

Market Segmentation

Analysing the respective market in India using Segmentation analysis for EV Market

By

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Overview

Using segmentation analysis to study the relevant market in India for providing EV Market as its first product is Car.

Before starting a marketing plan, segmentation analysis is a crucial step. Understanding how to analyse your market and audience is crucial.

The market for Electrical Vehicle worldwide is divided into categories based on product type Car.

Global Electrical Vehicle product Car By Distribution Channel (Brand, Speed, Fast Charge , Rapid Charge, Top Speed), and By Region (North India, East India, West India, South India) - Share, Size, Outlook, and Opportunity Analysis, 2020-2027.

Making ecologically responsible decisions and combating climate change are crucial given the rise in global warming. EVs are one such environmentally responsible option. The global car industry is undergoing a paradigm shift as it tries to switch to alternate, less energy-intensive solutions. The rise in oil import prices, rising pollution, and worldwide commitments to combat global climate change are some of the main reasons behind India's recent actions to quicken the switch to e-mobility. At the Conference of the Parties 26 (COP26) Summit, India pledged to work toward the aspirational goal of having at least 30% of private vehicles be electric by 2030.

The following actions were done to accelerate the growth of the Indian EV market.

First, in order to increase EV demand and achieve the aspirational objective, numerous traditional automotive players and oil firms are making significant investments. To name a couple, Indian Oil Corporation announced its plans to build 22,000 EV charging stations over the course of three to five years, and Skoda disclosed its intention to develop EVs locally in India starting in 2021.

Thirdly, in 2021, funding for EV startups increased by around 255% to a record-high \$ 444 Mn. For instance, the EV companies that obtained the most funding in 2021 were Ola Electric (\$253 Mn), Blusmart (\$25 Mn), Simple Energy (\$21 Mn), Revolt (\$20 Mn), and Detel (\$20 Mn). The Indian EV ecosystem consists of about 500 firms that span the whole EV value chain, with 63% of these startups being purely focused on manufacturing.

In the EV sector, India has already met one of the benchmarks. Bharat Heavy Electricals Limited (BHEL) has installed 20 solar-powered EV chargers on the highway connecting Delhi and Chandigarh, making it the first in the country to be e-vehicle friendly. In the financial year (FY) 2022, India's total number of charging stations increased by 285% year over year; aggressive government action is anticipated to hasten the expansion to 4 lakh stations by FY 2026.

Market Overview

In the last ten years, the market share of electric vehicles has grown significantly, and we anticipate this trend to continue. Even while the number of EVs has already increased dramatically on a global scale, estimates from the industry indicate that we have only begun to scratch the surface.

Up to 6.75 million vehicles were sold in 2021, a doubling of the market. In 2021, more electric vehicles were sold in a single week than were in all of 2012.

The industry is unmistakably preparing for the ambitious goal of zero emission targets set for 2050, which will be mostly driven by EVs.

