Psychographic Segmentation for EV Market in India Internship Report

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Github:- https://github.com/Arun9855/EV-Market-Segment

Psychographic Segmentation for EV Market in India

1. Overview

This report focuses on the psychographic segmentation of the Electric Vehicle (EV) market in India, utilizing a dataset that encapsulates various consumer attributes, preferences, and behaviors. Understanding the psychographics of potential customers is essential for businesses aiming to effectively market EVs. This analysis aims to identify specific segments within the market based on key psychographic traits, enabling tailored marketing strategies that resonate with the targeted audience.

Data Source:- We take data from two popular companies report

1:- Deloitte 2023 Global Automotive Consumer Study Report

2:- EY Parthenon Electrifying Indian Mobility Report

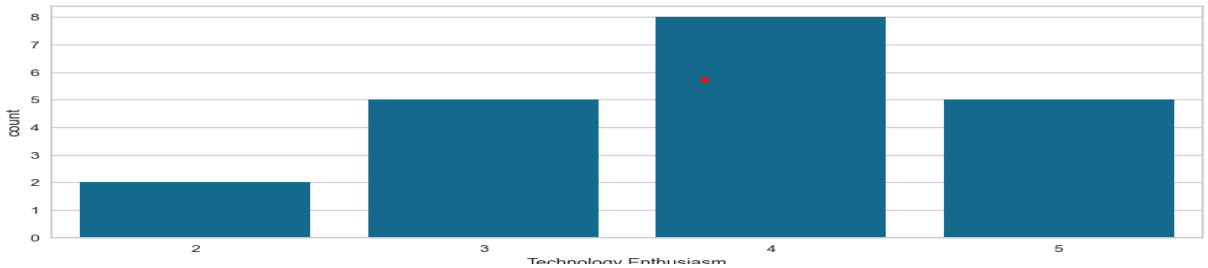
2. Dataset Description

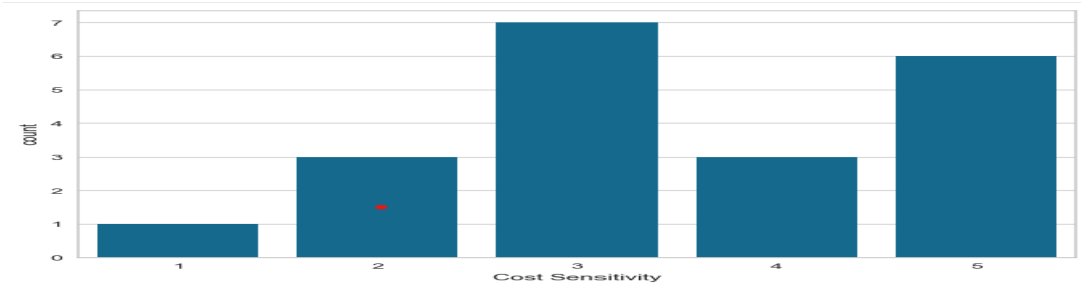
The dataset consists of various psychographic attributes relevant to consumer behavior regarding electric vehicles. The key features included are:

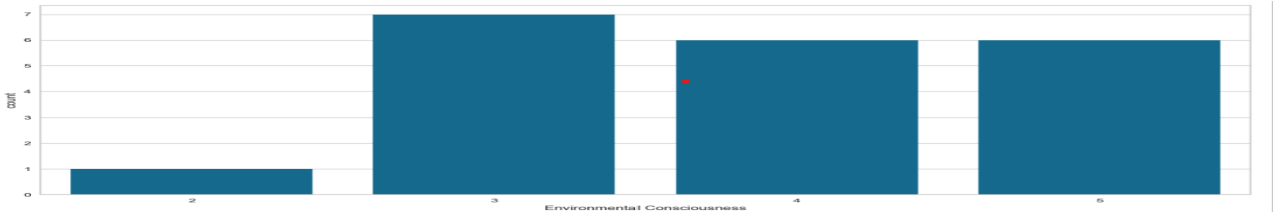
- **Customer ID**: Unique identifier for each customer.
- **Location**: Geographic location of the customers (e.g., Delhi, Mumbai, Bangalore).
- **Environmental Consciousness**: A score ranging from 1 to 5 that indicates the degree of concern for environmental issues (5 being very concerned).
- **Technology Enthusiasm**: A score representing the customer's interest in adopting new technologies (rated from 1 to 5).
- **Cost Sensitivity**: A score indicating how much the customer prioritizes cost when considering EV purchases (rated from 1 to 5).

