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GitHub Link: <https://github.com/RahulPrasadYadav/EV-Market-Project>

1. Conclusion - EV Market Analysis (2023-2024)

The Electric Vehicle (EV) market in India saw a significant growth of 20% in 2024 compared to 2023, driven by increased awareness, government support, and improved charging infrastructure.

Top Performing States

- Uttar Pradesh recorded the highest EV sales in 2024, followed closely by Maharashtra.
- These states emerged as leading EV markets due to large populations, better infrastructure, and increasing adoption.

Peak Sales Month

- December 2024 was the busiest month, likely due to festive seasons and year-end government targets.

Two-Wheelers Lead the Market

- 2-wheelers accounted for 67% of total EV registrations (1,29,181 units), making them the most popular segment.

Charging Infrastructure

- India has 32,696 PCS as of 2024.
- Karnataka leads with over 5,000 PCS, followed by Maharashtra and Delhi.

Final Insight

India's EV market is growing fast with 2-wheelers dominating, UP leading in sales, and Karnataka leading in infrastructure.

2. Process Explanation - Models, Frameworks, and Libraries Used

- Data loaded and cleaned using pandas in VS Code.
- Handled missing values using SimpleImputer.
- Encoded categorical features using OneHotEncoder and get_dummies.
- Applied KMeans Clustering and Random Forest Regressor.
- Visualized using seaborn and matplotlib.

Libraries:

- pandas, numpy, matplotlib, seaborn, sklearn

3. Visualizations

- Bar Plot: Shows state-wise/month-wise EV sales.
- Pie Chart: EV type share (2W, 3W, etc).
- Count Plot: Frequency of state categories.
- Box Plot: Income/Electric vehicle distribution.
- Histogram: Per capita income distribution.
- PCS Map: State-wise public charging station spread.

4. Strategy for Company

- Focus on Uttar Pradesh for EV expansion.
- Invest in 2-wheeler models and finance options.
- Expand charging infrastructure in high-demand states like UP, Bihar, and Maharashtra.

Clustering on Income:

- Delhi had highest per capita income (1750 units).
- States were grouped into 10 clusters using KMeans.
- Helped in identifying income-based market segments.