

Customer Analytics

- Our data is from a B2C, FMCG client: a physical Super Market, has 2,000 rows (customers)
- Data is collected from the loyalty card
- The first part of project is Customer Analytics: Segmentation
- The second part is Predictive / Purchase analytics: Positioning

What steps we will follow

Customer Analytics

1. To understand STP, 4 Ps of marketing: Marketing Mix
2. Segmentation + PCA (Cluster analysis & dimensionality reduction)
3. Descriptive stats (EDA) by Brand and Segments + their visualization + Heatmaps

Predictive - Purchase analytics

4. Elasticity modelling:
 - Price Elasticity of purchase probability
 - Price elasticity of brand choice probability (Own & Cross):
Own: Change in brand choice probability due to 1% change price changes in own price
Cross: Change in brand choice probability of brand 1 due to 1% change price change in brand 2

STP framework

1. Applies to all areas of business and marketing areas
2. We will work with a B2C, FMCG company [SUPER – MARKET]
3. STP is used to understand your customers.
 - **Segmentation:** Dividing a population into groups having similar characteristics. These characteristics are behavioural (purchase frequency, quantity) demographic & geographical data of our consumer dataset these groups have comparable purchase behaviour, respond similar to marketing activities.
 - **Targeting:** Evaluating potential profits from segments & deciding which segments to focus on. This involves **advertising, therefore not much covered in this project.**
 - **Positioning:** What products would the product need. It involves implementing the results of (targeting that you did before). Also involves how products should be presented to customers & through what channels. This has framework of its own called **Marketing Mix.**

Complete steps of customer analytics

1. **Feature Scaling:** Our original data was pre-processed, but statistical pre-processing of Feature Scaling data will be required before using K-means or PCA. Reason:
 - Income is in thousands but age in tens so comparing age with income will result in improper results due to difference in magnitude, hence here comes the need to scale the data/features.
 - Standardization will be used for feature scaling the variables. It is an important step of Data pre-processing. It controls the variability of the dataset; it converts data into specific range using a linear transformation which generate good quality clusters and improve the accuracy of clustering algorithms
 - If in any algorithm **EUCLIDIAN DISTANCE** is calculated between variables, we will apply feature scaling techniques (normalisation/ standardisation)
 - Best video on standardisation
<https://www.youtube.com/watch?v=2mcEMRGW1eY&list=PLAoF4o7zqskR7U98D799FKHkZ4YrHKPqs&index=25>
2. After all the wcss and kmeans use group by function to finally find the 4 segments your customers are in 0: well-off, 1: fewer-opportunities, 2: standard, 3: career focused. Finding the segments was main goal of group by.
3. Dimensionality reduction using PCA, chose top 3 PCs as their variance capture is high.
4. After PCA we get there 3 major components that our data has we plot heat map PCs and variables and observe that:
 - i. **PC1 = Career:** Age, Education, Income, Occupation, settlement size, these variables have high correlation with PC1, therefore we can give it a name career, it shows career focus of a person.
 - ii. **PC 2 = Education-Lifestyle:** Gender, marital status, education have high correlation with PC2 therefore PC2 is called Edu-life
 - iii. **PC 3 = Experience:** Age has high correlation with PC3 therefore PC3 is experience.
5. Apply kmeans on the data but this time instead of applying it standardised data (which had 7 variables) apply on the 3 principal components **scores_pca**
6. PCA V/S without PCA K-Means Clustering difference?
 - Observe the following in the 2 pictures:
 - We see that the number of people in different clusters are different in the 2 pics.
 - By applying K-means on PCA data, there was a better clustering that is also represented in the graphs below

K-Means application on original Data:

BEFORE PCA - No. of customers in the cluster

Labels	
career focused	570
fewer opportunities	462
standard	705
well-off	263

K-Means on the data after applying PCA on it:

AFTER PCA - No. of customers in the cluster

Legend	
career focused	583
fewer opportunities	460
standard	692
well-off	265

Diagrams showing clustering output:

Diagram 1: K-Means on original data

Diagram 2: K-Means on PCA Data

