- ▣ Large size of data, can not maintain by excel spreadsheet.
- ▣ Need several coordination from each department.
- ▣ Demography data have a lot missing values and typo.

Methodology / Analytic Technique:

- ▣ Descriptive analysis
- ▣ Graph analysis
- ▣ Segment Analysis

Business Benefit:

- ▣ Helping Business Development Team to create product differentiation based on the characteristic for each customer.

- Know how to treat customer with specific criteria.

Expected Outcome:

- Know how many product sold every month.
- Know how much customer spend their money every month.

- Customer segmentation analysis.
- Recommendation based on customer segmentation.

Business Understanding

- Retail is the process of selling consumer goods or services to customers through multiple channels of distribution to earn a profit.
- This case has some business question using the data:
- How many product sold every month?
- How much customer spend their money every month?
- How about Customer segmentation analysis?
- How about recommendation based on customer segmentation?

Data Understanding

- Data of Retail Transaction from 01 December 2010 to 09 December 2011
- Source Data: Online retail dataset by UCI Machine Learning Library. Customer Segmentation □ The dataset has 8 columns and 541909 rows.
- Data Dictionary:
 - InvoiceNo: Invoice number uniquely assigned to each transaction.
 - StockCode: Product (item) code.
 - Description: Product (item) name.
 - Quantity: The quantities of each product (item) per transaction.
 - InvoiceDate: The day and time when each transaction was generated.
 - UnitPrice: Product price per unit in sterling.

- CustomerID: Customer number uniquely assigned to each customer.
- Country: The name of the country where each customer resides.

Data preparation

Code Used:

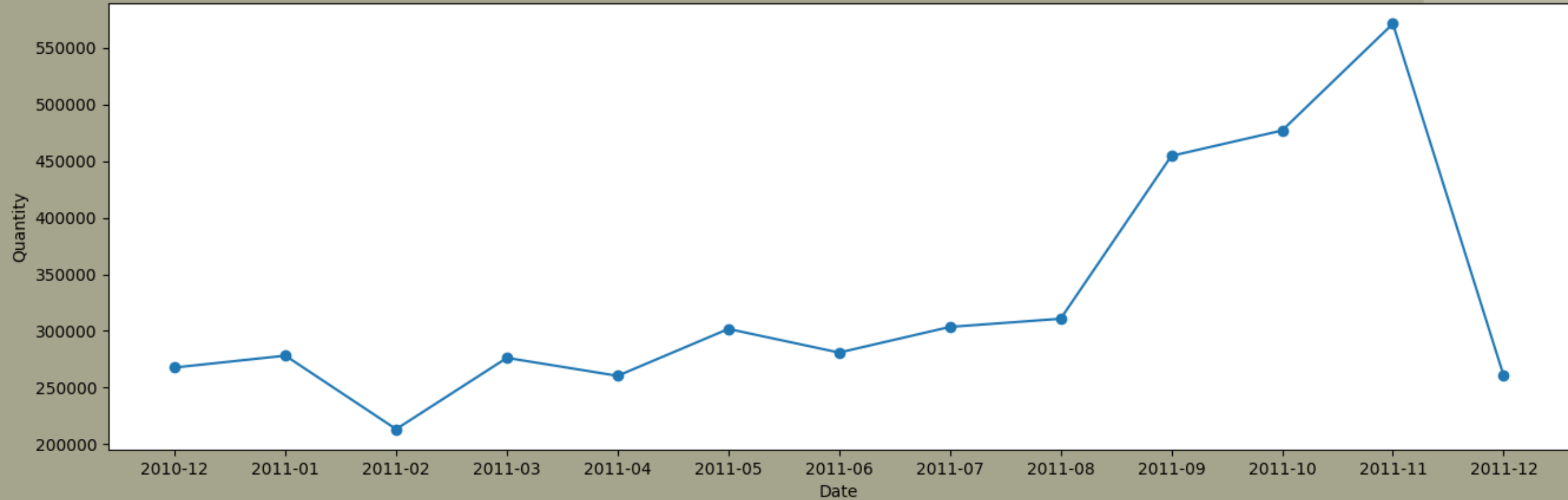
- ▣ Python Version: 3.7.6
- ▣ Packages: Pandas, Numpy, Matplotlib, Seaborn, Sklearn, and Feature Engine

Data Cleansing

- ▣ There are about 25% of Null CustomerID in the data. We need to remove them as there is no way we can get the number of CustomerID.

- There are few records with $\text{UnitPrice} < 0$ and $\text{Quantity} < 0$. We need to remove them from the analysis. This could represent cancelled or returned orders.
- There is more than 90% of 'United Kingdom' customers, therefore we will restrict the data to only United Kingdom customers.

