Customer Segmentation using Data Science

Customer Segmentation:

It is the process of grouping customers according to how and why they are buy products.

Problem Definition:

The problem is to implement data science techniques to segment customers based on their behavior, preferences, and demographic attributes. The goal is to enable businesses to personalize marketing strategies and enhance customer satisfaction. This project involves data collection, data preprocessing, feature engineering, clustering algorithms, visualization, and interpretation of results.

Main Objectives:

- The main goal for the customer segmentation using data science is to divide the customer base into distinct groups based on similar characteristics.
- This segment will helpful for many Business purpose.

Project Phases:

1. Data Collection
2. Data Preprocessing
3. Feature Engineering

4. Visualization
5. Interpretation of Results

Phase 1: Data Collection

- The main goal for the data collection phase is gathering the necessary data sources for customer segmentation.
- Collecting the customer transaction data are should be include here.
- This phase also collecting the data about the behavior of the customer.
- Huge volumes of data are needed for analysis.
- Example : Considering our given Mall dataset, we have collect the each customer's annual income for predicting the spending time.

Phase 2: Data Preprocessing

- After collecting the data that should be well prepared and clean for analysis.
- Handling the missing values, outliers, and data inconsistencies are should be including here.
- It transform the data through scaling, encoding categorical variables, and feature engineering.
- It integrate the data from different sources.
- Data cleaning, Data integration, Data transformation and Dimension reduction are the important factors in Data Preprocessing.

- Example: Considering Mall dataset we have to find out if any outliers or any missing values. The perfect data will output a perfect result.
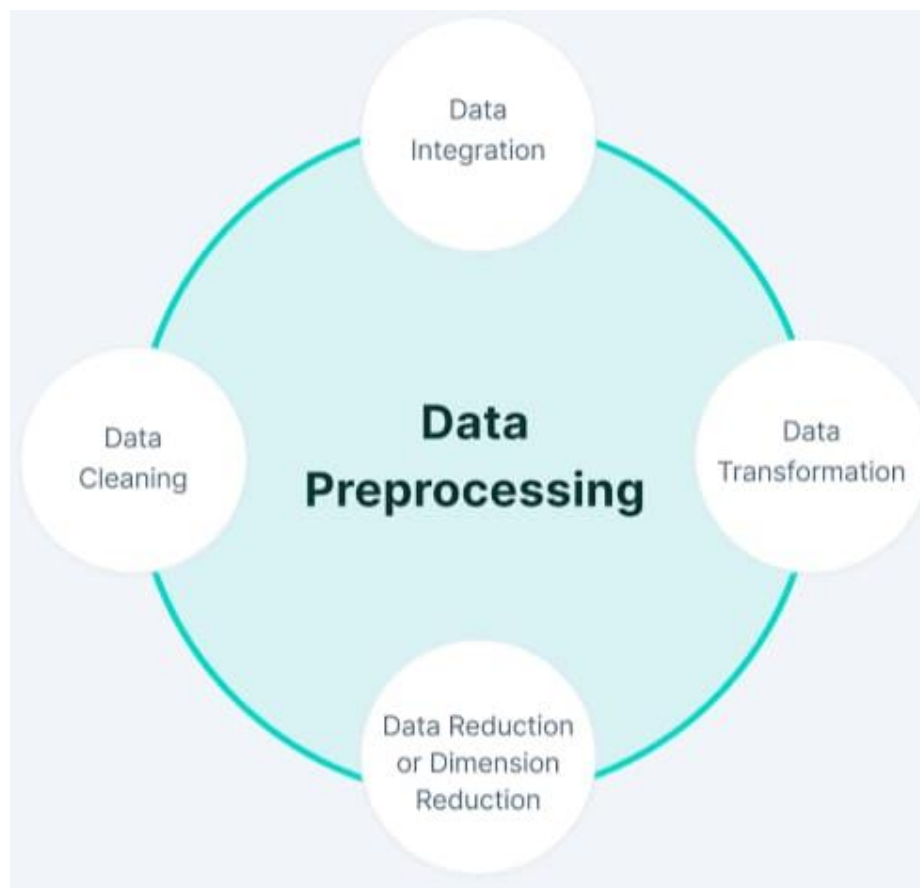
Phase 3: Feature Engineering

- The main objective of the feature engineering stage is to create the relevant features that capture customer behavior and preferences.