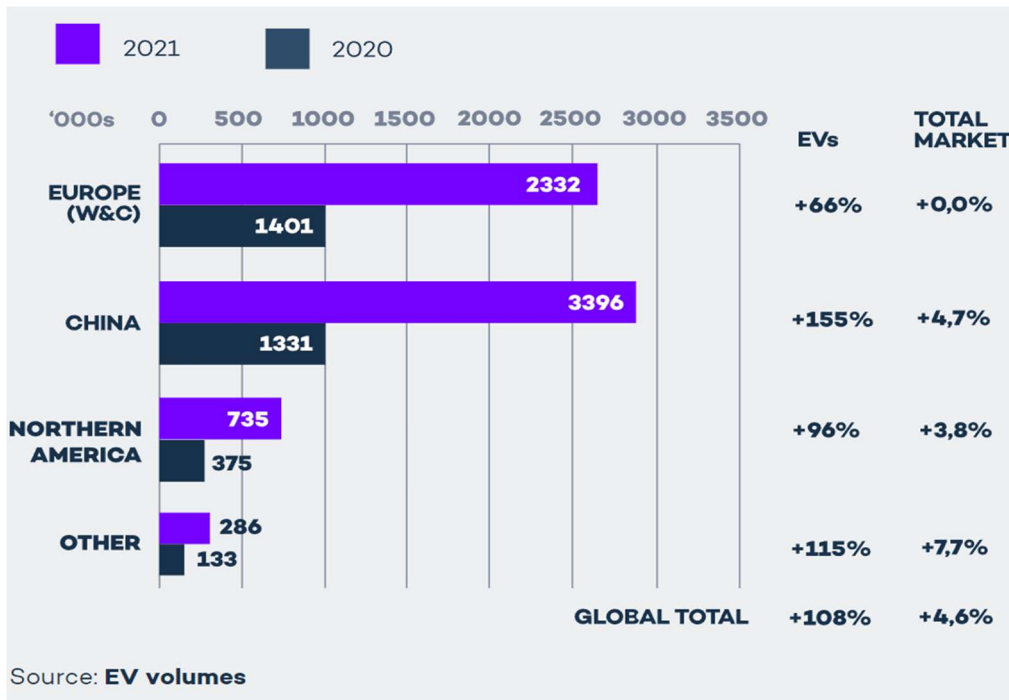
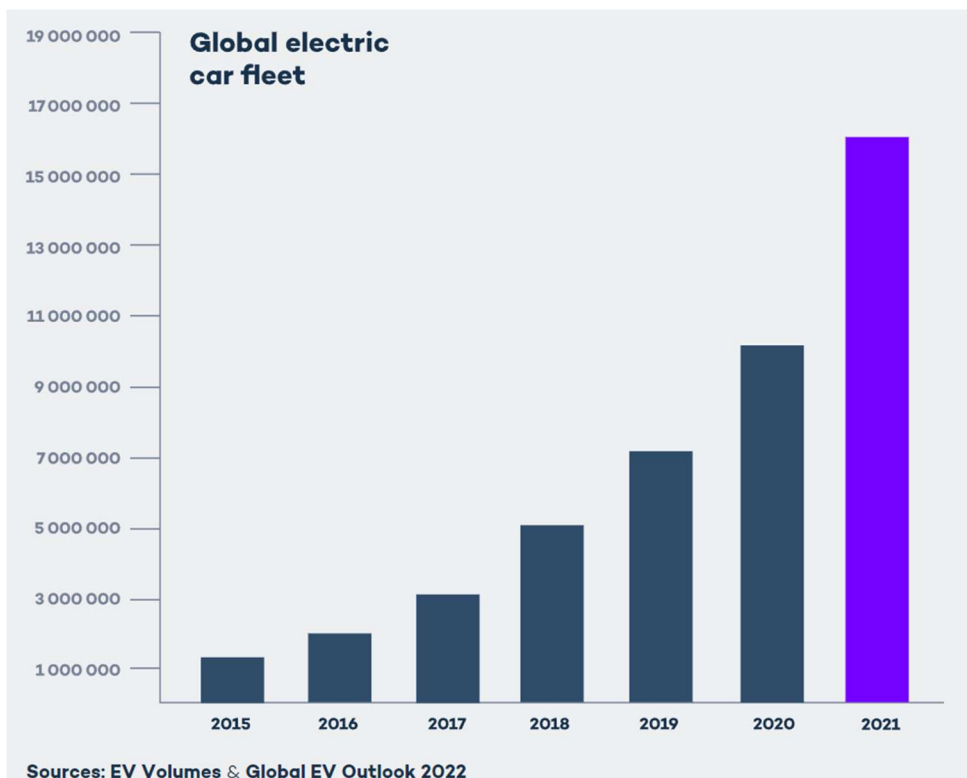


Figure 1: Growth of EV Market

GLOBAL ELECTRIC CAR MARKET SHARE AND SIZE

The year 2021 was already a major leap forward in terms of electric vehicle sales.