Orders in 2011



Exploratory Data Analysis

□ How many product sold every month?

Product sold in November has highest quantity that has around 13,41% product sold from all transaction along 1 year. Therefore the business team can increase sales in this month such as promoting new products to customers in this month.

□ How much customer spend their money every month ?

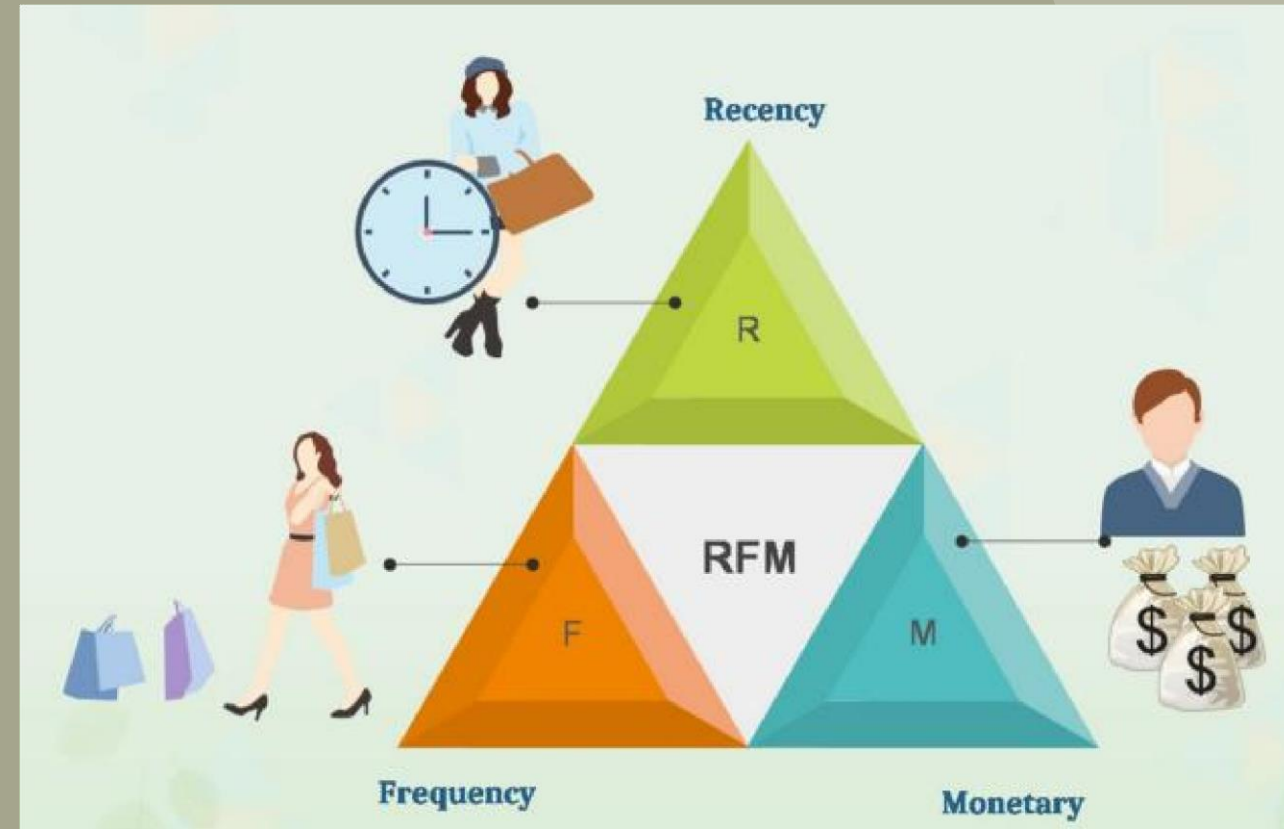


Revenue in November has highest amount that has 13,41% revenue from total revenue along 1 year. Therefore the business team can replicate the success of sales strategies in November to be implemented in other months

Modeling Data: RFM Quantiles

Recency Frequency Monetary (RFM)

RFM analysis allows you to segment customers by the frequency and value of purchases and identify those customers who spend the most money.



