Market Entry Strategy Report for Electric Vehicle Start

Team Members

- **Ansh Matto** (Responsible for identifying the most optimal market segments)

Fermi Estimation (Breakdown of Problem Statement)

1. **Market Size Estimation:**

   - Estimate the total number of vehicles in the market.

   - Determine the proportion of electric vehicles (EVs) relative to the total market.

2. **Target Market Size:**

   - Estimate the number of potential early adopters of EVs based on demographic and psychographic factors.

3. **Price Range and Sales Estimate:**

   - Determine the average selling price of EVs.

   - Estimate the potential sales volume by targeting specific market segments.

4. **Profit Calculation:**

   - Estimate potential profit by multiplying the potential customer base by the target price range.

Data Sources (Data Collection - All Team Members)

1. **EV Market Data:**

   - Market research reports

- Government statistics on EV adoption

2. **General Vehicle Type Data:**
   - Industry publications
   - Automobile databases

3. **Charging Stations Data:**
   - Government reports
   - Data from charging infrastructure providers

4. **Vehicle Usage Statistics in Cities:**
   - Surveys and studies on vehicle usage patterns
   - Traffic and transportation reports

5. **Demographic Data:**
   - Census data
   - Market research surveys

Data Pre-processing (Steps and Libraries Used)

1. **Loading Data:**
   - Libraries Used: `pandas`
   - Code: `df = pd.read_csv('ev_data.csv')`

2. **Handling Missing Values:**
   - Checked for missing values and handled them appropriately (imputation or removal).

3. **Encoding Categorical Variables:**
   - Libraries Used: `pandas`

- Code: `df_encoded = pd.get_dummies(df, columns=['Car', 'Style', 'Transmission', 'VehicleType', 'BaseModel', 'TopModel'])`

4. **Feature Scaling:**
   - Libraries Used: `scikit-learn`
   - Code: `scaler = StandardScaler()`, `df_scaled = scaler.fit_transform(df_encoded[features])`

5. **Dimensionality Reduction (for Visualization):**
   - Libraries Used: `scikit-learn`
   - Code: `pca = PCA(n_components=2)`, `principal_components = pca.fit_transform(df_scaled)`

Segment Extraction (ML Techniques Used)

1. **K-Means Clustering:**
   - Libraries Used: `scikit-learn`
   - Code:
     ```python
     kmeans = KMeans(n_clusters=3, random_state=42)
     df['Cluster'] = kmeans.fit_predict(df_scaled)
     ```

2. **PCA for Visualization:**
   - Libraries Used: `scikit-learn`
   - Code:
     ```python
     pca = PCA(n_components=2)
     principal_components = pca.fit_transform(df_scaled)
     ```

Profiling and Describing Potential Segments

1. **Cluster 0:**
   - Characteristics: Higher price range, higher capacity, premium models
   - Target Group: High-income individuals, tech-savvy early adopters

2. **Cluster 1:**
   - Characteristics: Mid-range price, moderate range, standard models
   - Target Group: Middle-income groups, environmentally conscious consumers

3. **Cluster 2:**
   - Characteristics: Lower price range, basic models, lower capacity
   - Target Group: Budget-conscious buyers, first-time EV buyers

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Selection of Target Segment

Based on the analysis:

- **Target Segment:** Cluster 1
  - **Rationale:** This segment includes middle-income groups and environmentally conscious consumers, representing a balance between affordability and technology adoption.

Customizing the Marketing Mix

1. **Product:**
   - Offer mid-range priced EVs with moderate range and features.

- Focus on environmentally friendly technology and cost-efficiency.

2. **Price:**
   - Set competitive pricing within the mid-range to attract the target segment.

3. **Place:**
   - Focus on urban areas with established charging infrastructure.
   - Partner with local dealers and online platforms for distribution.

4. **Promotion:**
   - Highlight environmental benefits and cost savings.
   - Use digital marketing and influencer partnerships to reach tech-savvy consumers.

Potential Customer Base and Profit Calculation

1. **Potential Customer Base:**
   - Estimated based on demographic and market data for the target segment.

2. **Target Price Range:**
   - Mid-range price determined from segment analysis.