- **Convenience Preference**: A score reflecting the importance of convenience in the purchase decision (rated from 1 to 5).
- **Concern for EV Charging Infrastructure**: A score reflecting how concerned the customer is about the availability of charging stations (rated from 1 to 5).
- **Attitude Toward Climate Change**: A score reflecting the customer's beliefs regarding climate change (rated from 1 to 5).
- **Interest in EVs**: A score indicating the overall interest level in purchasing or using electric vehicles (rated from 1 to 5).

The dataset provides insights into the psychographic dimensions that influence consumer preferences towards electric vehicles.

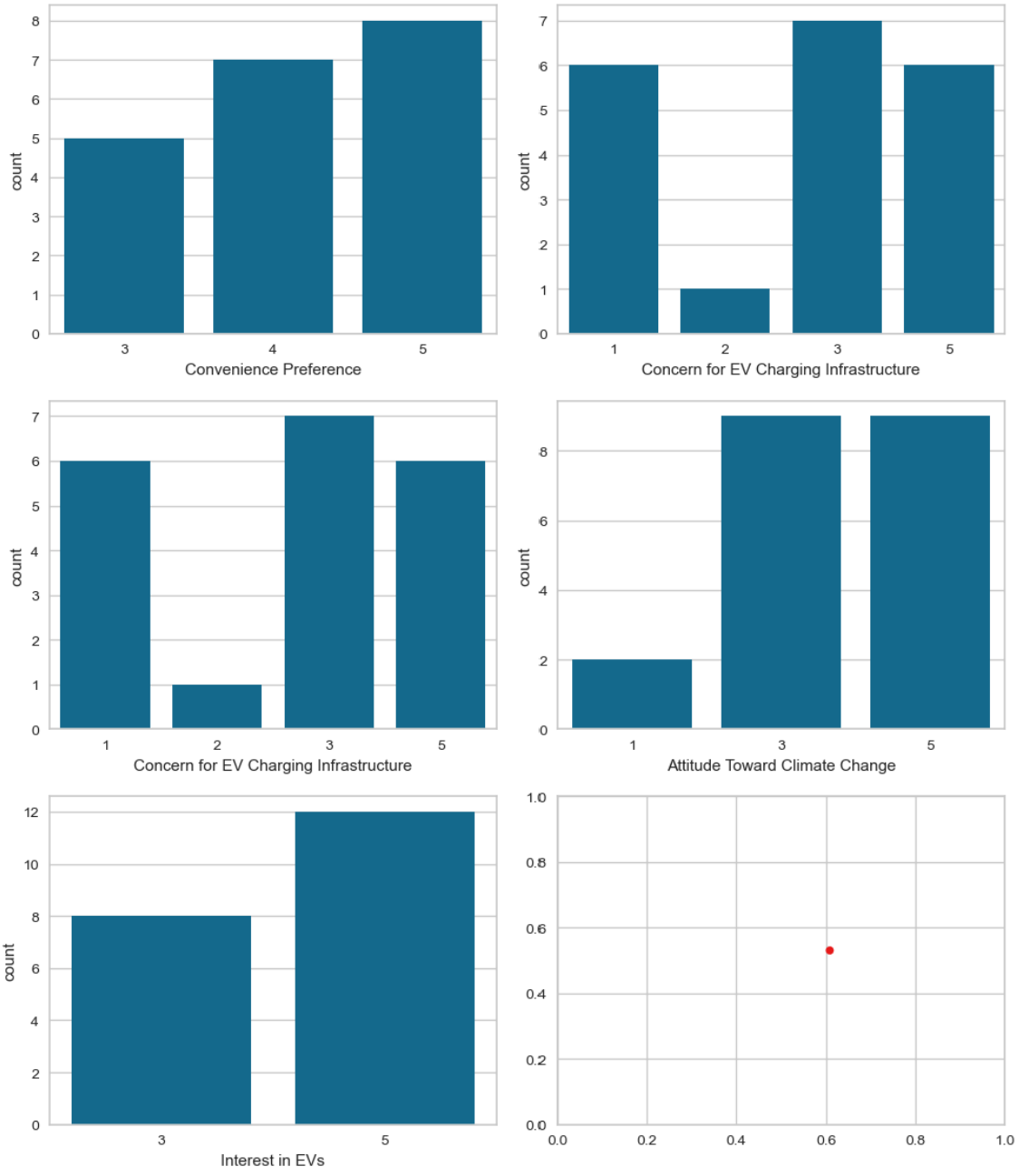






3. Data Preprocessing

```
]: plt.rcParams['figure.figsize'] = [10,15]
   plt.rcParams['figure.autolayout'] = True
   f,axes = plt.subplots(4,2)
   sns.countplot(x='Convenience Preference', data=df_e2w, ax=axes[0][0])
   sns.countplot(x='Concern for EV Charging Infrastructure', data=df_e2w, ax=axes[0][1])
   sns.countplot(x='Concern for EV Charging Infrastructure', data=df_e2w, ax=axes[1][0])
   sns.countplot(x='Attitude Toward Climate Change', data=df_e2w, ax=axes[1][1])
   sns.countplot(x='Interest in EVs', data=df_e2w, ax=axes[2][0])
   plt.show()
```



The following preprocessing steps were undertaken to prepare the data for analysis:

- **Data Cleaning**: The dataset was checked for duplicates, which were removed to ensure accurate analysis. There were no significant missing values, allowing for a straightforward analysis.
