Electric Vehicle User Rating Market Segmentation

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In this analysis, I utilized a dataset I discovered while searching for electric vehicle data, specifically focusing on the Indian electric two-wheeler market. The dataset includes key attributes such as ratings, visual appeal, reliability, performance, comfort, and value for money, alongside detailed customer reviews.

Our analysis aims to uncover the distinct market segments within the Indian electric two-wheeler industry, providing valuable insights into customer preferences and satisfaction levels across various models. By leveraging descriptive statistics and clustering techniques, we have identified patterns in customer feedback, which highlight both the strengths and areas for improvement for each model. The findings from this analysis are instrumental in guiding manufacturers, marketers, and stakeholders in making informed decisions that align with consumer expectations in this rapidly evolving market.

In this report, we not only explore the average performance of key features across different models but also dive into the distribution of customer ratings to paint a holistic picture of the market landscape. This approach enables us to pinpoint which models are excelling in customer satisfaction and which may require strategic enhancements to better meet consumer needs.

1. Introduction

- **Objective:** To segment the market based on customer ratings and preferences for various electric vehicle (EV) models.
- **Data Overview:** The dataset contains 844 entries with ratings on aspects such as Visual Appeal, Reliability, Service Experience, Comfort, and Value for Money, along with the Model Names of different EVs.

2. Segmentation Criteria

- **Features Used for Segmentation:**
  - Rating
  - Visual Appeal
  - Reliability
  - Service Experience
  - Comfort
  - Value for Money
- **Models Covered:** 37 different EV models, including TVS iQube, Revolt RV 400, Bajaj Chetak, and others.

3. Cluster Analysis

- **Methodology:**
  - The data has been segmented using a clustering algorithm, such as K-Means, to group customers with similar preferences and ratings.
  - The optimal number of clusters was determined based on the Elbow Method or Silhouette Score.
- **Cluster Descriptions:**
  - **Cluster 1:** High ratings for Reliability and Comfort, moderate Visual Appeal, and Value for Money.
  - **Cluster 2:** Low ratings across most features, particularly in Service Experience and Reliability.
  - **Cluster 3:** High ratings in Visual Appeal but lower in Comfort and Value for Money.

- **Cluster 4:** Balanced ratings across all features, indicating overall satisfaction with the product.
- **Cluster 5:** Very high ratings in Service Experience and Value for Money, indicating a preference for cost-effective and reliable models.

4. Market Segments

- **Segment 1: Premium Buyers**
  - Models: Ather 450X, OLA S1 Pro, Tork Kratos
  - Characteristics: Customers in this segment rate the models highly on Visual Appeal and Comfort. They are less price-sensitive and prioritize design and performance.
- **Segment 2: Value Seekers**
  - Models: Hero Electric Optima, Ampere Magnus EX
  - Characteristics: These customers are focused on Value for Money and Reliability. They are likely to choose models that offer the best utility for their price.
- **Segment 3: Performance Enthusiasts**
  - Models: Revolt RV 400, Okinawa Praise
  - Characteristics: This segment prioritizes Performance and Reliability, often compromising on Comfort for a more robust experience.
- **Segment 4: Budget-Conscious Buyers**
  - Models: Ampere REO, Okinawa Lite
  - Characteristics: Customers in this segment focus on low maintenance costs and adequate performance, often selecting models that are practical and affordable.
- **Segment 5: Unhappy Customers**
  - Models: Mixed across various low-rated models
  - Characteristics: These customers generally gave low ratings across the board, indicating dissatisfaction with their purchases. This segment may require targeted improvements in both product and service.

4.1 Feature Averages

The table of feature averages provides insight into how different models perform across key attributes such as Visual Appeal, Reliability, Performance, Comfort, and Value for Money. Models with higher average scores in these features are generally perceived more favorably by customers.

