MARKET SEGMENTATION ANALYSIS OF ELECTRIC VEHICLES MARKET IN INDIA

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Problem Statement

Our goal is to analyze market segment for an Electric Vehicle Charging based startup to decide which vehicle/customer space is suitable for developing its EVs.

In this report we analyze the Electric Vehicles Charging Market in India using segments such as region, The dataset encompasses various attributes, including latitude, longitude, payment modes, vendor names, and station types

Data Collection

Data collected from one of the most popular data science platforms which is Kaggle and public datasets to extract meaningful insights. We'll be using these datasets for our market segmentation analysis.

https://www.kaggle.com/datasets/nezukokamaado/e-v-charging-stations

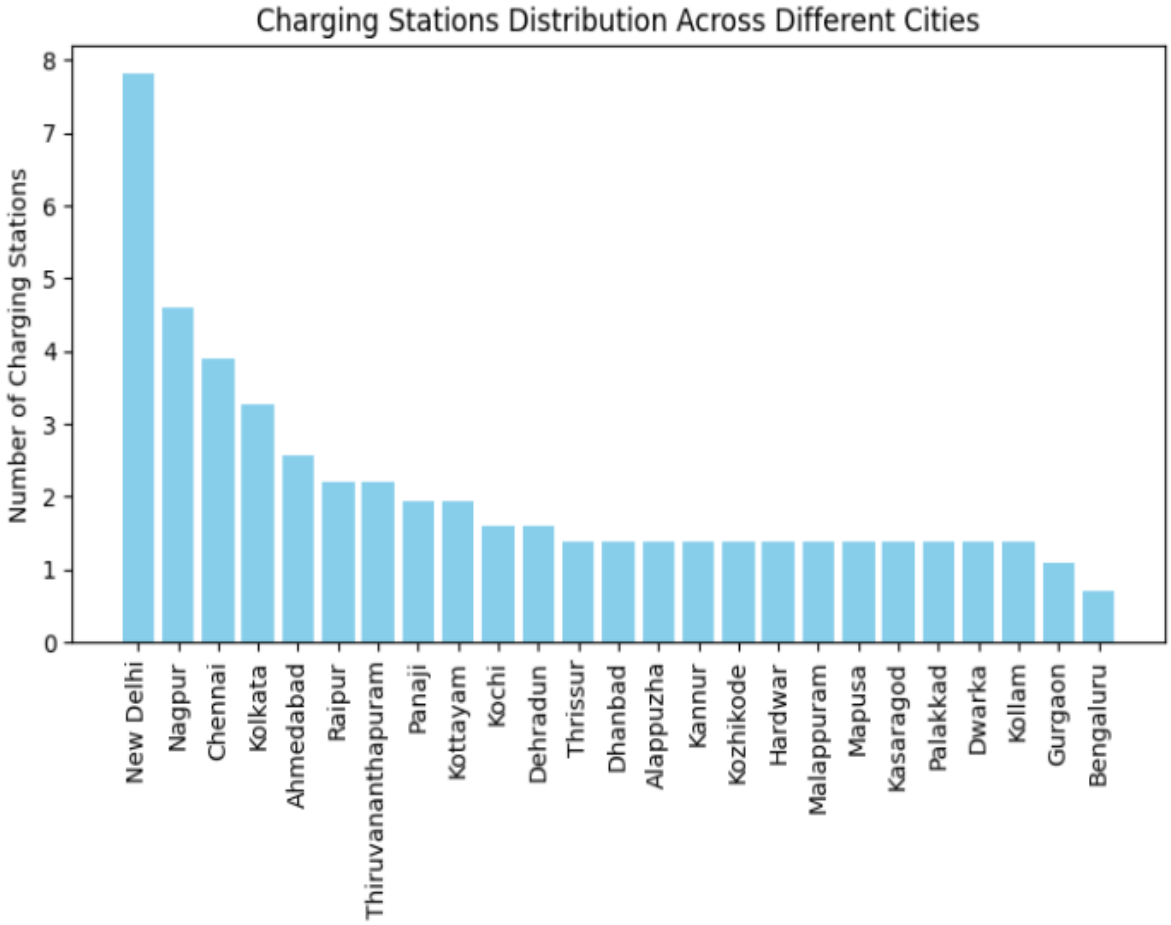
Loding Data

Using Python libraries such as NumPy and Pandas, the data was loaded into the notebook and preprocessed. The preprocessing involved encoding of categorical variables, extraction of important features, deletion of unnecessary variables. This part ensured that our datasets are for further analysis of features.