Situational Analysis

Environment

The situation analysis is required prior to setting up a marketing strategic plan. The culture of EV Market is growing at an unimaginable rate.

Current Trends in Electrical Vehicle Market Industry

- The Electrical Vehicle sales are expected to reach 39 millions unit by 2030
- EV battery costs per kWh are expected to drop to USD 50-60/kWh by 2030, thereby reducing the costs of electric cars by around 40-50% as compared to that in 2021.
- Yes, the Electric Vehicle market is projected to grow from 8 million units in 2022 to 39 million units by 2030, at a CAGR of 22%(2022-2030).
- Global automotive players such as BYD, Tesla, Nissan have been leading the EV market from past 2-3 years.
- EV battery price reductions, connected cars, battery management systems, Smart charging, wireless on the go charging are the key market trends or technologies which will have a major impact on the electric vehicle market in the future.

Implementation

Data sources

We have collected some dataset which is somehow related to case.

Packages/Tools Used:

Numpy: To calculate the numerical calculations related to arrays.

Pandas: To read/load the datasets

We have considered one dataset for the analysis:

1. It is a survey result of the customers preference and most purchased cars.

```
: df = pd.read_csv('https://raw.githubusercontent.com/sumeet0701/EV-market-segment-analysis/main/EV%20Data%20set/clean_dataframe.csv')
df.drop('Unnamed: 0', axis=1, inplace=True)
df['inr(10e3)'] = df['PriceEuro']*0.08320
df.head(5)
```

	Brand	Model	Accel	TopSpeed	Range	Efficiency	FastCharge	PowerTrain	PlugType	BodyStyle	Segment	Seats	PriceEuro	inr(10e3)
0	Tesla	Model 3 Long Range Dual Motor	4.6000	233.0000	450.0000	161.0000	940.0000	All Wheel Drive	Type 2 CCS	Sedan	D	5	55480	4615.9360
1	Volkswagen	ID.3 Pure	10.0000	160.0000	270.0000	167.0000	250.0000	Rear Wheel Drive	Type 2 CCS	Hatchback	C	5	30000	2496.0000
2	Polestar	2	4.7000	210.0000	400.0000	181.0000	620.0000	All Wheel Drive	Type 2 CCS	Liftback	D	5	56440	4695.8080
3	BMW	iX3	6.8000	180.0000	360.0000	206.0000	560.0000	Rear Wheel Drive	Type 2 CCS	SUV	D	5	68040	5660.9280
4	Honda	e	9.5000	145.0000	170.0000	168.0000	190.0000	Rear Wheel Drive	Type 2 CCS	Hatchback	B	4	32997	2745.3504

Demographic segmentation:

Demographic segmentation refers to the categorization of the target market based on specific variables like age, education, and gender. Examples of demographic segmentation in marketing:

1. Segmentation by Family: When marketing items like diapers and cereals, organizations typically create advertisements that appeal to the traditional young nuclear family structure – father, mother, and children.
2. Segmentation by Location: If your product is restricted to a specific location, this information will reflect on your marketing strategy. For example, in crafting ads, you may use language that is peculiar to that environment.
3. Segmentation by Gender: Adverts and market strategies are typically gender-specific. For instance, when creating an advert for a lipstick brand or other makeup products, organizations may create adverts that center women.

Geographic segmentation:

A marketing strategy created by dividing the target market into segments on the basis of factors such as economics, food habits, clothing habits, languages, traditions and many other traits is known as geographic segmentation.

● Products based on season:

Regions such as Canada and Russia, that are cold throughout the year, will see a huge number of warm clothing traders promoting and selling their products. They focus on targeting their products only to locations in Canada and Russia. Due to such targeted selling, it becomes easy for traders to make profits. These traders will fail to make profits if they target warmer parts of the world, such as Australia.