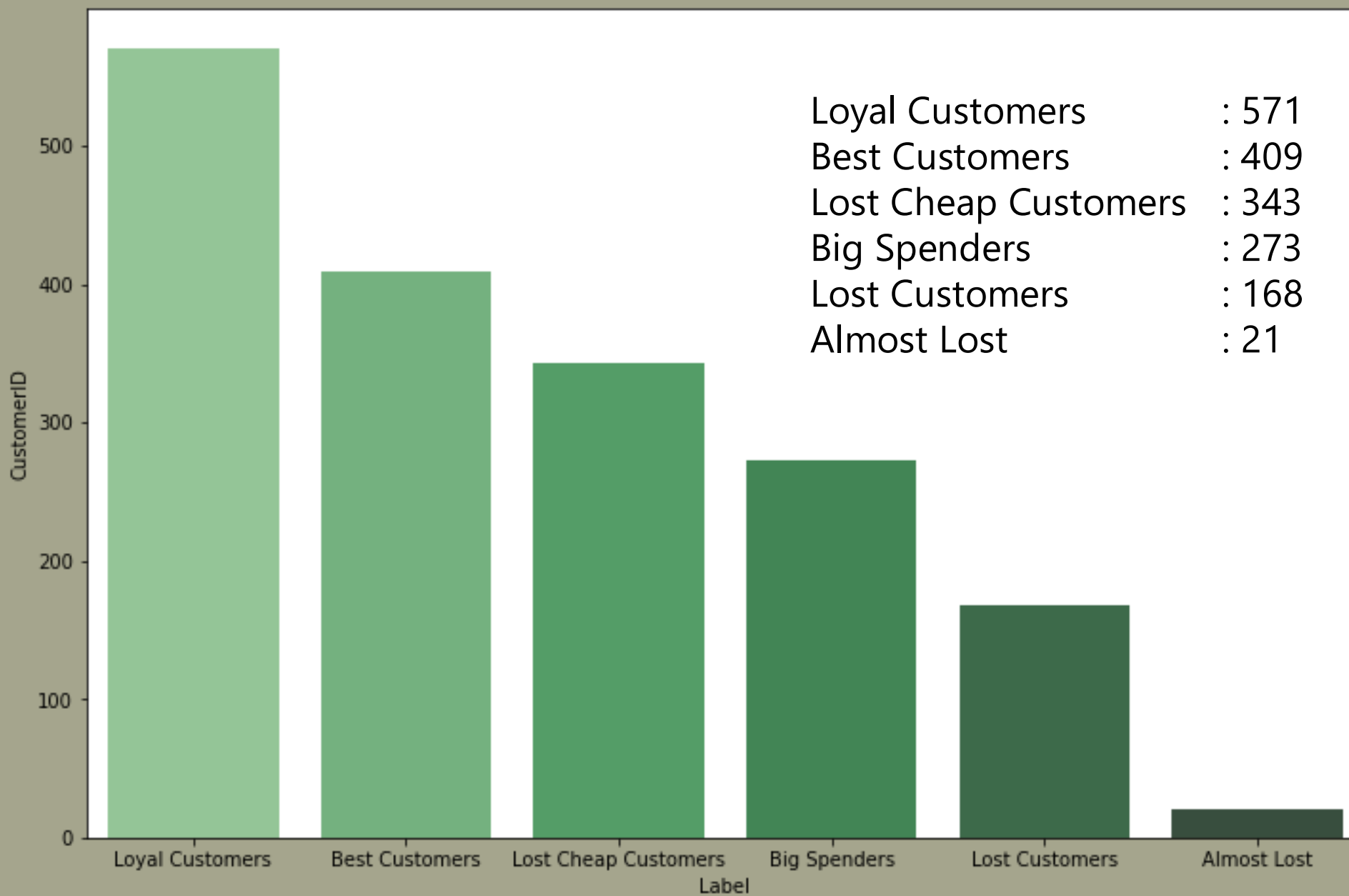
- Recency — how long it's been since a customer bought something from us.
- Frequency — how often a customer buys from us.
- Monetary value — the total value of purchases a customer has made.

Modeling Data: RFM Quantiles

- RFM Quantiles
- Split the metrics into segments using quantiles.
- We will assign a score from 1 to 4 to each Recency, Frequency and Monetary respectively.
- 1 is the highest value, and 4 is the lowest value.
- A final RFM score (Overall Value) is calculated simply by combining individual RFM score numbers.