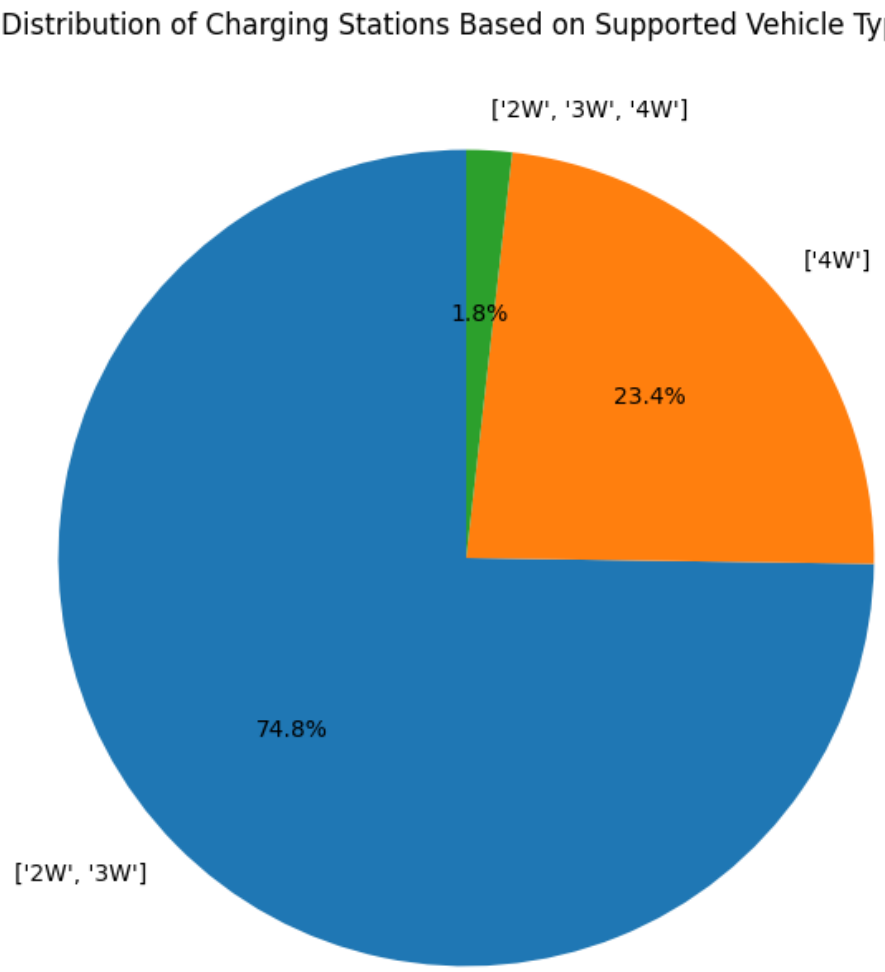
```
df = pd.read_excel('D:\ev_final.xlsx')
df
```

Exploratory Data Analysis

Exploratory data analysis (EDA) is used for data analysis to analyze and investigate data sets and summarize their main characteristics. It helps determine how best to manipulate data sources to get the answers you need, making it easier to discover patterns, spot anomalies, test a hypothesis, or check assumptions.