● Size and type of region:

There are countries in Asia, such as India, where people speak different

languages in different states. This is the primary reason for successful Western fast food outlets to devise new strategies to target local flavors and costs to flourish in the Indian market. A strategy designed around geography will help these outlets compete with local players and grow in a market as diverse as India.

- **Food inclinations:**

With the change in the region, there is a drastic change in food preference as well. In the U.S., there is a constant supply of seafood across the east and west coast, which are promoted all throughout the year. In Asian countries, such as China, food habits are highly dependent on religious ceremonies. For example, the Chinese eat dumplings during the Spring festival to convey their relationship with God. Local food chains produce food by keeping these aspects in mind to make sure they do not suffer losses with the change in occasions.

- **Launch products or services in new regions:**

Geographic segmentation is used when an organization wishes to launch a product/service in a new geographic location. For a Western burger giant to launch a new outlet in underdeveloped countries such as, Bangladesh, where most citizens are habituated to breads such as, naan, roti and not the ones that the burger giant offers, it's crucial to understand how to establish or mold their products to suit the palate, traditions and culture of this geographic segment.

Data Pre-processing:

Tools Used:

1. SkLearn: We have no null values in our dataset so categorical variable stored in and integer or float stored in two other series respectively.

```
cat_col = df.select_dtypes(include=['object']).columns  
num_col = df.select_dtypes(include=['int', 'float']).columns
```

```
len(num_col)
```

```
8
```

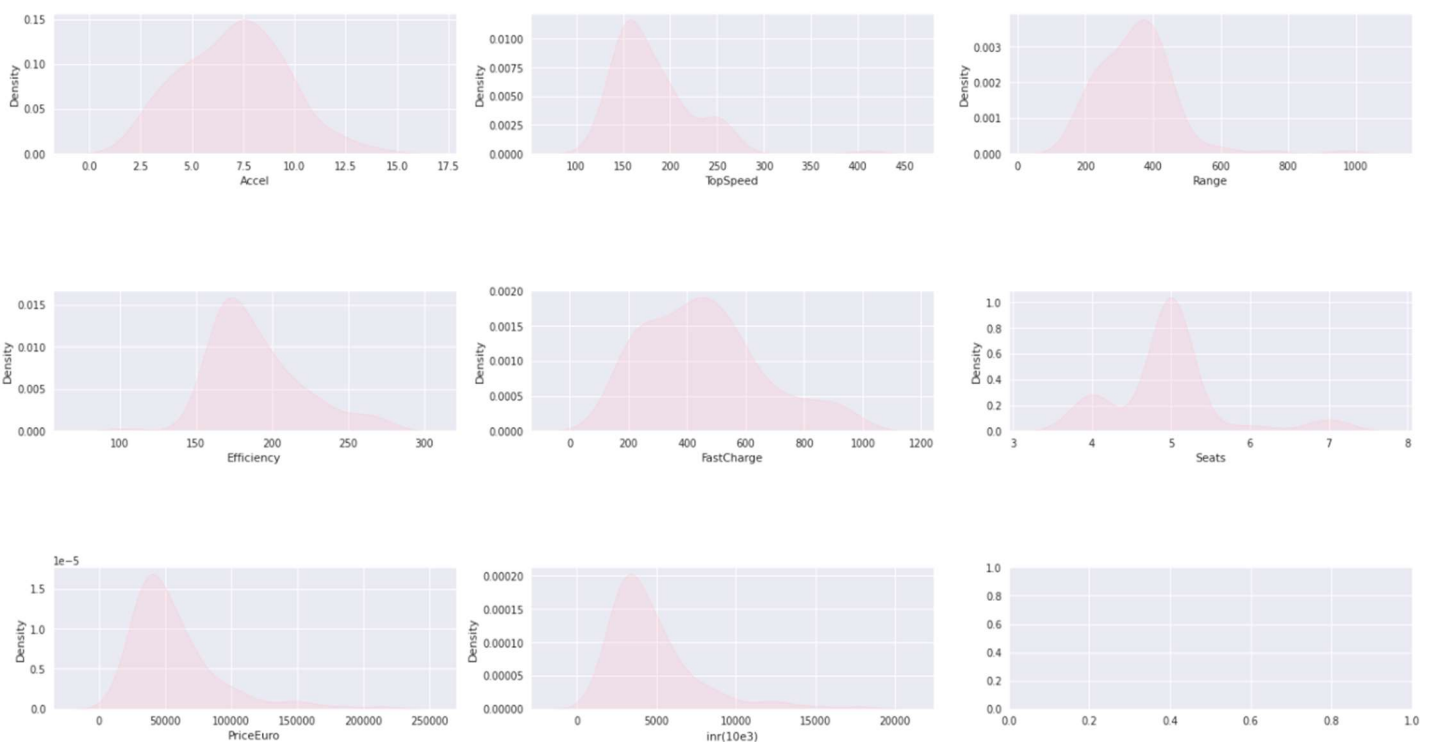
Data Visualization and Analysis:

KDE Plot described as Kernel Density Estimate is used for visualizing the Probability Density of a continuous variable. It depicts the probability density at different values in a continuous variable. We can also plot a single graph for multiple samples which helps in more efficient data visualization.

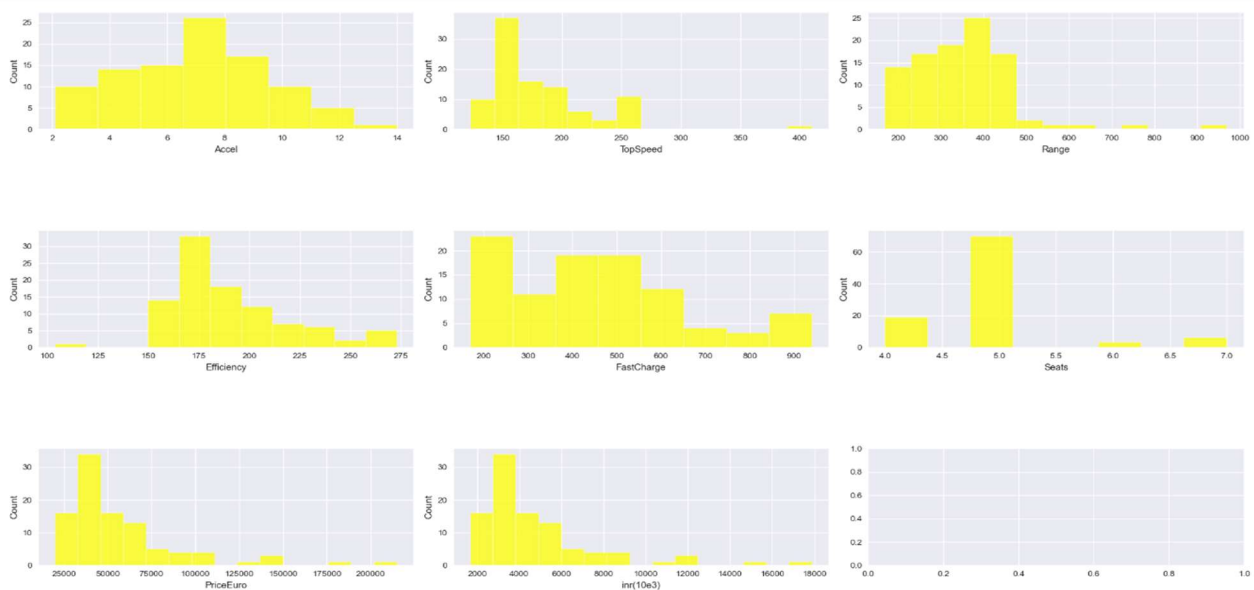
```
|:
fig, ax = plt.subplots(ncols=3, nrows=3, figsize=(20,10))
index = 0
ax = ax.flatten()

for col in num_col:
    sns.kdeplot(x=col, data=df, ax=ax[index], color='pink', shade=True)
    index += 1
plt.tight_layout(pad=0.5, w_pad=0.7, h_pad=5.0)
```

KDE plot will present relation between each variable and count/density .