- **Top Performers:**

    - **Hero Electric NYX** and **Odysse Evoqis** both have perfect scores in Performance, with Odysse Evoqis also excelling in Reliability and Comfort.
    - **Gemopai Astrid Lite** and **Gemopai Ryder** show strong averages across most features, indicating high customer satisfaction.
    - **Ather 450X** and **OLA S1 Pro** are well-rounded models with good averages in Visual Appeal, Performance, and Comfort, making them attractive options for customers looking for balanced performance and aesthetics.

- **Low Performers:**

    - **BGauss B8** has the lowest scores in all features, reflecting potential issues with customer satisfaction.
    - **Ampere REO** and **Okinawa Praise** also show lower averages in key areas such as Performance and Comfort, which could indicate areas needing improvement.

4.2 Rating Distribution

Analyzing the rating distribution provides a more granular view of how customers feel about each model. This helps identify models that are polarizing (i.e., having a mix of high and low ratings) versus those that consistently receive either high or low ratings.

- **Highly Rated Models:**

- **Evolet Polo** and **Gemopai Astrid Lite** stand out with a 100% distribution of 5-star ratings, suggesting exceptional customer satisfaction.
    - **Revolt RV 300** and **Tork Kratos** also have high proportions of 5-star ratings, making them strong contenders in the market.
- **Mixed Ratings:**
    - **TVS iQube** and **Okinawa Lite** have a spread across multiple rating levels, indicating a more mixed customer experience. This suggests that while some users are satisfied, others find areas for improvement.
    - **Hero Electric Optima** has a balanced distribution across the rating spectrum, reflecting a broad range of customer experiences.
- **Lower Rated Models:**
    - **BGauss B8** and **Joy e-bike Wolf** have significant proportions of low ratings, with BGauss B8 particularly standing out for its evenly distributed ratings from 1 to 5 stars, but with a clear indication of dissatisfaction among many users.

5. Segment-Specific Insights

With the deep dive into feature averages and rating distribution, the market segments can be further refined:

- **Premium Buyers:** Models like **Odysse Evoqis** and **Gemopai Astrid Lite** are ideal for this segment, offering top-notch performance and comfort. Marketing should focus on these strengths and emphasize the superior experience these models provide.

- **Value Seekers: Hero Electric Atria** and **Bajaj Chetak** cater well to this segment, with good scores in Value for Money and balanced ratings across other features. Promotions should highlight the cost-effectiveness and overall value these models offer.

- **Performance Enthusiasts: Revolt RV 400** and **Tork Kratos** attract customers looking for reliability and top performance. These models

should be marketed with a focus on their technical capabilities and robust performance.

- **Budget-Conscious Buyers: Ampere Magnus EX** and **Okinawa Lite** fit this segment, with reasonable ratings across most features and a focus on affordability. Marketing strategies should emphasize low ownership costs and practicality.

- **Unhappy Customers:** Models like **BGauss B8** and **Joy e-bike Wolf** show significant customer dissatisfaction. Efforts should be made to understand the specific pain points, whether they relate to performance, reliability, or other features, and address them through product improvements or better customer support.

5. Recommendations

- **For Manufacturers:**
  - Focus on improving Service Experience and Comfort, as these were common pain points across lower-rated clusters.
  - Consider targeted marketing for Premium Buyers and Value Seekers, emphasizing the strengths of the models in their respective segments.
- **For Marketers:**
  - Highlight key features like Performance and Reliability for Performance Enthusiasts.
  - Offer promotional deals or extended warranties to convert Budget-Conscious Buyers into loyal customers.

6. Conclusion

The market for electric vehicles is diverse, with distinct segments that prioritize different aspects of their purchase. By understanding these segments, manufacturers and marketers can better cater to the needs of each group, driving customer satisfaction and market growth. By diving deeper into the feature averages and rating distribution, it's clear that different segments have unique

preferences. Understanding these nuances allows for more targeted marketing and product development strategies that cater to the specific needs and desires of each customer group.

Github link for the Implementation:

https://github.com/Jarvis2008/electric_vehicle_market_segmentation