2022

Customer Segmentation

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Customer-Segmentation

Use Case

- Use Case Summary
- Objective Statement:
    - Get business insight about how many products 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.
- Challenges:
    - Large size of data, cannot 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 products 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 products 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. https://archive.ics.uci.edu/ml/datasets/Online+Retail
- The dataset has 8 columns and 541909 rows.
- Data Dictionary:
- Invoice No: Invoice number uniquely assigned to each transaction.
- Stock Code: Product (item) code.
- Description: Product (item) name.
- Quantity: The quantities of each product (item) per transaction.
- Invoice Date: The day and time when each transaction was generated.
- Unit Price: 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

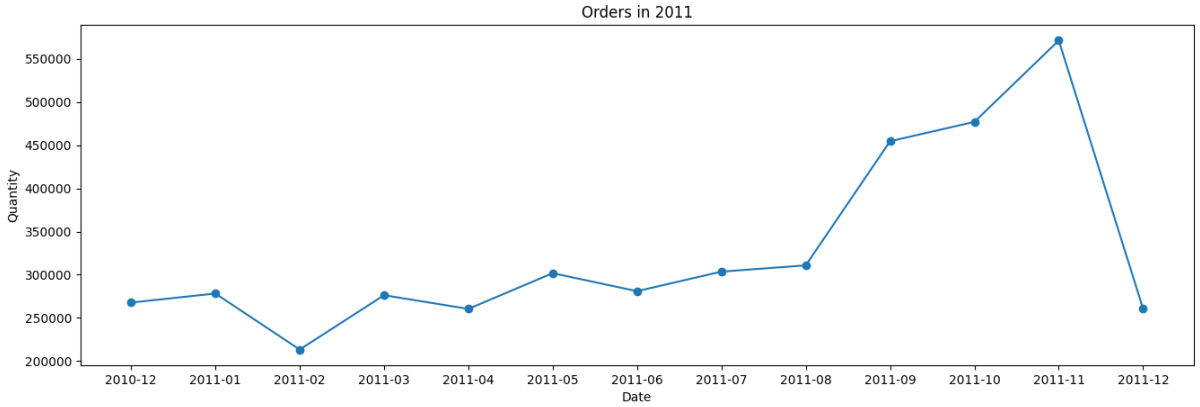
Data Cleansing

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

- There are few records with Unit Price<0 and 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.

