Market Segmentation Report: Indian Automobile Buying Behaviour

1. Machine Learning Model Used in Project 2

In the second project, the **KMeans Clustering** algorithm was used to segment the automobile market based on customer behavior patterns. This unsupervised machine learning model was ideal because we did not have predefined labels; instead, we aimed to discover distinct groups within the data based on features like **Age, Income, Gender, Marital Status, Education, and Vehicle Type Preference**. KMeans helped identify buyer personas by grouping customers with similar attributes, which can be leveraged for targeted marketing.

2. Final Conclusion and Insights Gained

The analysis revealed several important market segments:

- **Young High-Income Professionals** inclined toward SUVs and premium vehicles.
- **Middle-Aged Married Individuals** preferring sedans or family-friendly models.
- **Low-Income First-Time Buyers** often going for compact cars.

These insights help manufacturers and dealerships tailor marketing strategies, vehicle offerings, and financing plans according to each segment's needs. We also learned that income and age were the most influential features in shaping automobile preferences.

3. Potential Improvements with More Time & Budget

If additional resources were available, the project could be significantly enhanced in the following ways:

a. Data Collection (additional columns to include):

- **Occupation Type**
- **Vehicle Usage Purpose (e.g., commute, leisure, business)**
- **Brand Loyalty / Previous Vehicle Owned**
- **Credit Score or Financing Preferences**
- **Urban/Rural Location**
- **Online vs In-store Research Habits**

b. Additional ML Models to Try:

- **DBSCAN**: To detect arbitrarily shaped clusters and outliers (e.g., niche luxury buyers).
- **Hierarchical Clustering**: For visualizing how customer groups merge or split.
- **Gaussian Mixture Models (GMMs)**: For probabilistic clustering where overlaps exist between segments.
- **PCA (Principal Component Analysis)**: To reduce dimensionality and enhance model interpretability.

4. Estimated Market Size (Non-Segmented)

The estimated size of the Indian automobile market (non-segmented) as of the latest industry reports is approximately **4.2 million passenger vehicles sold annually**, translating to a market value of **₹7.5 lakh crores (INR 7.5 trillion)**. This figure excludes segmentation but gives an idea of the vast potential for data-driven marketing and personalized strategies.

GitHub Link: **EV Market Segmentation**