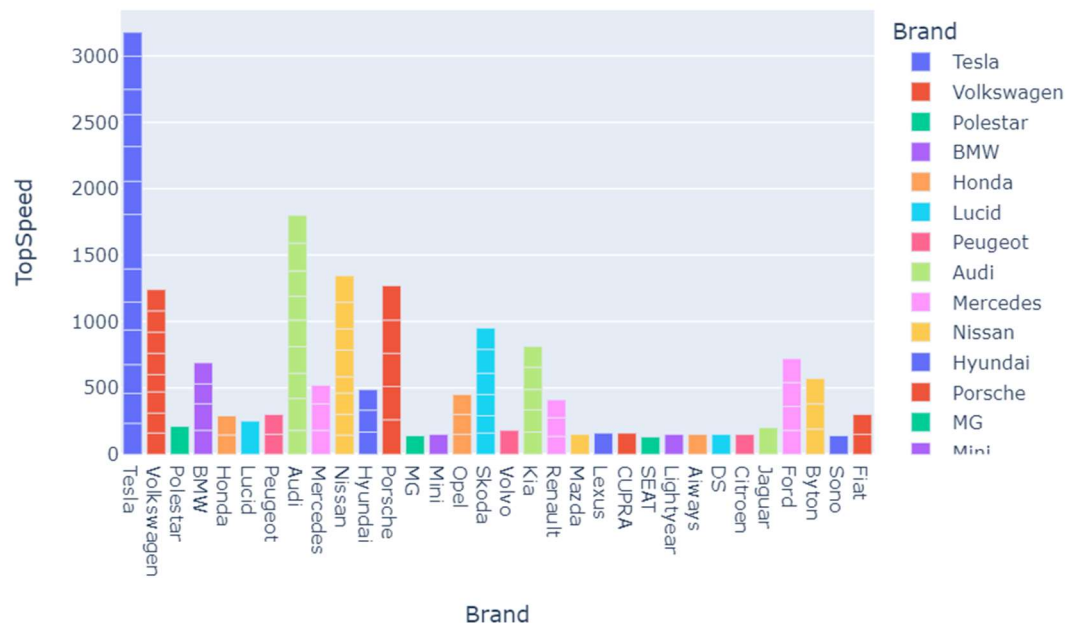


Count based on different Variable which related to the EV market



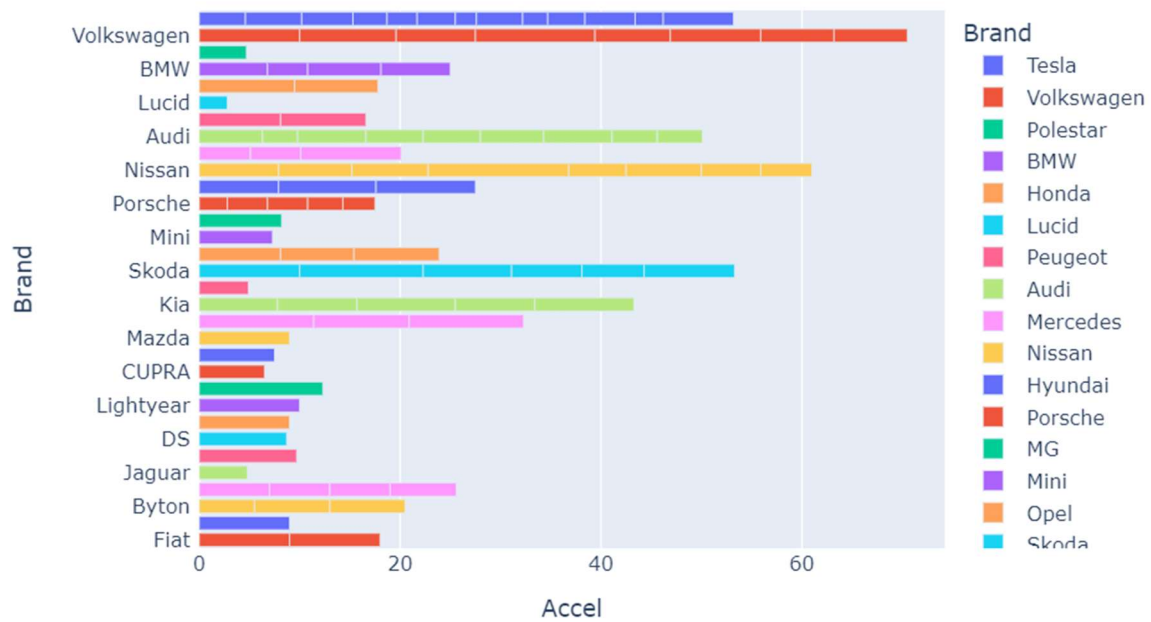
The Brand which have the top most the speed. The the brand which have the topmost in the dataset.

