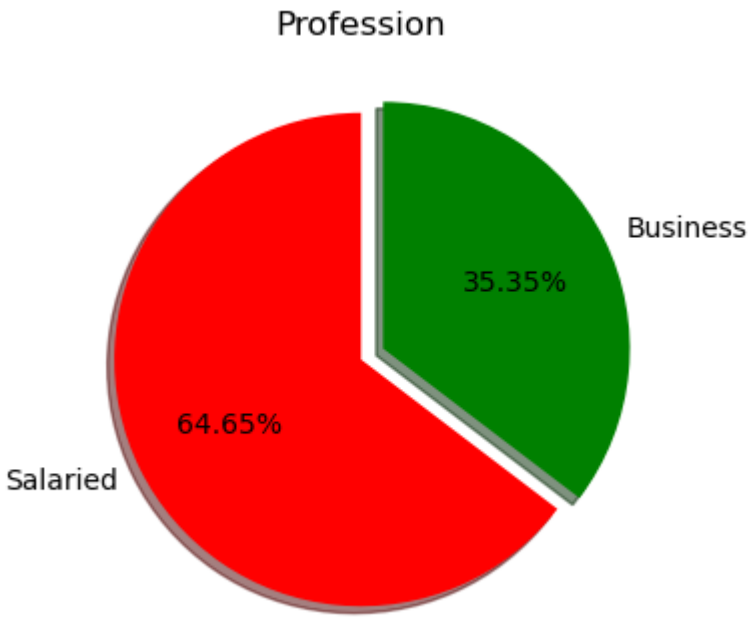
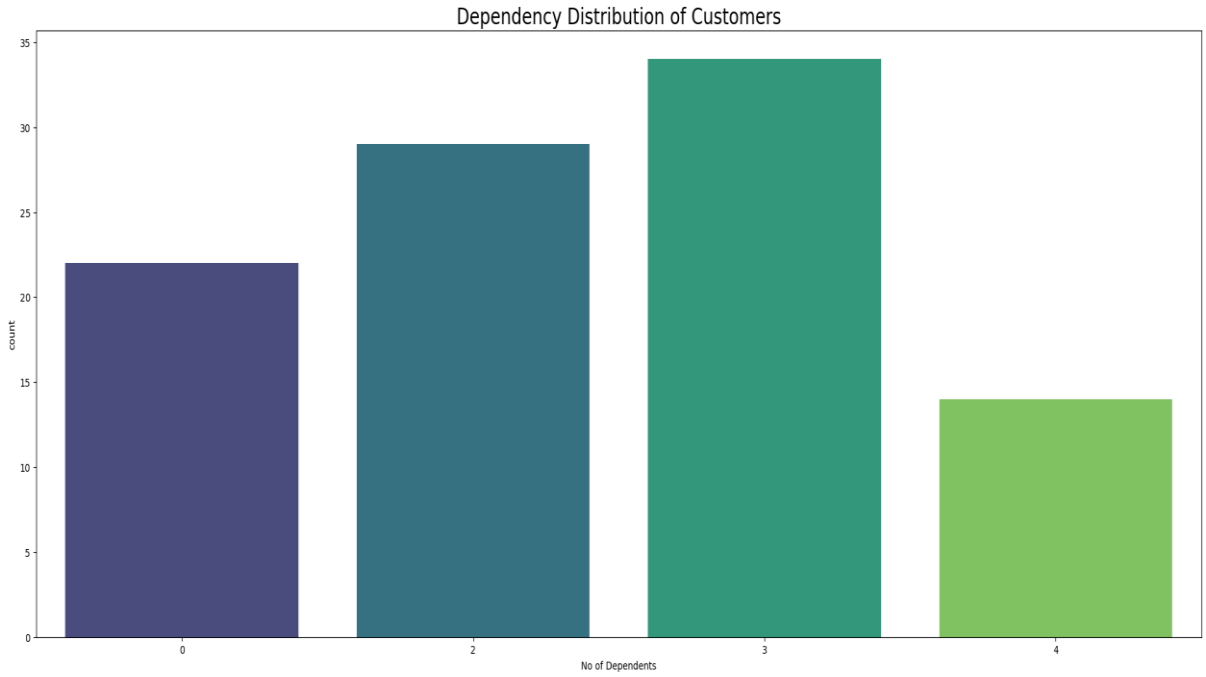
Behavioural Analysis for EV Market Segmentation