- It also generate new features based on customer interactions and demographics.
- It reduce the dimensionality in case of the necessary situation.
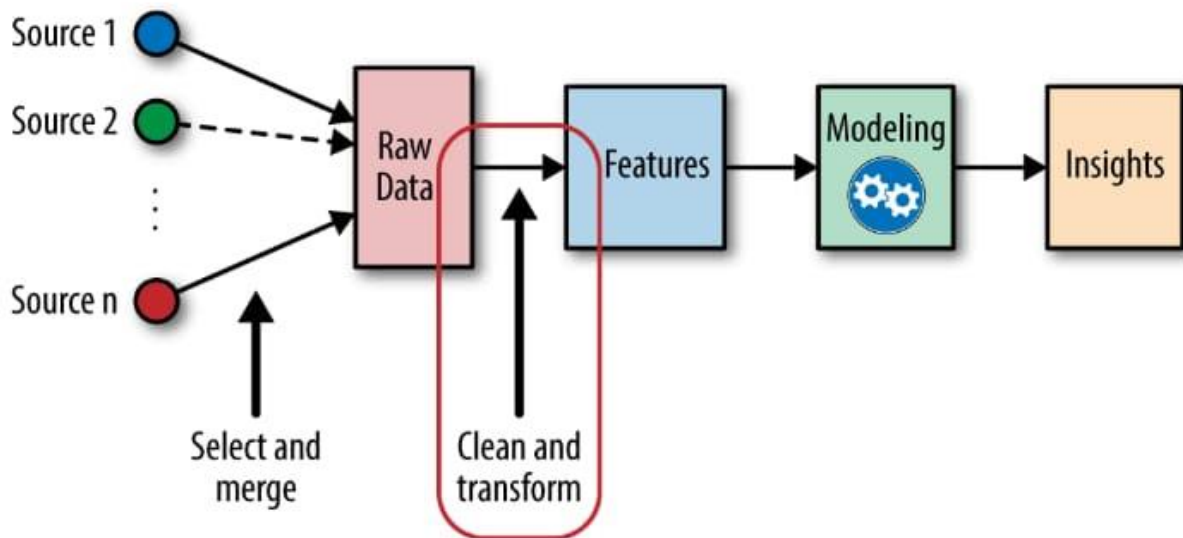
Phase 4: Visualization

- Visualization is one of the key concept in data science which can be used for give the pictorial or virtual representation about the data.
- Several plots are used for visualize the customer segments.
- Plots example:
    1. Bar Chart
    2. Scatter Plot
    3. Pie Plot
    4. Line Plot
    5. Histogram

- In python, Matplotlib library used for the visualization.
- Using these charts we can clearly virtualize our Mall Dataset especially Bar chart is used in popularly for virtualize the dataset.
- Syntax,

    " Import matplotlib.pyplot as plt "