Tesla have the fastest speed with 300.0 km/hr.

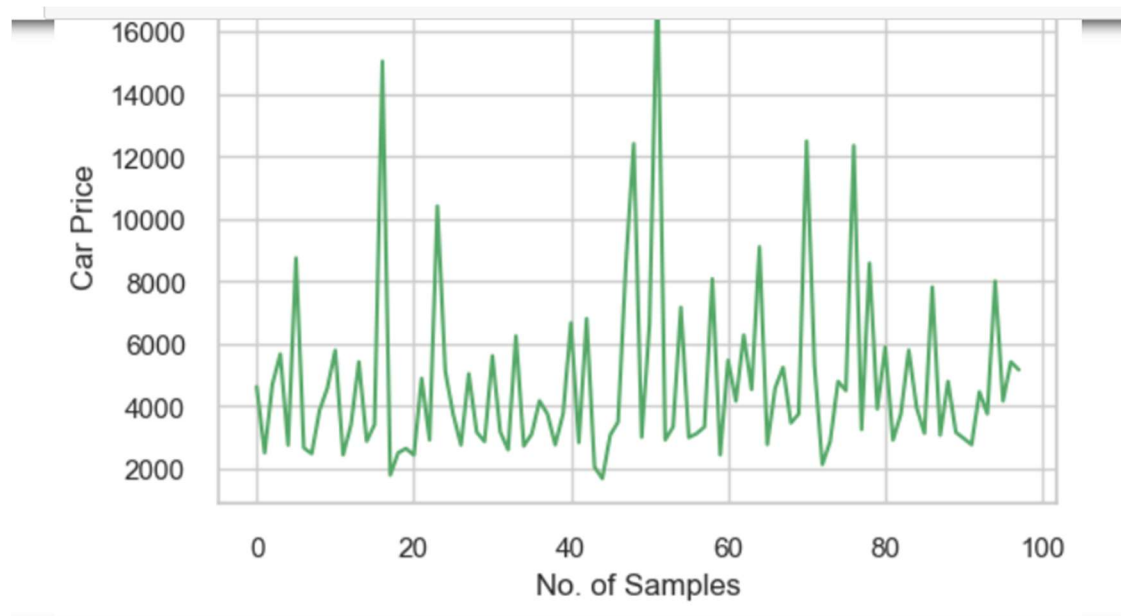


The Brand of the Car which have the fastest acceleration.

The Volkswagen brand Car have fastest acceleration.