Segment	RFM Score
Best Customers	111
Loyal Customers	F=1

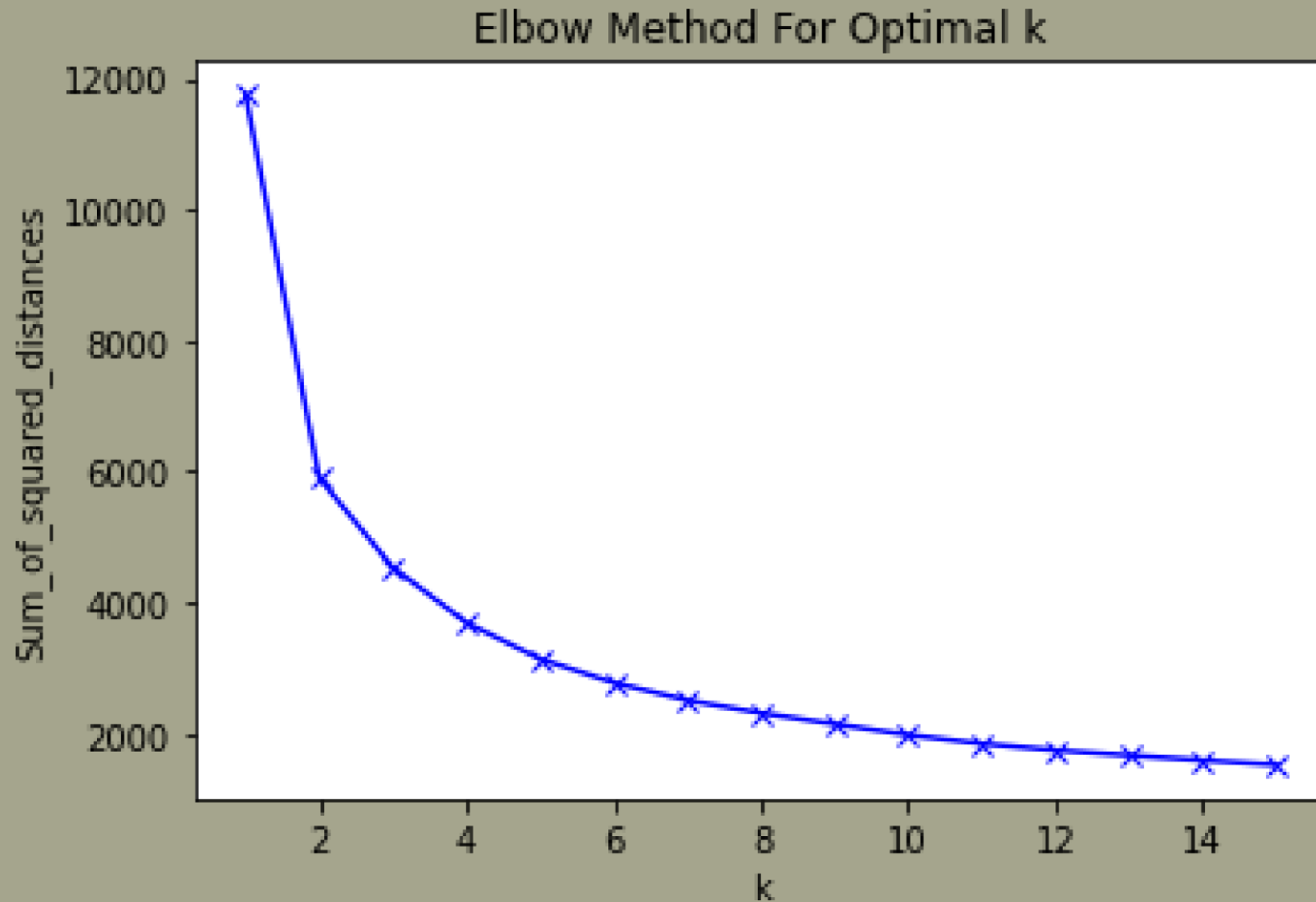
Big Spenders	M=1
Almost Lost	134
Lost Customers	344
Lost Cheap Customers	444