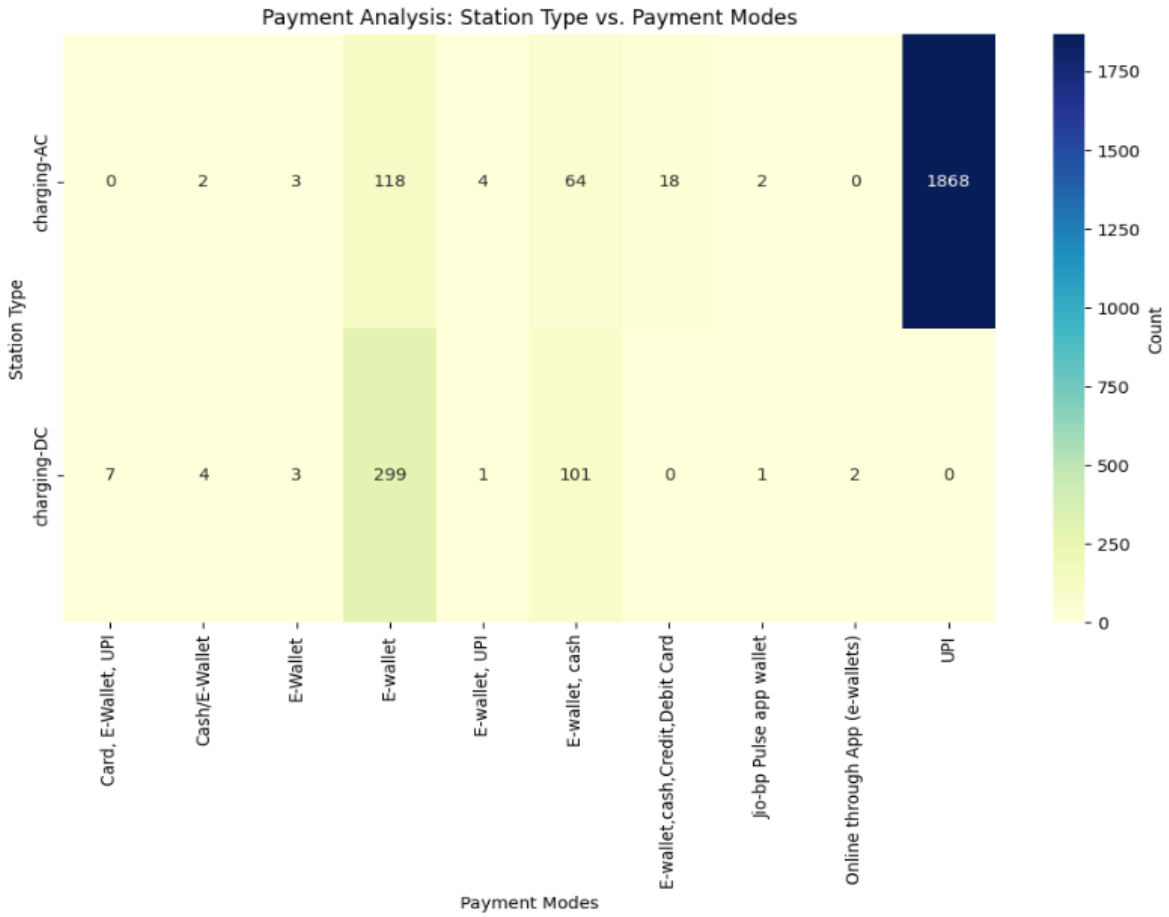


The above dataset determines the number of charging station across different cities.



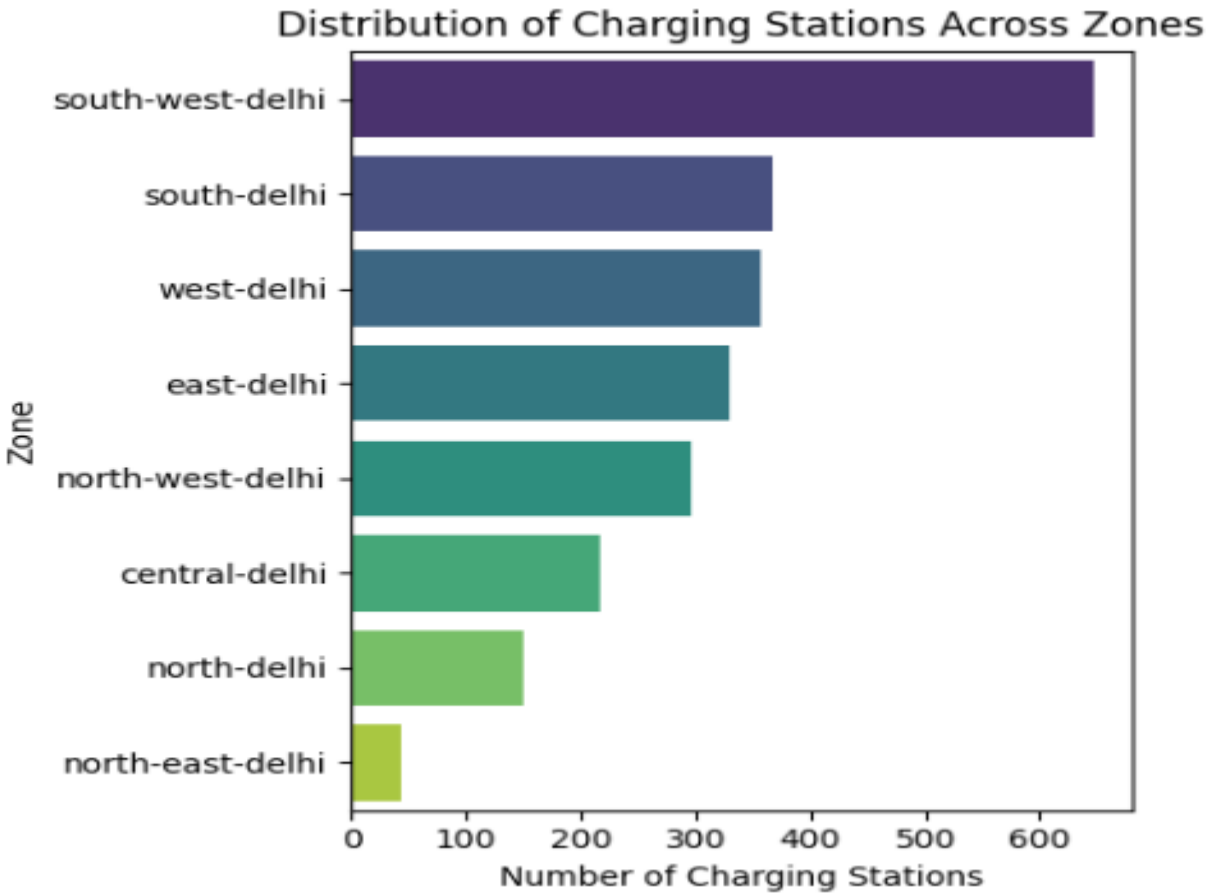
The above figure says that charging station with only '4W' facility are very less in number compared to 2W and 3W. One inference that we can draw is that 4W are new set of vehicle types and infrastructure for these types are under development and possibly many of 2W and 3W stations will eventually have facility for 4W as well. We see this happening already with 1.8% having all 3 options