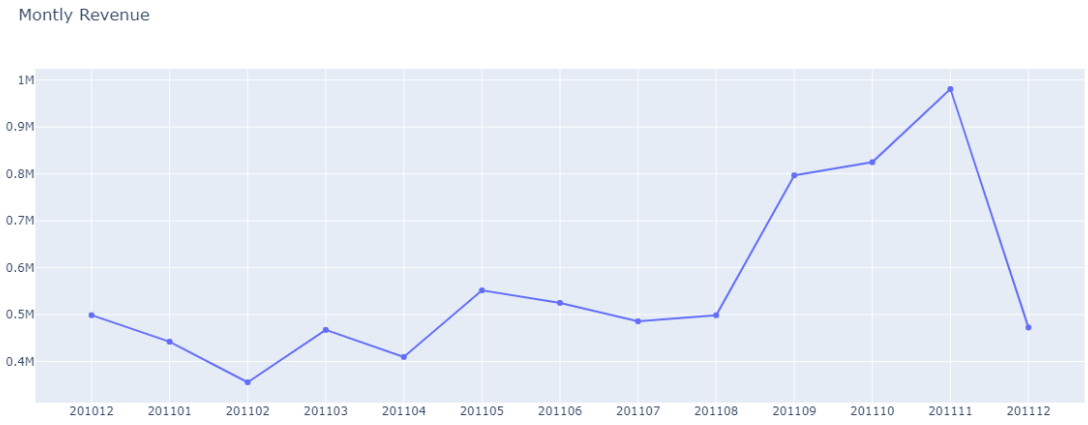
Exploratory Data Analysis

- 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

RFM Analysis

- 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

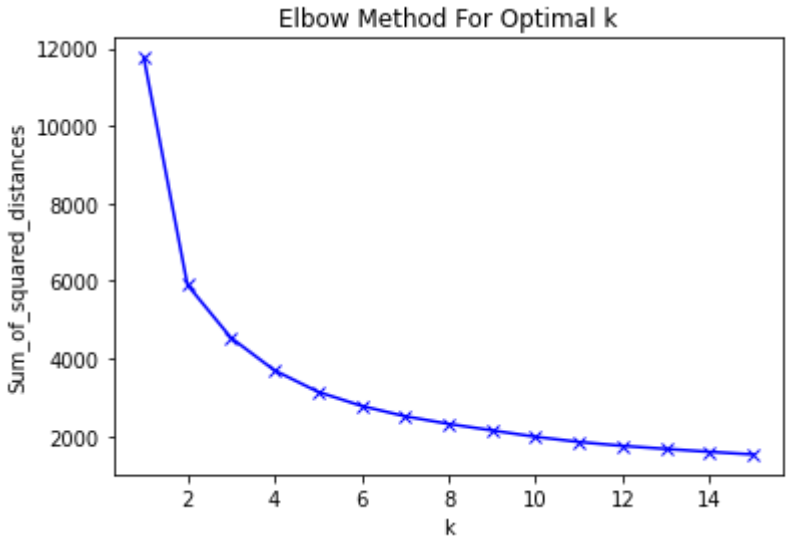
- Now we split the metrics into segments using quantiles.
- We will assign a score from 1 to 4 to each Recency, Frequency and Monetary respectively.
- 1 is the highest value, and 4 is the lowest value.
- A final RFM score (Overall Value) is calculated simply by combining individual RFM score numbers.

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 unlabelled 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.

- Finding the optimal number of clusters



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.

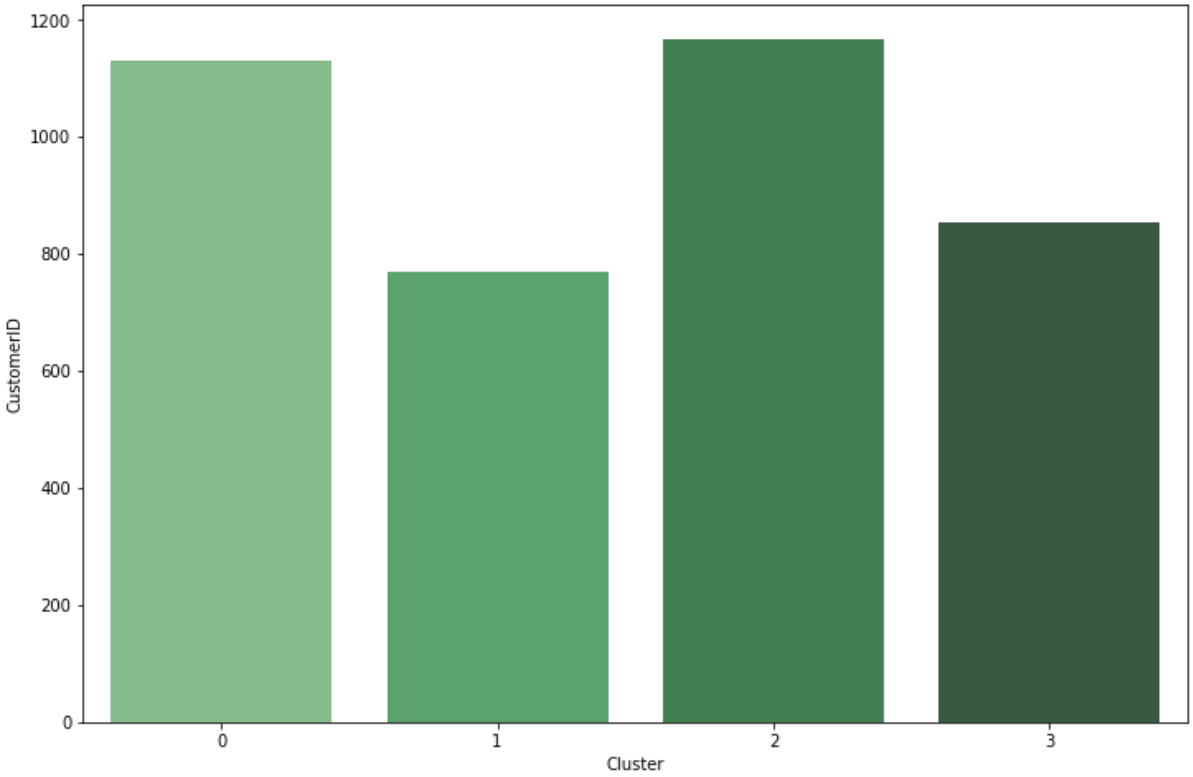
K-Means Cluster	Davies Bouldin Score
3	1.119
4	1.065
5	1.067

K-Means 4 clusters has lowest Davies Bouldin Score than other cluster. Therefore, the optimum cluster is 4.

Interpretation of the clusters formed using K-Means

- "Cluster 0" has 29% customers. It belongs to the “Loyal Customer" segment as they Haven’t purchased for some time, but used to purchase frequently (F=2) and spent a lot.
- "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 spend 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.