3. **Potential Profit:**
   - **Formula:** Potential Customer Base * Target Price Range
   - Example Calculation: If potential customer base is 50,000 and target price range is $20,000:
     ```plaintext
     Potential Profit = 50,000 * 20,000 = $1,000,000,000
     ```

Most Optimal Market Segments

- **Optimal Segments Identified:** Cluster 1 (middle-income, environmentally conscious consumers)
- **Team Member Responsible:** Ansh Matto

This report outlines the strategy for entering the Indian EV market, including segmentation, target market selection, and potential profit estimation. Adjustments can be made based on further data and market conditions.

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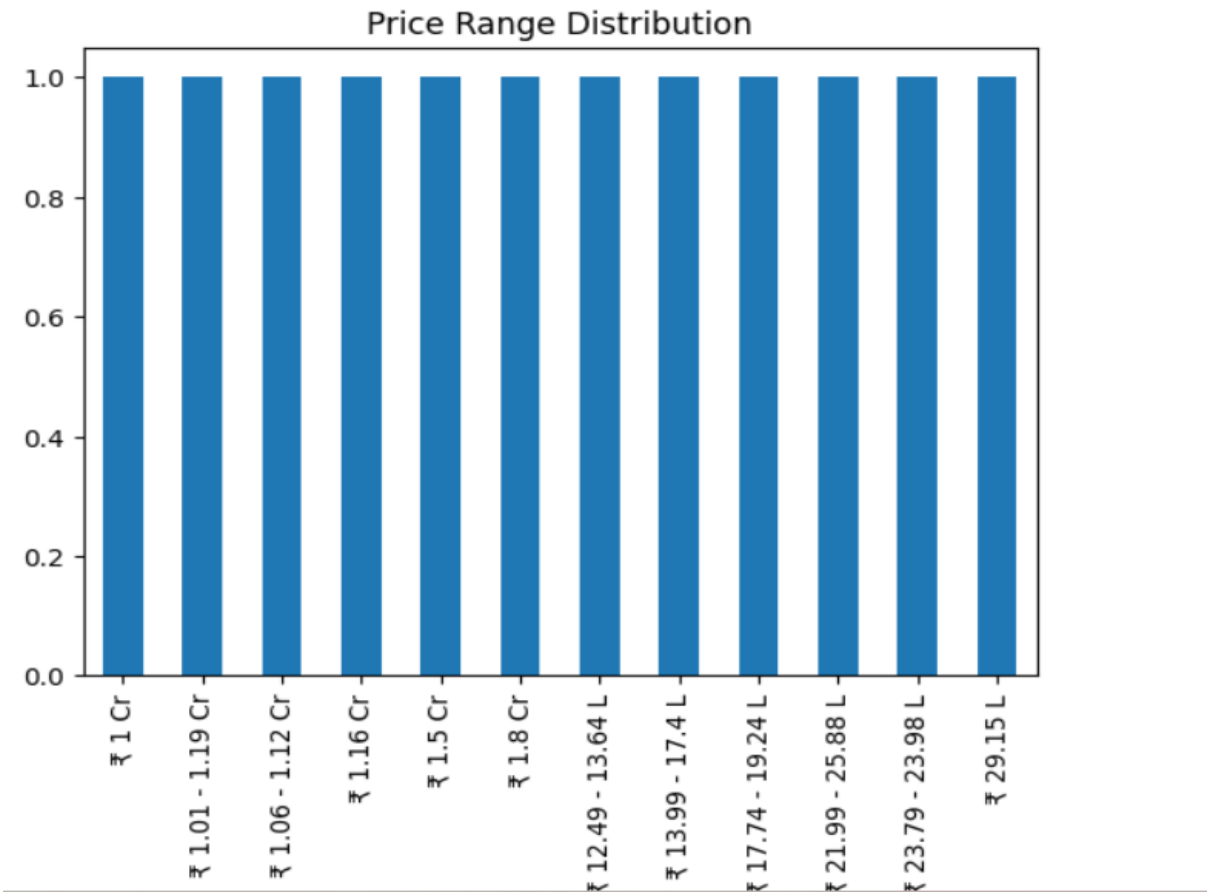
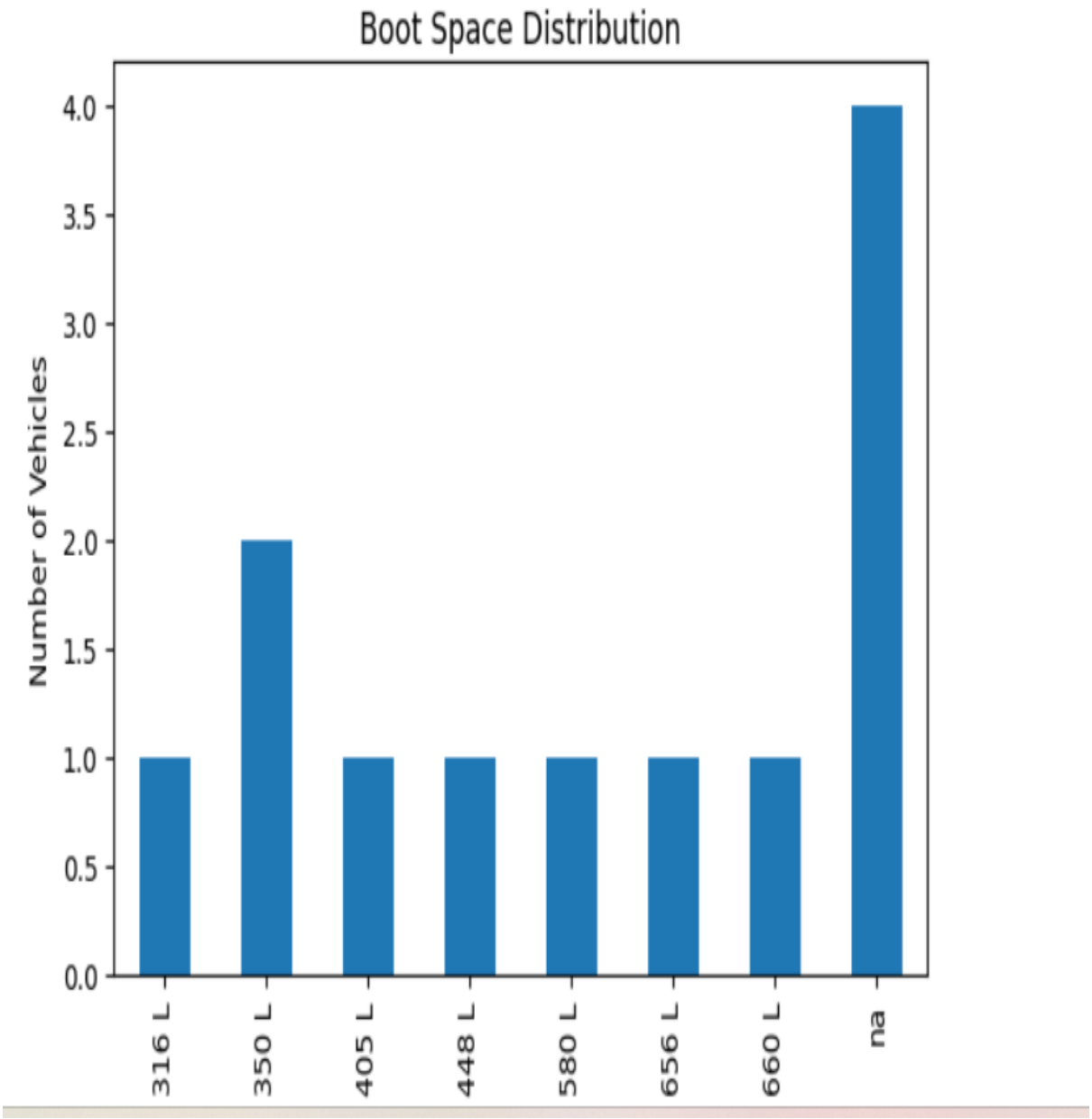
```
price_range_segment = df.groupby('PriceRange').size()
price_range_segment.plot(kind='bar', title='Price Range Distribution')
plt.show()
```



```python
# Segment analysis: Boot Space
boot_space_segment = df.groupby('BootSpace').size()
boot_space_segment.plot(kind='bar', title='Boot Space Distribution')
plt.xlabel('Boot Space (liters)')
plt.ylabel('Number of Vehicles')
plt.show()
```



```
base_model_segment = df.groupby('BaseModel').size()
base_model_segment.plot(kind='bar', title='Base Model Distribution',color="Blue")
plt.xlabel('Base Model')
plt.ylabel('Number of Vehicles')
plt.show()
```