- **Feature Scaling**: All numerical features were normalized to ensure that the KMeans algorithm effectively grouped similar data points without bias toward any particular feature.
- **Exploratory Data Analysis (EDA)**: Initial visualizations were created to understand the distribution of the data. Key insights were identified, such as the correlation between environmental consciousness and interest in EVs.
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4. Segmentation Methodology

The analysis employed the **KMeans clustering algorithm** to segment consumers based on their psychographic traits. The steps involved are as follows:

1. **Determining the Number of Clusters**:
    - The **Elbow Method** was used to identify the optimal number of clusters. A plot was created to visualize the Within-Cluster Sum of Squares (WCSS) against the number of clusters. The point where the rate of decrease sharply changes indicates the optimal number of clusters.
2. **Applying KMeans Clustering**:
    - The KMeans algorithm was executed with the optimal number of clusters to segment the customers. Each customer was assigned to a specific cluster based on their psychographic attributes.
3. **Interpreting Clusters**:
    - The characteristics of each cluster were analyzed to derive insights about consumer preferences and behaviors.

Diagram Placeholder: ***Elbow Method Plot showing the optimal number of clusters.***

5. Analysis and Insights

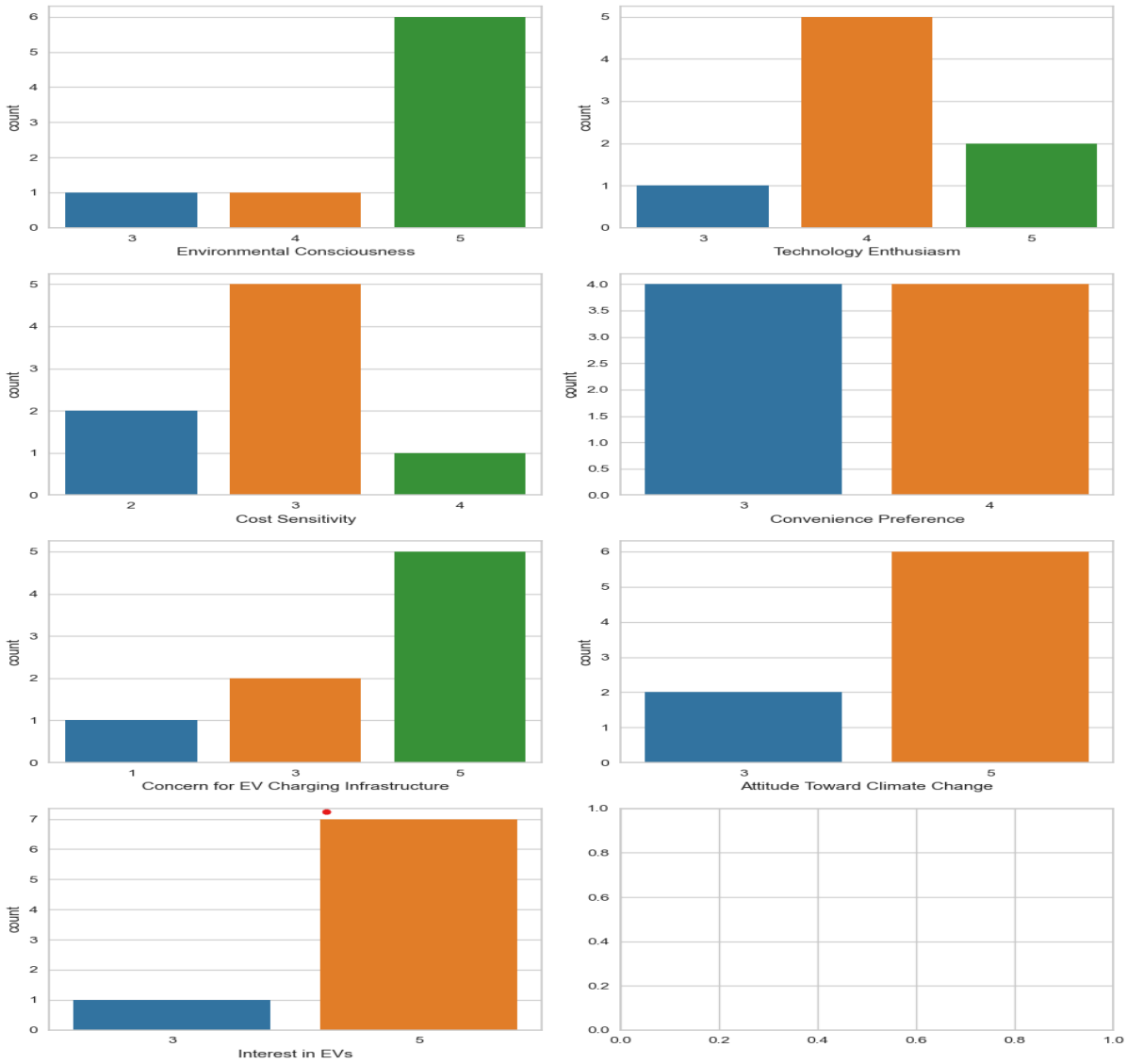
The clustering analysis revealed two distinct psychographic segments within the EV market:

Cluster 1: Highly Environmentally Conscious and Technology Enthusiasts

- **Profile**:
  - Customers in this cluster show high scores in environmental consciousness and technology enthusiasm (scores of 4-5).
  - They prioritize sustainability and are eager to adopt innovative technologies.
  - Cost sensitivity is lower for this group, indicating a willingness to invest in EVs that align with their values.
- **Marketing Implications**:
  - Marketing strategies for this segment should emphasize the environmental benefits of EVs, showcasing their contribution to reducing carbon footprints.
  - Highlighting cutting-edge technology features, such as advanced battery systems and smart connectivity, will resonate well with these consumers.

Cluster 2: Convenience Seekers with Moderate Interest in EVs

- **Profile**:
  - This group has moderate scores in environmental consciousness and technology enthusiasm (scores of 3-4) but high scores in convenience preference (4-5).
  - They express concerns about the availability of EV charging infrastructure, indicating that this factor heavily influences their decision-making.
  - Cost sensitivity is higher in this segment, making price a critical factor in their purchasing decisions.
- **Marketing Implications**:
  - Strategies should focus on the availability and convenience of charging solutions. Marketing messages should communicate the growing network of charging stations and easy accessibility.
  - Competitive pricing and promotional offers could be effective in attracting this segment, addressing their cost sensitivity while emphasizing convenience.



Cluster 3: Price-Sensitive Skeptics

- **Profile**:
  - Customers in this cluster tend to score low on environmental consciousness and technology enthusiasm (scores of 1-2).
  - They are highly cost-sensitive, indicating that price plays a significant role in their purchase decisions.
  - This segment shows limited interest in EVs, reflecting skepticism towards their benefits.
- **Marketing Implications**:
  - For this group, it is crucial to focus on cost savings and the long-term financial benefits of switching to EVs, such as lower fuel and maintenance costs.
  - Marketing efforts should also address common misconceptions about EVs and provide clear, straightforward information about their economic advantages.

6. Conclusion

The psychographic segmentation of the EV market in India provides essential insights into consumer preferences and behaviors. By understanding the distinct profiles of customers, businesses can tailor their marketing and product strategies to better meet the needs of different segments.

- **Recommendations**:
    - For **Cluster 1**, leverage the strong environmental values and technological interests by highlighting sustainability and innovation in EV offerings.
    - For **Cluster 2**, focus on convenience and pricing strategies to enhance the appeal of EVs among consumers who prioritize these factors.
    - For **Cluster 3**, emphasize the economic benefits and address misconceptions to convert skeptics into potential buyers.

This segmentation approach will enhance marketing effectiveness and contribute to increasing the adoption of electric vehicles in the Indian market.