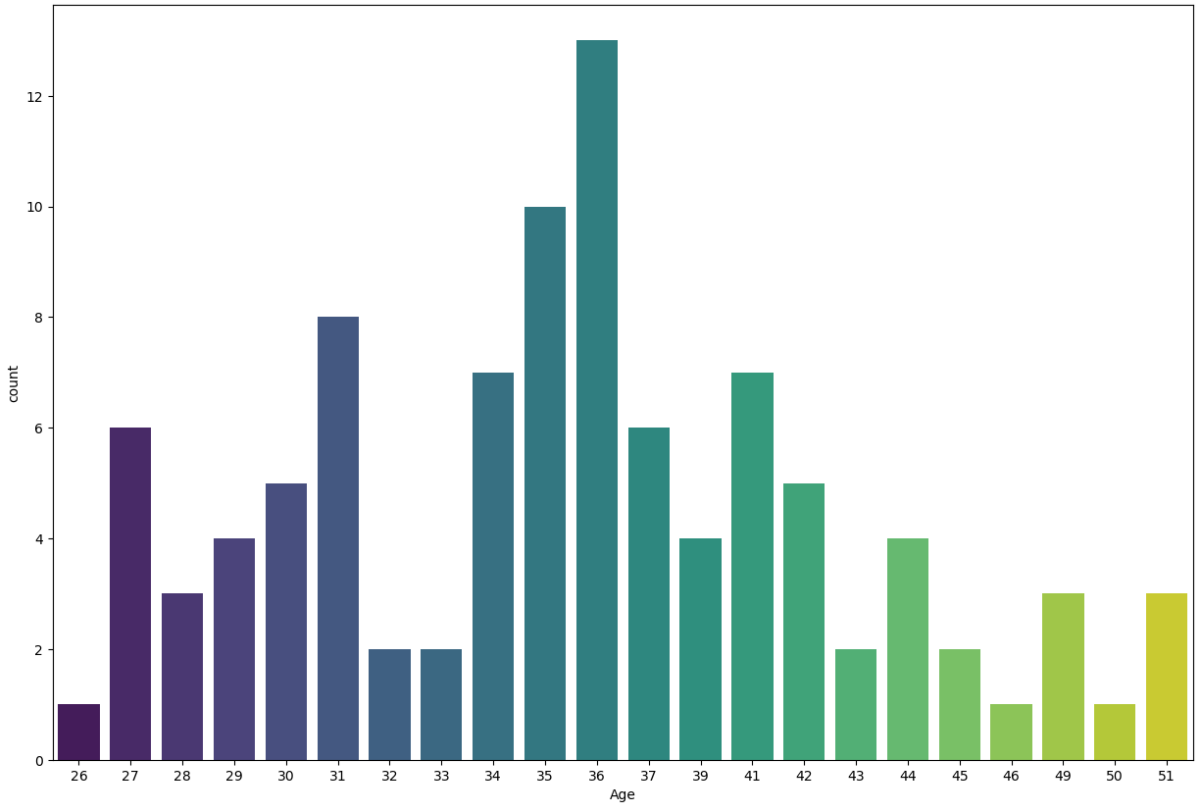
A. Conclusions drawn from Exploratory Data Analysis (EDA):



- There are 64.65% salaried profession and 35.35% business profession customers are in the dataset.