Modeling Data: K-Means Clustering

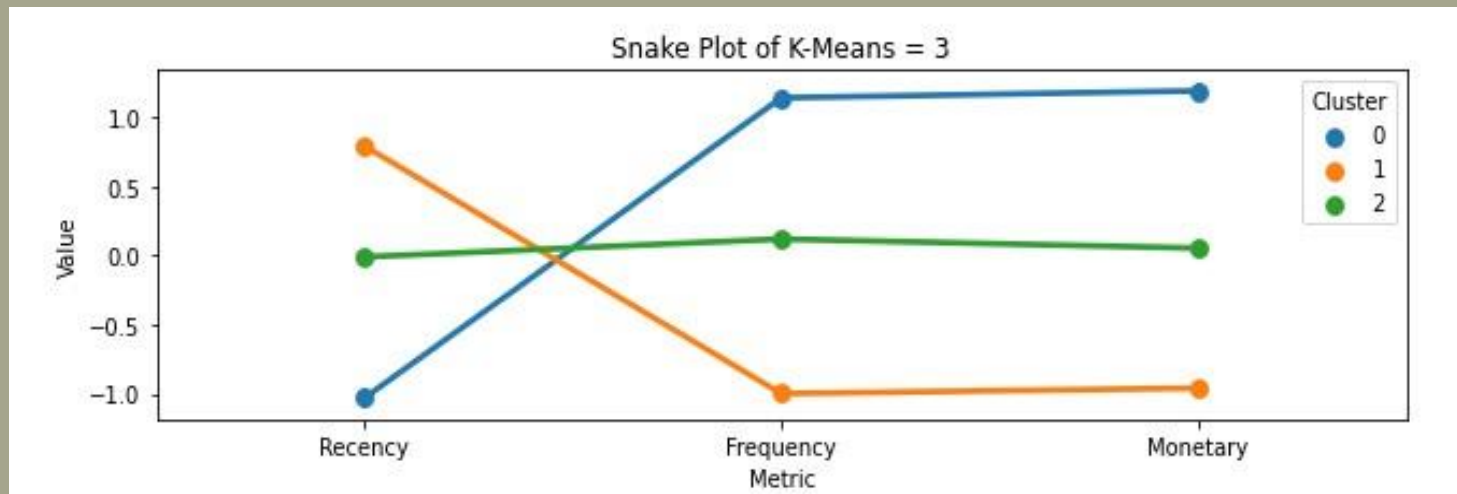
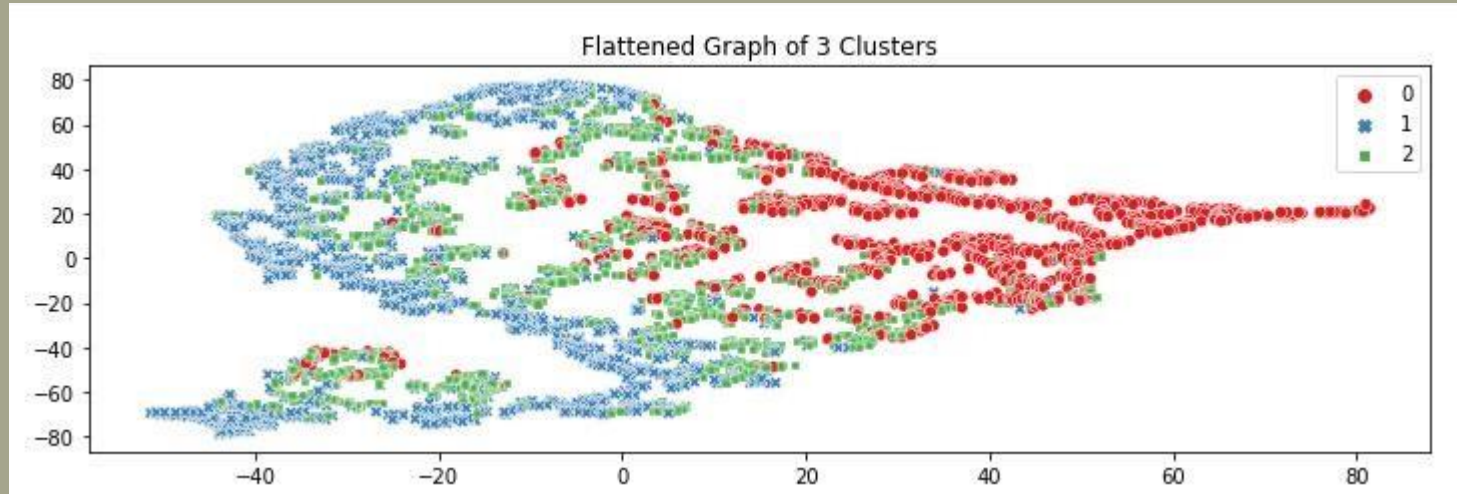
- K-Means clustering algorithm is an unsupervised machine learning algorithm that uses multiple iterations to segment the unlabeled data points into K different clusters in a way such that each data point belongs to only a single group that has similar properties.
- K-means gives the best result under the following conditions:
 - Data's distribution is not skewed
 - Data is standardised
- The data is highly skewed, therefore I will perform log transformations to reduce the skewness of each variable and I standardised the data.

