Customer Segmentation

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Contents

- Business Problem Overview

- Data Overview

- Exploratory Data Analysis (EDA)

- K-Means Clustering

- Hierarchical Clustering

- Cluster Profiling

- Business Insights and Recommendations

Business Problem Overview and Solution Approach

- AllLife Bank wants to focus on its credit card customer base in the next financial year. They have been advised by their marketing research team, that the penetration in the market can be improved.

- We will identify different segments in the existing customer, based on their spending patterns as well as past interaction with the bank, using clustering algorithms, and provide recommendations to the bank on how to better market to and service these customers.

- Focusing on current customers may increase the number of products that they will hold with the bank. In addition, by improving the service delivery model, the current customers may be inclined to refer others to the bank. An incentive may speed this up as well. This will increase the banks bottom line with the additional income from credit card services and interest on other products.

Data Overview

- The data includes information about 660 customers.

- The information includes Average Credit Limit, Total Credit Cards, Total Visits to the Bank, Total Visits Online and Total Calls Made.

- We dropped the Customer Key and Primary key of the records as they did not offer any insight into the data.
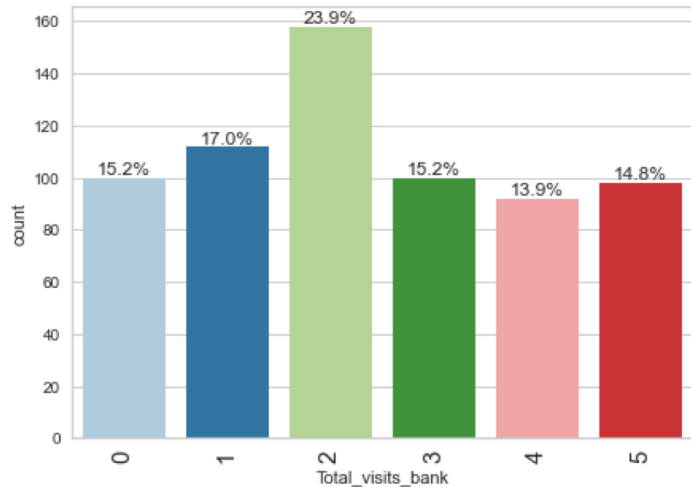
Exploratory Data Analysis
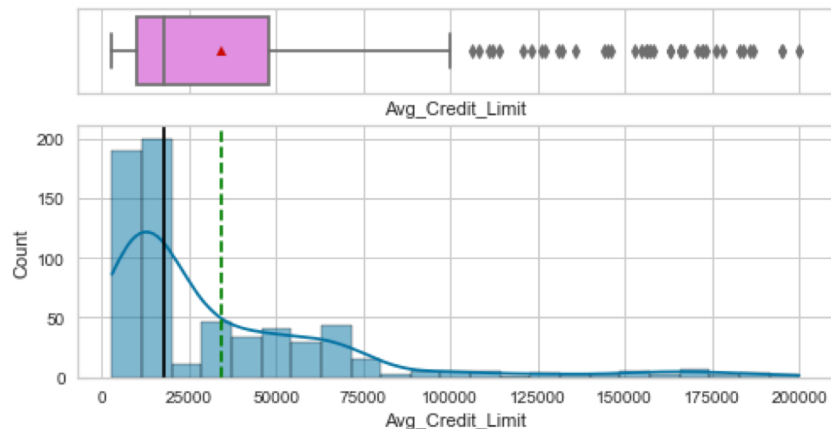
The average Credit Limit is skewed to the right. There are some outliers but they are valid amounts.