Produce sales
IN THOUSANDS (USD)
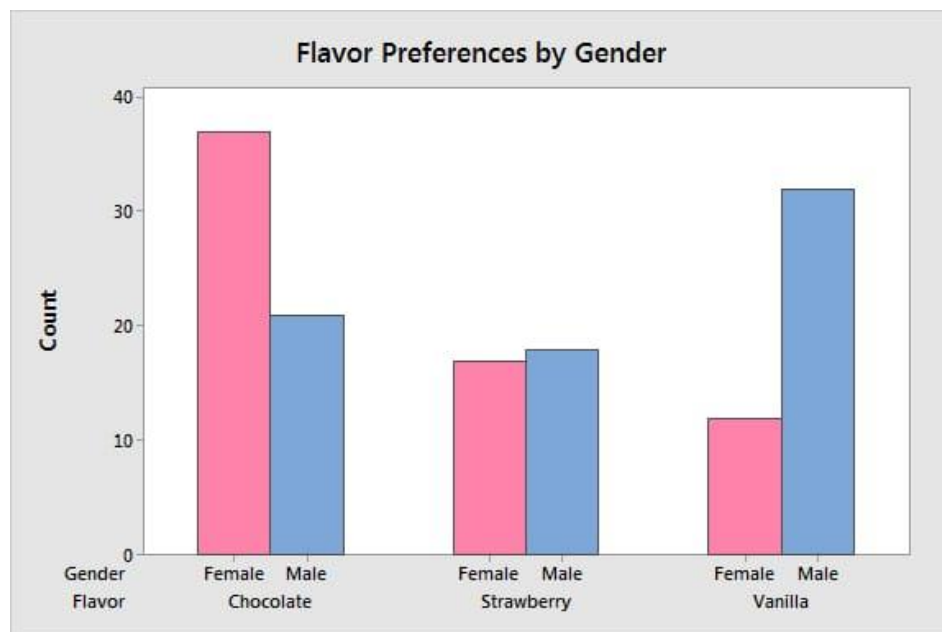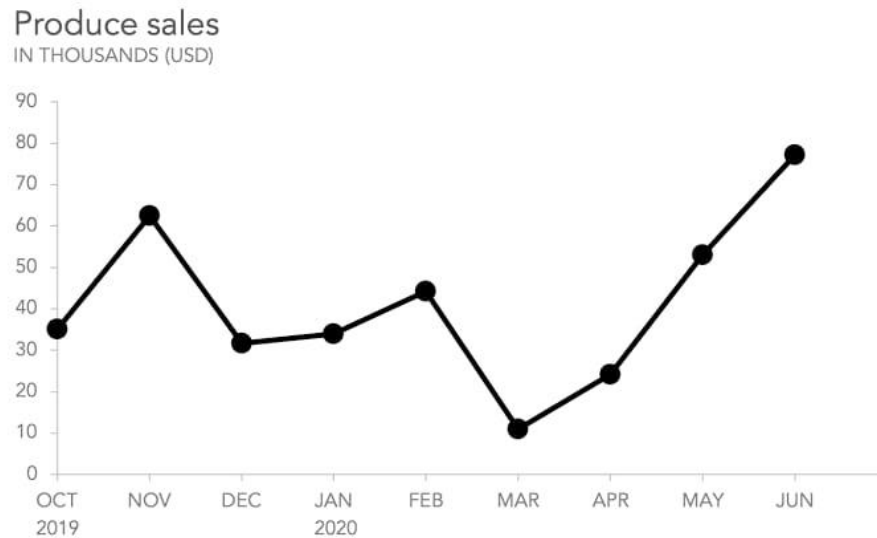
Phase 5: Interpretation of Results

- The goal of this phase is to interpret customer segments and derive actionable insights.
- It identifies the distinguishing characteristics for each segment.
- Profile each customer segment regarding behavior, preferences, and demographics.
- It also formulates the personalized marketing strategies for each segment.

According to given Dataset:

Mall Customers Dataset

Considering the mall Customers dataset we can analysis the customer's spending time.

Given data,

1. Customer_Id
2. Age
3. Annual Income
4. Spending Score

- If the customer's annual income will increases then they are spending more time comparing to before.
- Considering our dataset, female having a majority for spending more time in a mall.

Customer segmentation for shopping mall customers
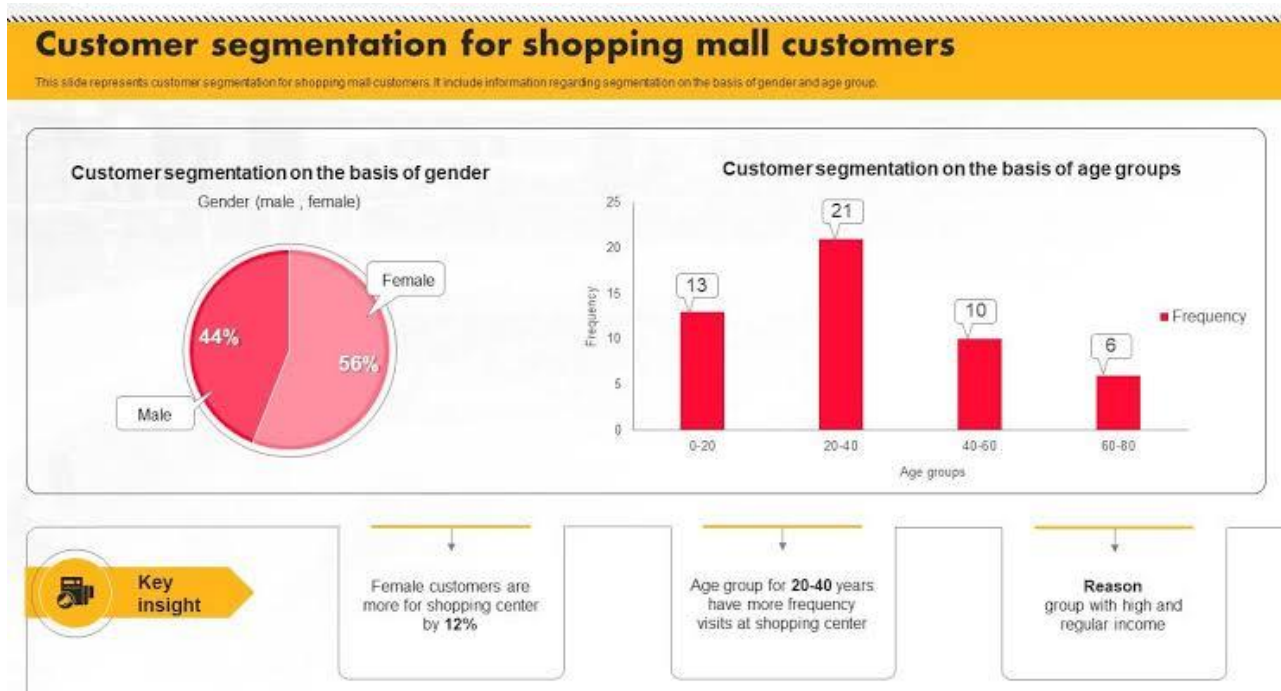
Bar Graph Showing of Business Income and Expenditure