Modeling Data: K-Means Clustering

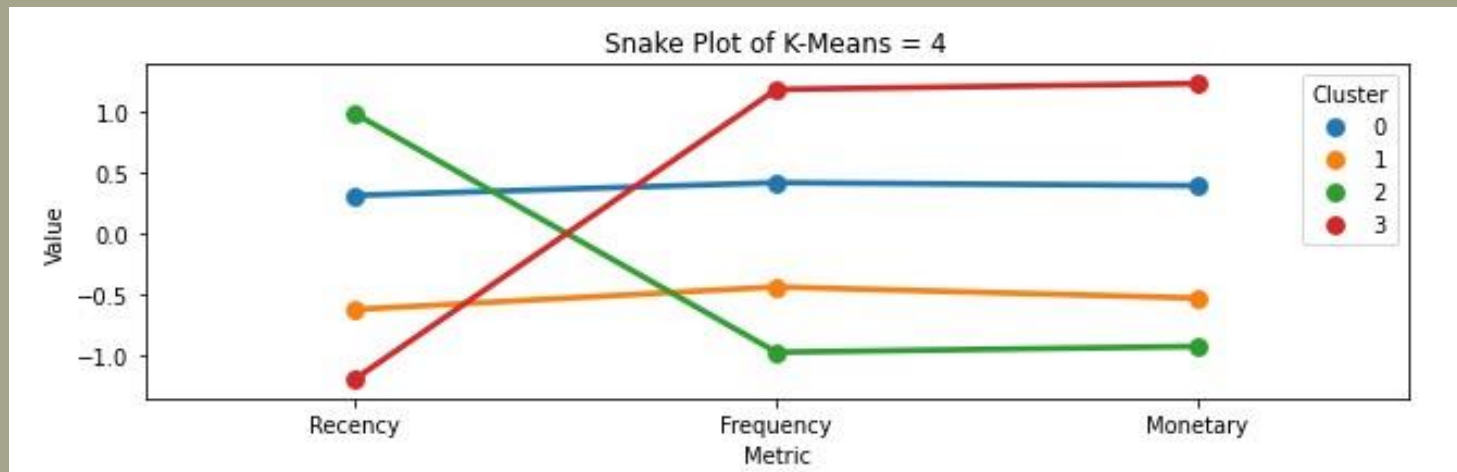
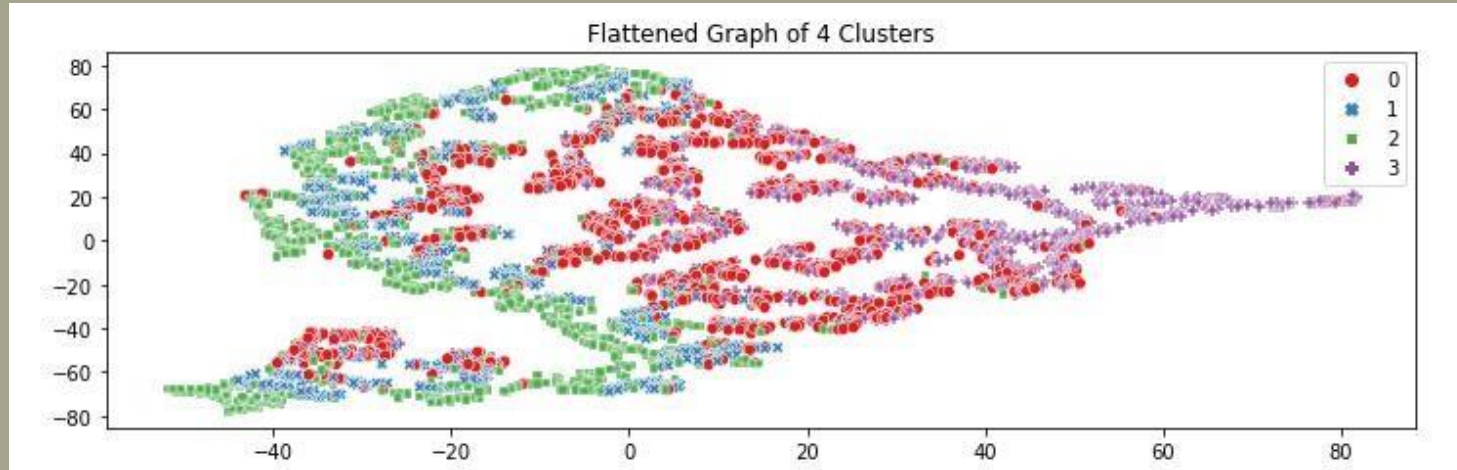


□ Finding the optimal number of clusters (Finding K) using Elbow Method.