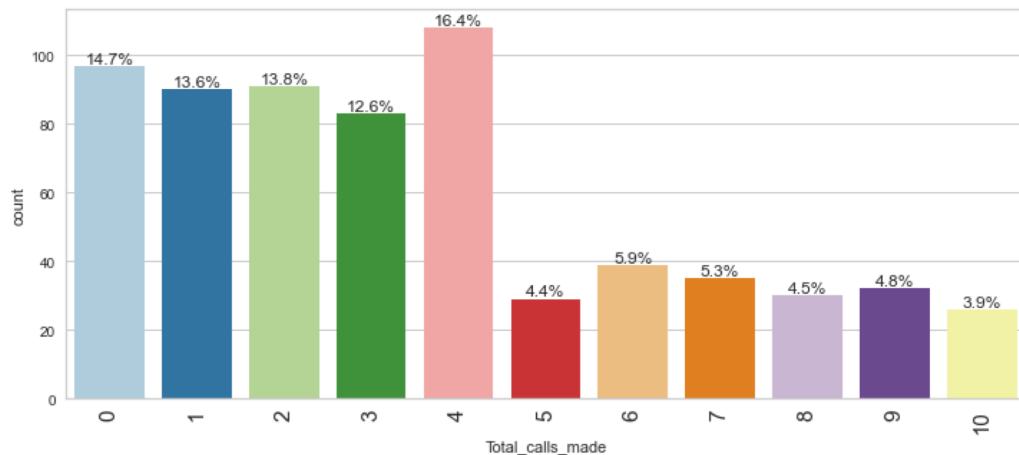22.9% of customers have 4 credit cards followed by 17.7% who have 6 cards.
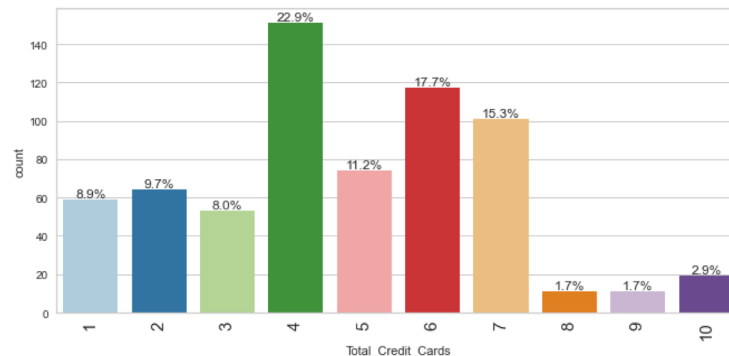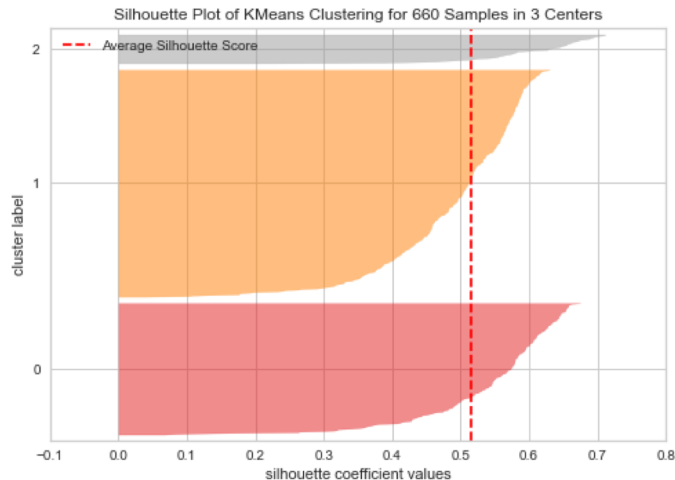
Exploratory Data Analysis

71.1% of customers make 4 or less calls to the bank per year.

56.1% of the customers visit the bank 2 or less times per year.

K-Means Clustering

Silhouette Plot of KMeans Clustering for 660 Samples in 3 Centers

Three was the optimal number of clusters to properly segment the customers of AllLife Bank.

K_means_segments	Avg_Credit_Limit	Total_Credit_Cards	Total_visits_bank	Total_visits_online	Total_calls_made	count_in_each_segment
0	12174.107143	2.410714	0.933036	3.553571	6.870536	224
1	33782.383420	5.515544	3.489637	0.981865	2.000000	386
2	141040.000000	8.740000	0.600000	10.900000	1.080000	50

Hierarchical Clustering

	Linkage	Cophenetic Coefficient
0	single	0.739122
1	complete	0.859973
2	average	0.897708
3	centroid	0.893939
4	ward	0.741516
5	weighted	0.886175
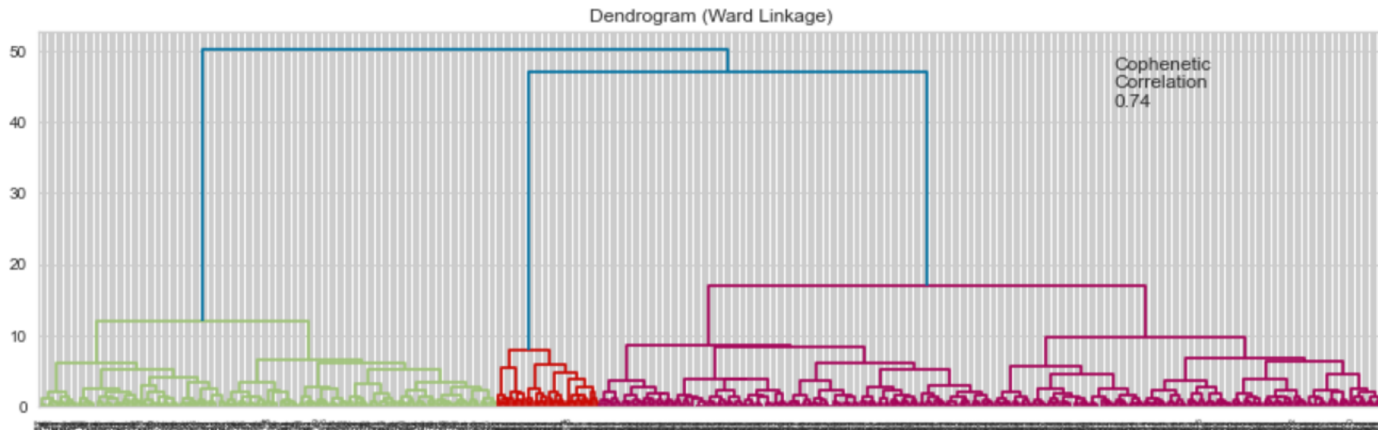
Dendrogram (Ward Linkage)

Cophenetic Correlation 0.74

| HC_Clusters	Avg_Credit_Limit	Total_Credit_Cards	Total_visits_bank	Total_visits_online	Total_calls_made	K_means_segments	count_in_each_segments
0	33713.178295	5.511628	3.485788	0.984496	2.005168	1.981912	387
1	141040.000000	8.740000	0.600000	10.900000	1.080000	0.000000	50
2	12197.309417	2.403587	0.928251	3.560538	6.883408	1.991031	223

We can see distinct clusters in the ward linkage.

