MARKET SEGMENTATION ANALYSIS

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EV MARKET IN INDIA- SEGMENTATION ANALYSIS

The dataset that I have chosen consists of following features:

- Brand
- Model
- AcclSec
- TopSpeed
- Range (kmh)
- Efficiency (WhKm)
- Fast Charge
- Rapid Charge
- Power train
- Plug Type
- Body style
- Segment
- Seats
- Price

This dataset seems to be designed for comparing different EV models based on their technical specifications, performance, and pricing. So this can be defined as a **'product-specific dataset'**.

INTRODUCTION

This report provides a comprehensive analysis of the electric vehicle (EV) market based on a dataset comprising various features of EVs. The analysis includes data preprocessing, exploratory data analysis (EDA), and the application of K-means clustering to segment the EV market. The goal is to uncover patterns and insights that can guide stakeholders in making informed decisions.

FOLLOWING STEPS WERE FOLLOWED:

1. Data Collection
2. Data Standardization: The features were standardized to ensure they have a mean of 0 and a standard deviation of 1. This is essential for the performance of clustering algorithms.
3. Exploratory Data Analysis
4. Feature Identification
5. Segment Identification through importance
6. Visualization and insights

EDA revealed the following insights:

The distribution of each feature was examined to understand the central tendency and variability. Correlation analysis was conducted to identify relationships between features. Significant correlations include:

- Acceleration and Top Speed
- Range and Price
- Efficiency and Range

K-means Clustering

K-means clustering was applied to segment the EV market into distinct clusters. The optimal number of clusters was determined using the Elbow Method, resulting in three clusters.

Cluster Analysis

- **Cluster 0**: Represents mid-range vehicles with moderate performance, range, and price.
  - **Acceleration**: 6.25 seconds
  - **Top Speed**: 184.73 km/h
  - **Range**: 379.32 km
  - **Efficiency**: 210.65 Wh/km
  - **Fast Charge Speed**: 508.65 km/h
  - **Price**: €59,076.14
  - **Brands:** Kia, Ford, some models from Audi, BMW, and Hyundai.
- **Cluster 1**: Represents budget-friendly vehicles with lower performance and range.
  - **Acceleration**: 9.61 seconds
  - **Top Speed**: 148.52 km/h
  - **Range**: 249.17 km
  - **Efficiency**: 171.13 Wh/km
  - **Fast Charge Speed**: 282.50 km/h
  - **Price**: €33,235.10
  - **Brands:** Citroen, DS, Fiat, Honda, and some models from BMW and Hyundai.
- **Cluster 2**: Represents high-end vehicles with superior performance, range, and price.
  - **Acceleration**: 3.86 seconds
  - **Top Speed**: 249.61 km/h
  - **Range**: 494.44 km
  - **Efficiency**: 193.11 Wh/km
  - **Fast Charge Speed**: 743.33 km/h
  - **Price**: €109,304.94
  - **Brands:** Mainly high-end models from Audi, Tesla, and Porsche.

Feature Importance

The importance of each feature in the clustering process was determined. The most significant features are:

1. **FastCharge_KmH**
2. **TopSpeed_KmH**
3. **PriceEuro**
4. **AccelSec**
5. **Range_Km**
6. **Efficiency_WhKm**

CLUSTER CHARACTERISTICS

- **Mid-Range Segment (Cluster 0)**: Vehicles in this cluster are suitable for consumers seeking a balance between performance, range, and cost. Manufacturers can focus on enhancing the range and efficiency to make these vehicles more appealing.
- **Budget Segment (Cluster 1)**: This cluster caters to price-sensitive consumers. Improving the efficiency and range within this cost bracket could attract more buyers.
- **High-End Segment (Cluster 2)**: High-performance and high-price vehicles. Focus on maintaining superior performance and adding premium features to justify the high price.