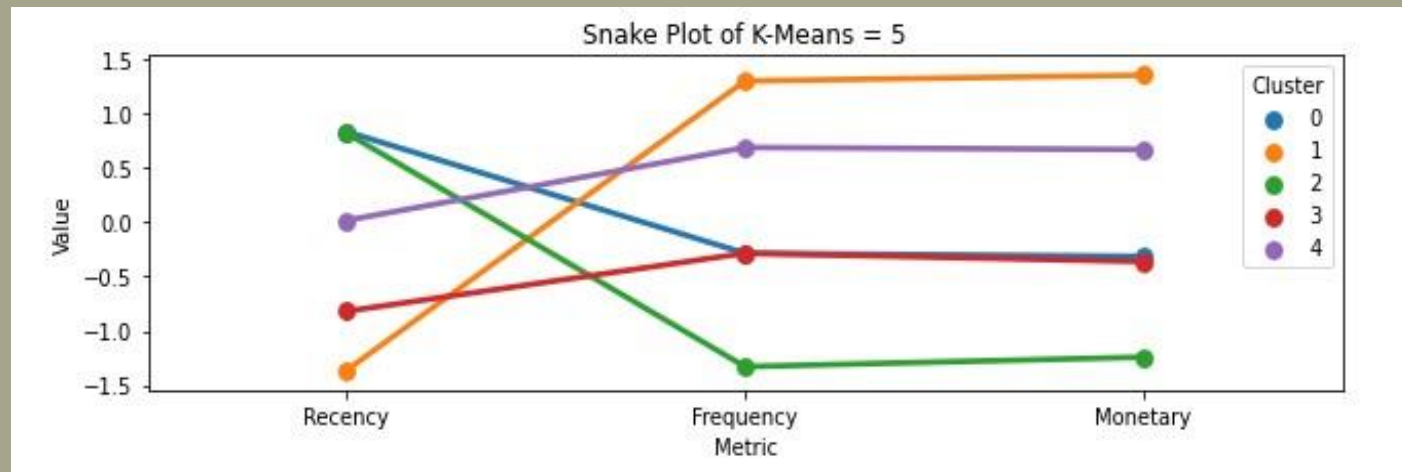
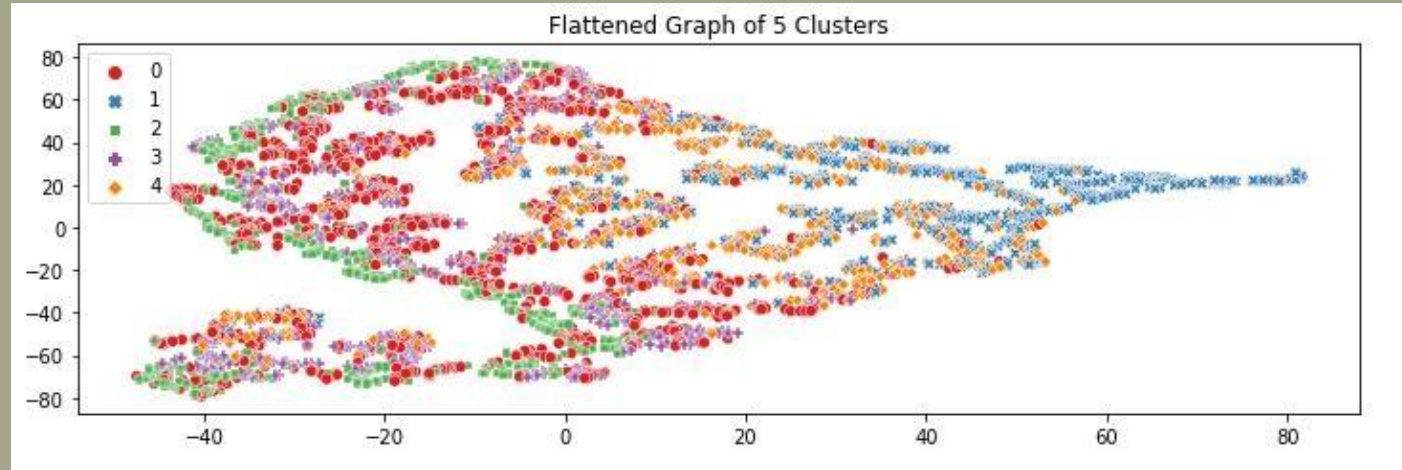
Modeling Data: K-Means Clustering



Modeling Data: K-Means Clustering



Modeling Data: K-Means Clustering



Evaluating Model: K-Means Clustering

Davies Bouldin Score is a metric for evaluating clustering algorithms.

The smaller Davies Bouldin Score is The more optimal the cluster.

K-Means Cluster	Davies Bouldin Score
3	1.119
4	1.065
5	1.067

K-Means 4 clusters has lowest Davies Bouldin Score than other cluster.