Cluster Profiling

Boxplot of numerical variables for each cluster
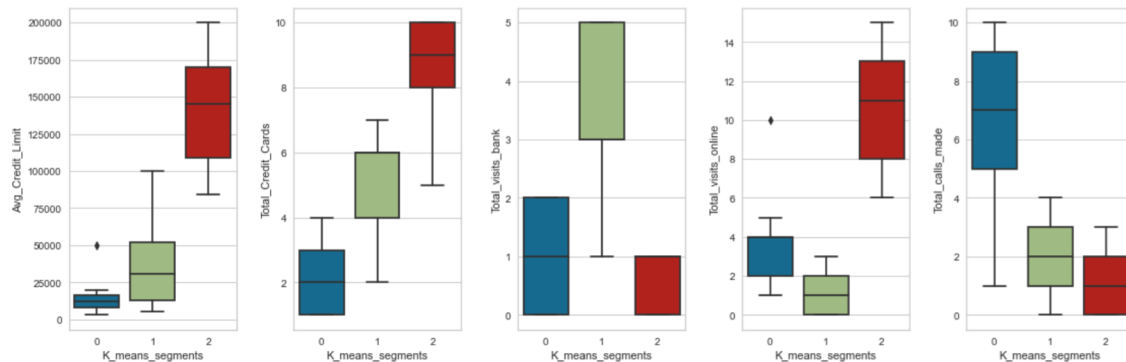
Boxplot of scaled numerical variables for each cluster
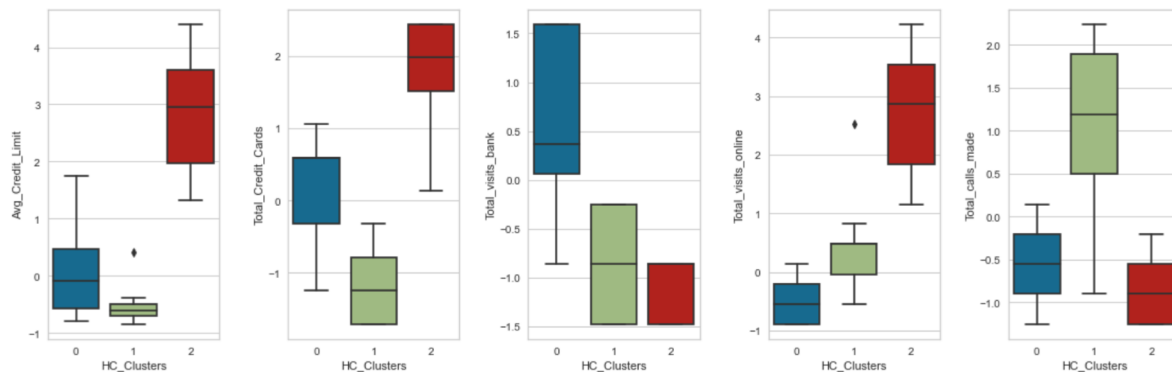
- Both methods provided similar information although the clusters were in different order.
- The red boxes in both plots are the same which further supports the likeness of both the K-Means and Hierarchical clustering methods.

Cluster Profiling

FINAL CLUSTER SEGMENTATION

Cluster 0

- The average credit limit is $33,713.
- The average total credit cards is 5.5.
- The average visits to the bank is 3.5.
- The average customer has 1 online visit.
- The customers made on average 2 calls.

Cluster 1

- The average credit limit is $12,197.
- The customers have an average of 2.4 credit cards.
- The customers make about 0.9 visit to the bank per year.
- The average online visits is 3.6.
- The average calls to the bank is 6.9.

Cluster 2

- The average credit limit is about $141,040.
- The customers have an average of 8.7 credit cards.
- The customers make an average of 0.6 visits to the bank.
- The average visits online is 10.9.
- The average calls made to the bank is 1.

Business Insights and Recommendations

- Market new exclusive credit cards to Cluster 0 customers. Give them an incentive to come into the bank to receive a gift with opening the credit card in person. Cross sell other banking products such as home equity loans, car loans, etc.

- Preemptively review the accounts of Cluster 1 customers. Look for any discrepancies and opportunities to call them before they call the bank. In addition, send marketing to show them how to get questions answered online or via an app.

- Cluster 0 is our biggest group or average customer. They should be sent marketing to boost the online presence, by downloading the bank app and letting them know what features the online banking hold. In addition, they could need other services such as mortgages, home equity loans, and parent loans for college aged children.