This graph/chart is linked to excel, and changes automatically based on data. Just left click on it and select "Edit Data".

Company Name: ABC Company   Units In USD

Total Revenue   Total Expenses
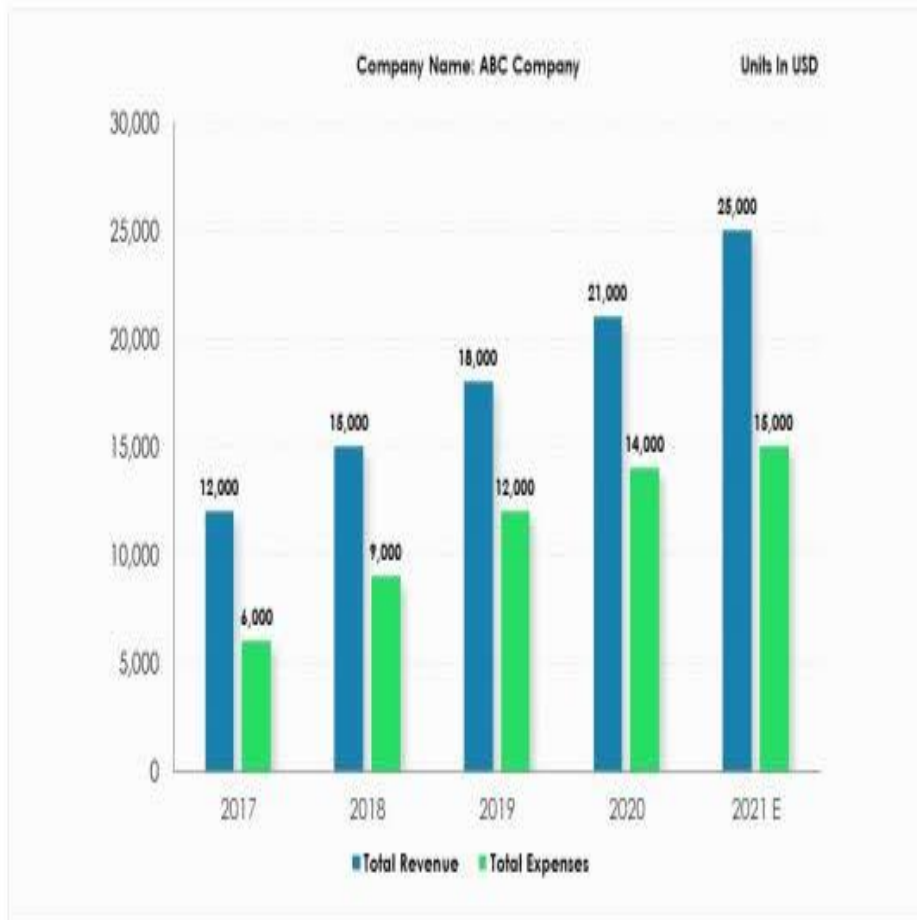
Conclusion:

This project aims to the data science techniques to enhance customer satisfaction and business revenue through customer segmentation and personalized marketing. By systematically following the outlined phases and goals, we can achieving the deeper understanding of customer behavior and preferences, resulting in more effective marketing strategies.