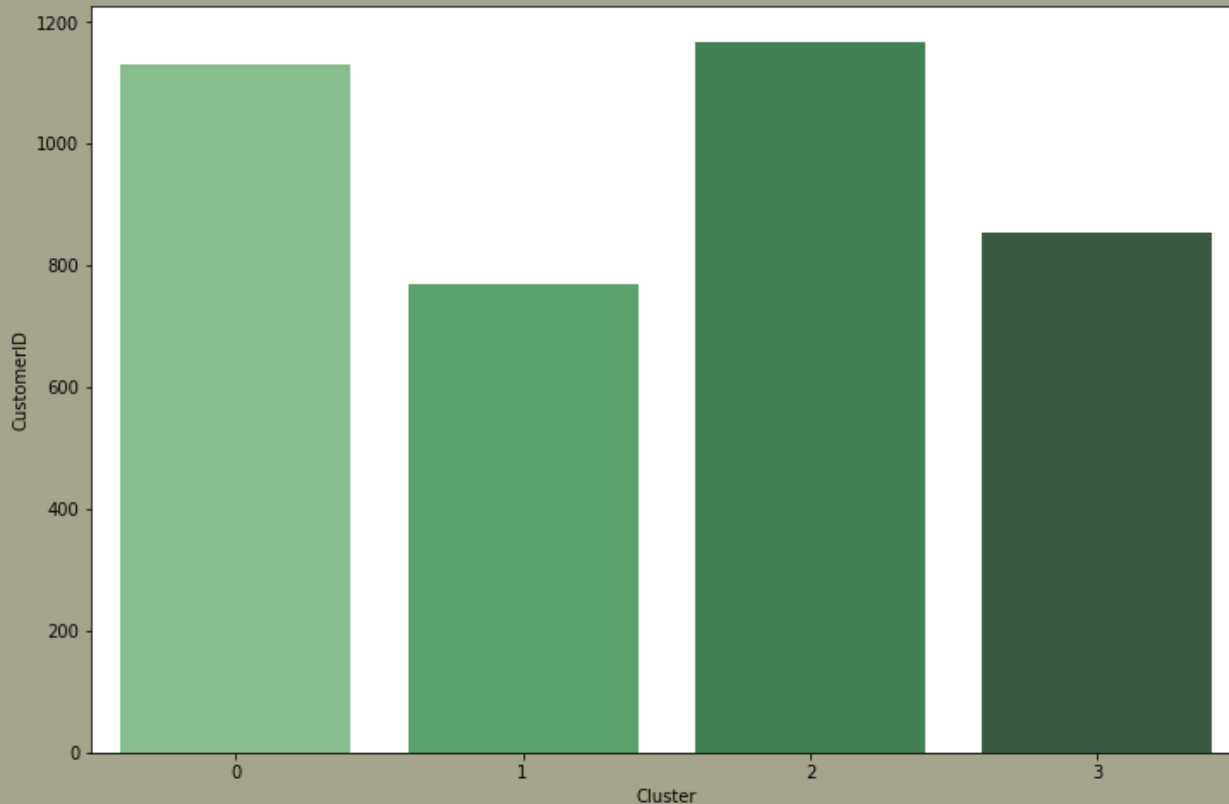
Therefore the optimum cluster is 4.

K-Means 4 Clusters

Interpretation of the clusters formed using k-means:

□ "Cluster 0" has 29% customers. It belongs to the

Haven't Loyal Customers : 29% purchased for some time, but used to purchase Almost Lost : 20% frequently (F=2) and spent a lot.
Lost Cheap Customers : 30%
Best Customers



"Loyal Customer" segment as they
: 21% □ "Cluster 1" has 20% customers. It can be interpreted as "Almost Lost". They purchase recently (R=2). However they do not purchase frequently and do not spent a lot.

□ "Cluster 2" has 30% customers. It can be interpreted as "Lost Cheap Customers". Their last purchase is long ago (R=4), purchased very few (F=4) and spent little (M=4).

□ "Cluster 3" has 21% customers. It belongs to the "Best Customers" segment which we saw earlier as

they purchase recently ($R=1$), frequent buyers ($F=1$), and spent the most ($M=1$).

Recommendation

□ Recommendation for “Best Customers” segment:

Focus on increasing customer purchases therefore it is necessary to form a cross/Up Selling Strategy.

□ Recommendation for “Loyal Customers” segment:

The business team must optimize the budget campaign and the time campaign for this customer segment in order to maintain their loyalty and increase their value.

□ Recommendation for “Almost Lost” segment:

This customer segment is very at risk for churn, so focus on activating customers and making repurchases by forming a Reactivation Strategy, Retention Strategy.

□ Recommendation for “Lost Cheap Customers” segment:

This customer segment has churned, so the focus of the campaign is to reactivate the customer by forming a Reactivation strategy.

A decorative graphic in the top right corner consisting of a cluster of small white dots and a larger, light green organic shape.

Thank You