The below figure shows payment method UPI payments happening in large number followed by E-wallets. It is interesting to see that are no cash only stations as expected and what is surprising to see is that even card payments are neglible.

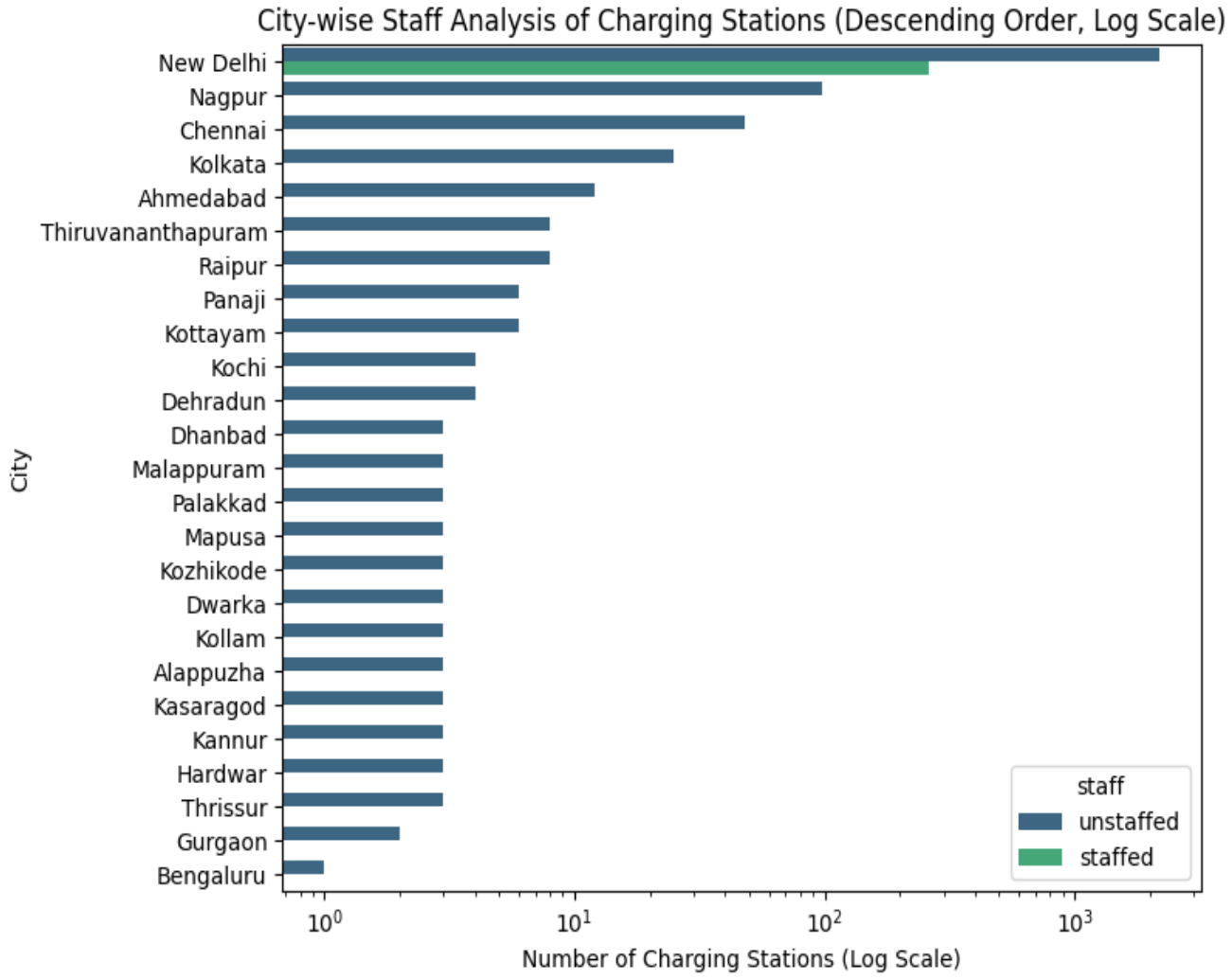


Although the dataset mainly focusses on the New Delhi, it will be good to analyse all the cities to check if there is any EV initiatives happening. We observe that other metropoliton cities like Chennai and Kolkatta has some EV station presence. In Nagpur there are 98 vendors operating.

The below graph plot between charging station and city zone in New Delhi, its shows that south west delhi having large number of charging station.

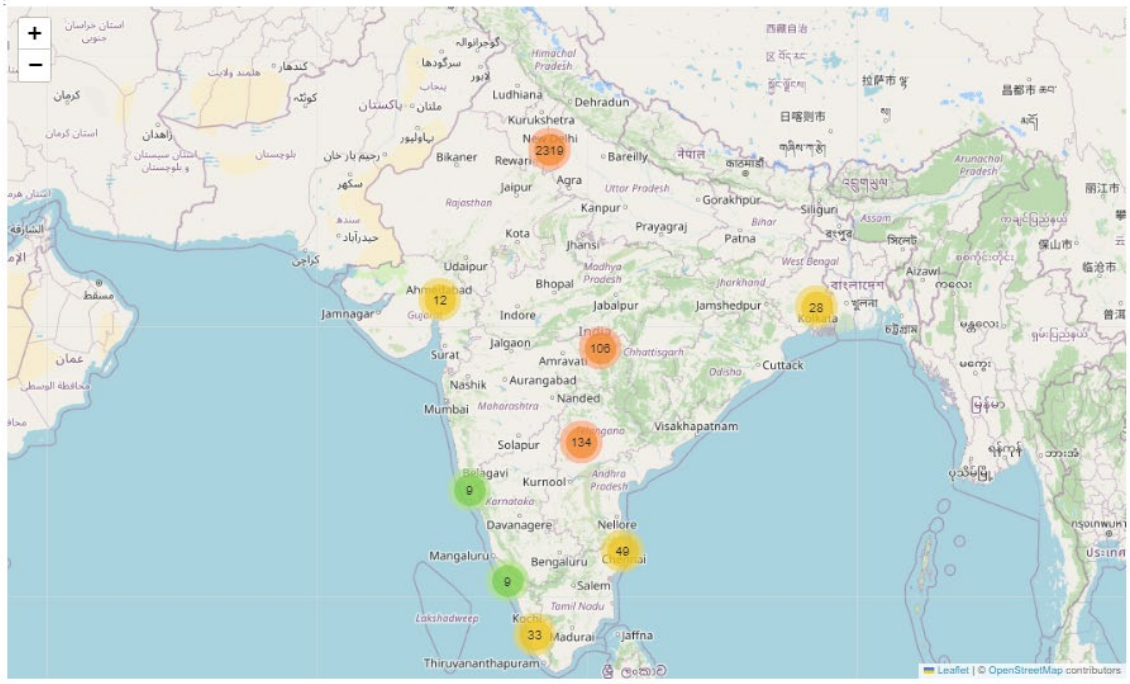


Let's now bring the citywise staffing to check the trends. As the data is mostly focused on Delhi, it is clearly mention in graph we should have some decent numbers for Delhi but for other cities unstaffed numbers will be high.



As the data has latitude and longitude, it will be interesting to locate the vendors / Ev stations on the map. Let's use Folium to achieve this. The idea is to have cluster to start with and we as we zoom in, the cluster gets divided and in the end the name of the EV station and the contact number is shown in the pop up.

Out[17]:



Conclusion

Thus, charging is more popular than battery swapping, and though battery swapping is discussed for its ease, it may take time to establish the needed infrastructure. Few charging station with only '4W' facility are very less in number compared to 2W and 3W. Payment options, particularly UPI, dominate in India, with a lack of cash-only stations, and surprisingly low card payments. While the dataset focuses on New Delhi, exploration of other cities reveals EV initiatives in places like Chennai and Kolkata. Staffing trends vary across cities, requiring further visualization to validate assumptions. Lastly, using latitude and longitude data to map EV stations.

Implementation

https://github.com/akshaylanjewar0872/EV-Market-Analysis/