- Most of the customer in the dataset have 2-3 member in their family
- Those customers who have zero family members dependency are the single.



- Customer between age group of 30-40 have the most chances of buying the EV.

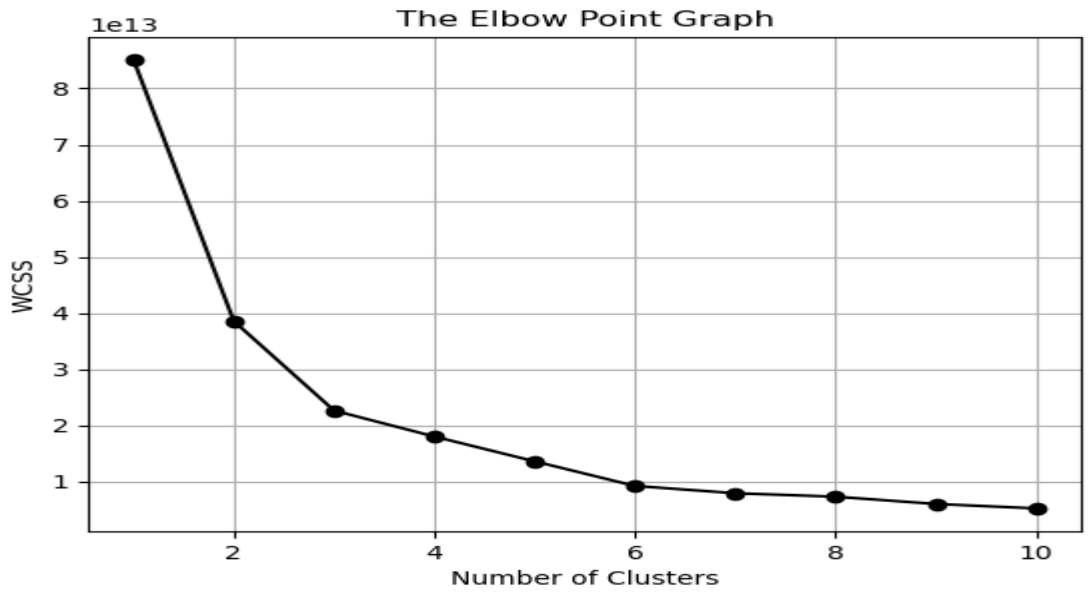
Methodology:

In this study, an unsupervised learning approach was employed to analyze customer behaviour using a behavioural dataset. The K-Means clustering algorithm was chosen for customer segmentation due to its efficiency in identifying patterns within unlabelled data.

Methodology:

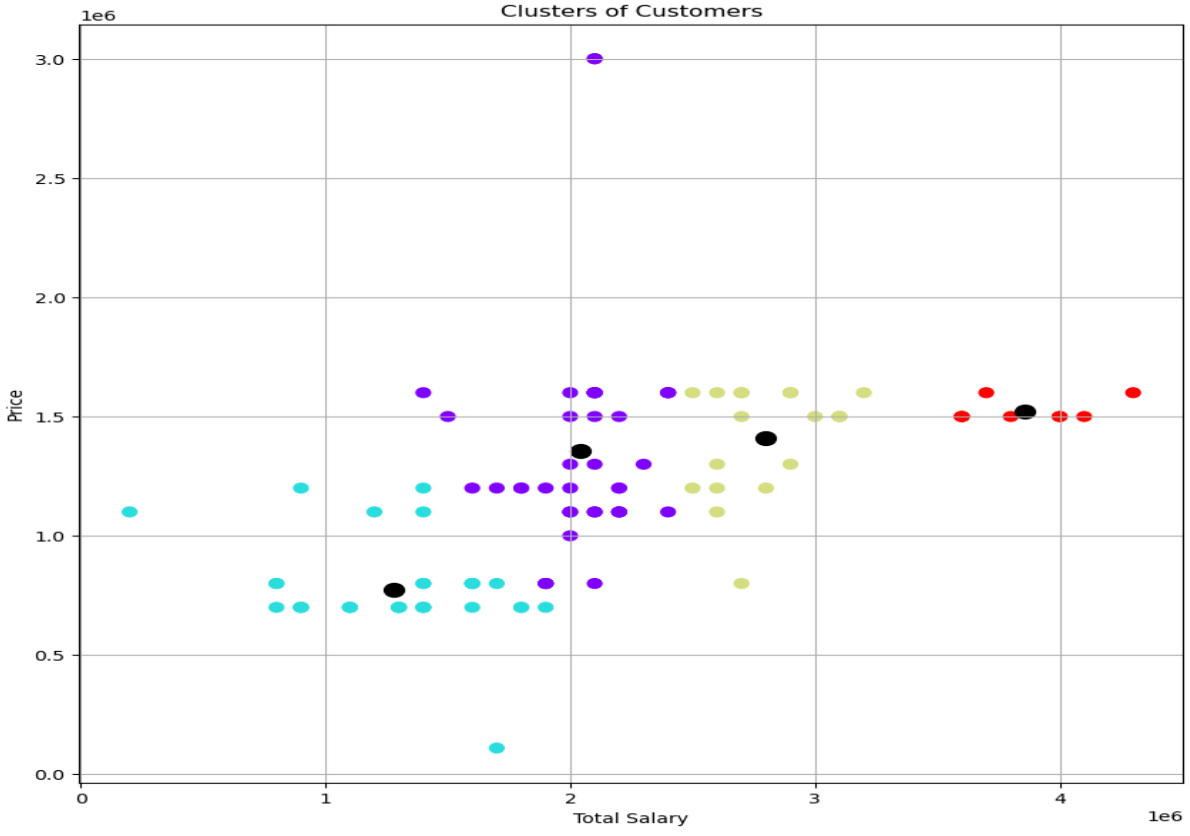
- Data Preprocessing – The dataset was cleaned, missing values were handled, and relevant features were selected for clustering.
- Choosing Optimal K – The Elbow Method was used to determine the optimal number of clusters.
- Applying K-Means Clustering – The dataset was segmented into distinct customer groups based on behavioural patterns.
- Cluster Interpretation – The resulting clusters were analyzed to extract meaningful insights, such as customer salary and purchasing price

Results:



Elbow Method for Optimal k:

- The plot shows the sum of squared distances (inertia) against the number of clusters (k).
- The "elbow" point, where the rate of decrease sharply changes, suggests that k = 4 is the optimal number of clusters for segmentation.



- Total Salary and Price have a little bit stronger correlation than normal: Generally, as the total of the customer increases, its buying price tends to increase. However, this relationship is lesser than very strong but stronger than weak, as there's not so much amount of scatter in the data.
- Four distinct clusters of vehicles: The data points seem to form four main clusters, suggesting the existence of four different customer behaviour segments based on total salary and purchasing price.

Solution Extracted from Exploratory Data Analysis and Model Performance:

- Salaried Profession customers ratio is higher as compared to business profession. EV companies need to produce not that much expensive vehicles, so that middle class people can afford to buy EV.
- Most of the customers have 2-3 members in their family. EV companies need to manufacture more numbers of cars as compared to other vehicles, so that all the family member easily accommodate in it or travel from it.
- Most of the customers who buy the EV's are from 30-40 age group, So companies to need to add the better features and remove the unwanted vehicle complexities which will help them drive the vehicle in very easier manner.
- After visualizing clustering graph, I reached the point which concludes that customer who have normal salary or customers who have so much salary are also going to buy similar price range EV's, So companies need to manufacture the EV's whose price is lesser than very expensive EV's. It will also help EV companies to increase their EV sells and maximize their profit.

Github Link: https://github.com/UjjwalChavan/Behavioural-Analysis-for-EV-Market-Segmentation