

1. Detailed introduction of the project:

Customer Segmentation is also known as **Market Basket Analysis**. Customer Segmentation can be a powerful means to identify unsatisfied customer needs. This technique can be used by companies to outperform the competition by developing uniquely appealing products and services.

Customer segmentation is the action of breaking the customer base into groups depending on demographic, psychographic, etc. Using customer segmentation in marketing means that we can target the right people with the right messaging about our products. This will increase the success of our marketing campaigns.

➤ Why Customer Segmentation? :

The owner of mall/shopping complex wants to understand the customers like who can be easily converge [Target Customers] so that the sense can be given to marketing team and plan the strategy accordingly.

In supermarket malls through membership cards, we can have some basic data about our customers like customer-id, age, gender, annual income and spending score.

Spending Score is something we can assign to the customer based on our defined parameters like customer behaviour and purchasing data.

➤ Advantages of Customer Segmentation:

Customer segmentation is great for many different types of businesses who are looking to get smart about how they do marketing and sales activities. Some of these benefits include:

1. **Ability to Personalize Communication:** Personalizing marketing communication for customers leads to a better relationship between the customer and the business. This can greatly improve customer loyalty. Acknowledging the customer as more than another member of the email database can go a long way for the brand equity.
2. **Upselling / Cross-selling Opportunities:** Knowing the customer's buying behavior or income level can help identify customer segments who can buy further products. Alternatively providing special offers to those who have just bought from us can increase sales of related products also.
3. **Higher ROI and CRO:** Sending out targeted campaigns to customers gets better ROI as they have already shown interest in buying from us. When we send out generic campaigns customers are less likely to engage with the content. This is because it is not relevant to them, or not of interest to them. Taking the time to segment the customers will greatly improve the CRO.
4. Determine appropriate product pricing.
5. Develop customized marketing campaigns.
6. Design an optimal distribution strategy.
7. Choose specific product features for deployment.
8. Prioritize new product development efforts.



By using this solution we would be able to target the customers with whom we can start marketing strategy [easy to converse].



Segmenting allows to more precisely reach a customer or prospect based on their specific needs and wants. **Customer Segmentation** will allow to: Better identify the most valuable customer segments. Improve the return on marketing investment by only targeting those likely to be the best customers.

2. Dataset Preparation:

Some basic data about customers like customer-id, age, gender, annual income and spending score can easily be captured through membership card and the information they provide in the visit feedback. These data are very critical to work for Customer Segmentation as once having an accurate model it is very helpful to take confidence of the unsatisfied customers.

CustomerID	Gender	Age	Annual Income (...)	Spending Score ...
Unique ID assigned to the customer	Gender of the customer	Age of the customer	Annual Income of the customer	Score assigned by the mall based on customer behavior and spending nature

Legend
Integer
A String
Id

➤ Data column description:

There are 5 columns that are considered important to Customer Segmentation:

S. No.	Columns	Data type	Description
1.	Customer-id	ID (Integer)	Unique ID assigned to the customers
2.	Gender	String	Gender of the customer
3.	Age	Integer	Age of the customer
4.	Annual Income	Integer	Annual Income of the customer
5.	Spending Score	Integer	Score assigned by the mall based on customer behavior and spending nature

3. Propose a machine learning model:

Unsupervised Machine Learning for Customer Segmentation: we will train unsupervised machine learning algorithms to perform customer market segmentation. Market segmentation is crucial for marketers since it enables them to launch targeted ad marketing campaigns that are tailored to customer's specific needs.

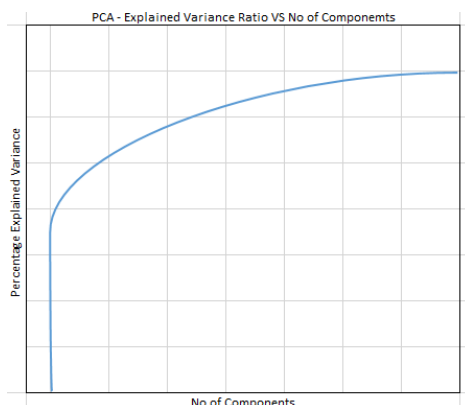
➤ Customer Segmentation using Unsupervised Machine Learning:

For cluster segmentation, there are two steps to be performed.

1. Dimensionality Reduction
2. Clustering

○ Dimensionality Reduction:

Out of 50+ feature we are using most 5 important features for it, i.e. some features might be the same for all the people.



Principal Component Analysis (PCA) has been performed to analyse the explained variance of the PCA components. PCA applies a linear transformation on the data to form a new coordinate system such that the components in the new coordinate system represent the variation in the data.

○ Clustering:

After the dimensionality reduction, the next step is to divide the general population and customer population into different segments. **K-Means clustering algorithm** has been chosen for this task. Since it is simple and is apt for this task since it measures the distance between two observations to assign a cluster. This algorithm will help us in separating the general population with the help of the reduced features into a specified number of clusters and use this cluster information to understand the similarities in the general population and customer data.

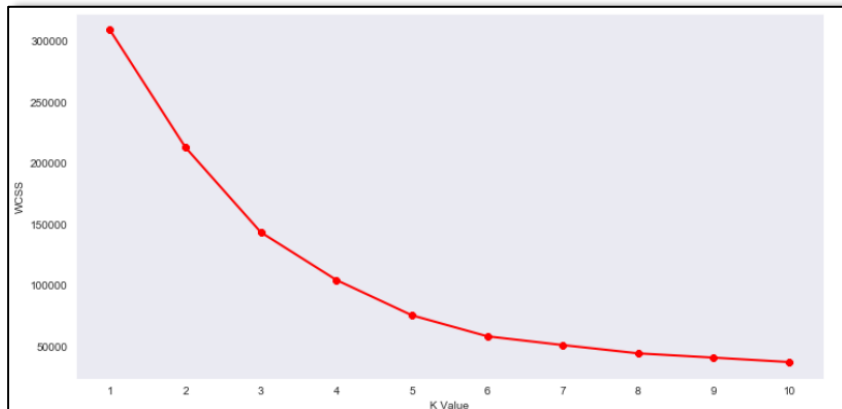
The number of clusters is a hyperparameter when working with clustering algorithms. The basic idea behind the clustering algorithms is to select the number of clusters to minimize the intra-cluster variation. Which means the points in one cluster are as close as possible to each other.

4. Preliminary results:

The general population and customer population have been compared and segmented using an **Unsupervised learning algorithm**. We were able to determine which clusters have more customers and which potential clusters to have probable customers are.

By using this model we can target the customers with whom we can start marketing strategy [easy to converse].

This segmentation enables marketers to create targeted marketing messages for a specific group of customers which increases the chances of the person buying a product. It allows them to create and use specific communication channels to communicate with different segments to attract them.



3D plot to visualize the spending score of the customers with their annual income.