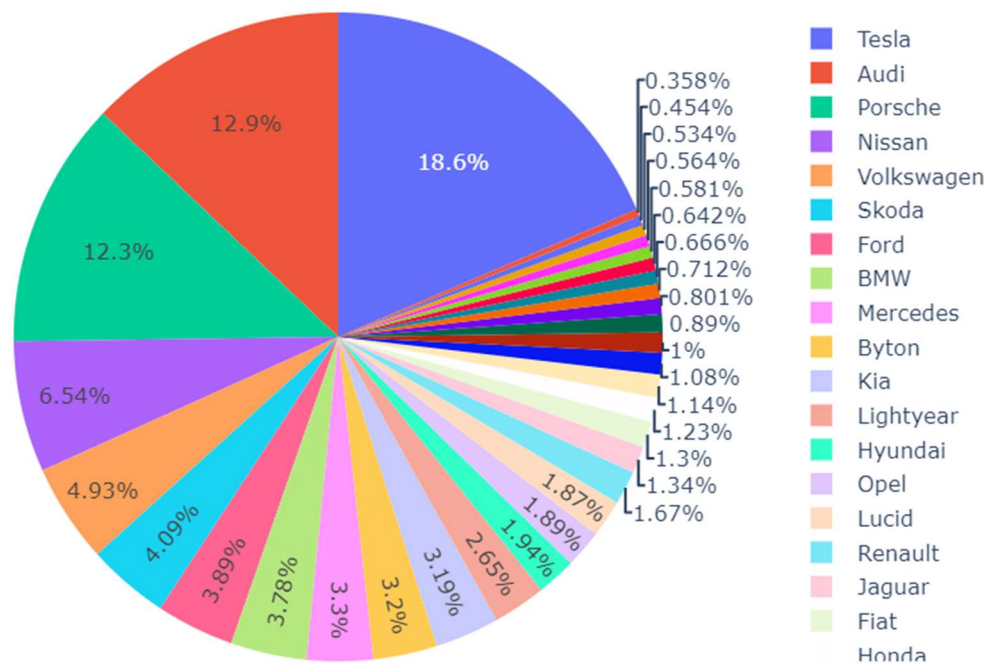
Now we are find the relation between the Car_Price and no of samples.



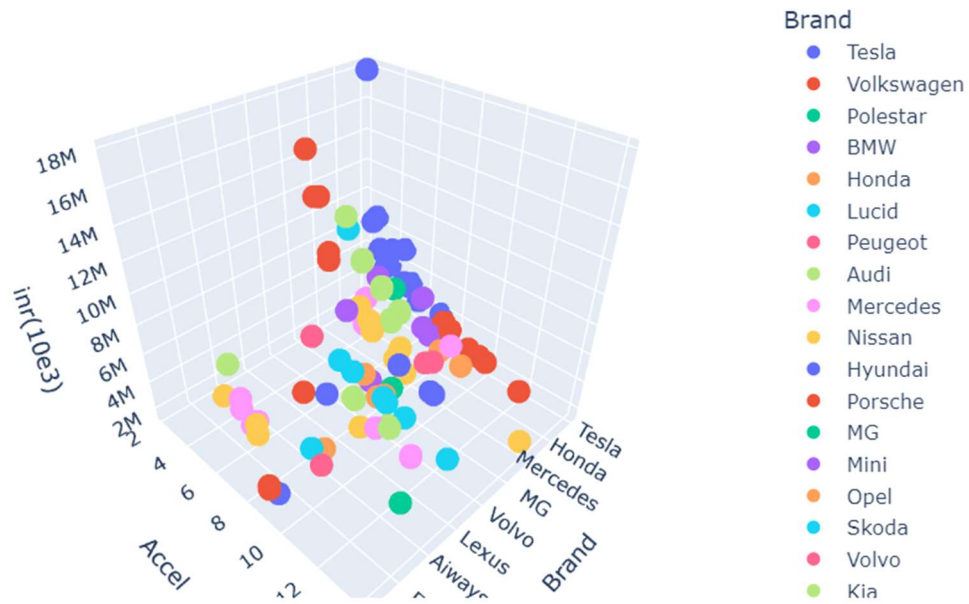
Relation between type of wheel drive and price_segment:



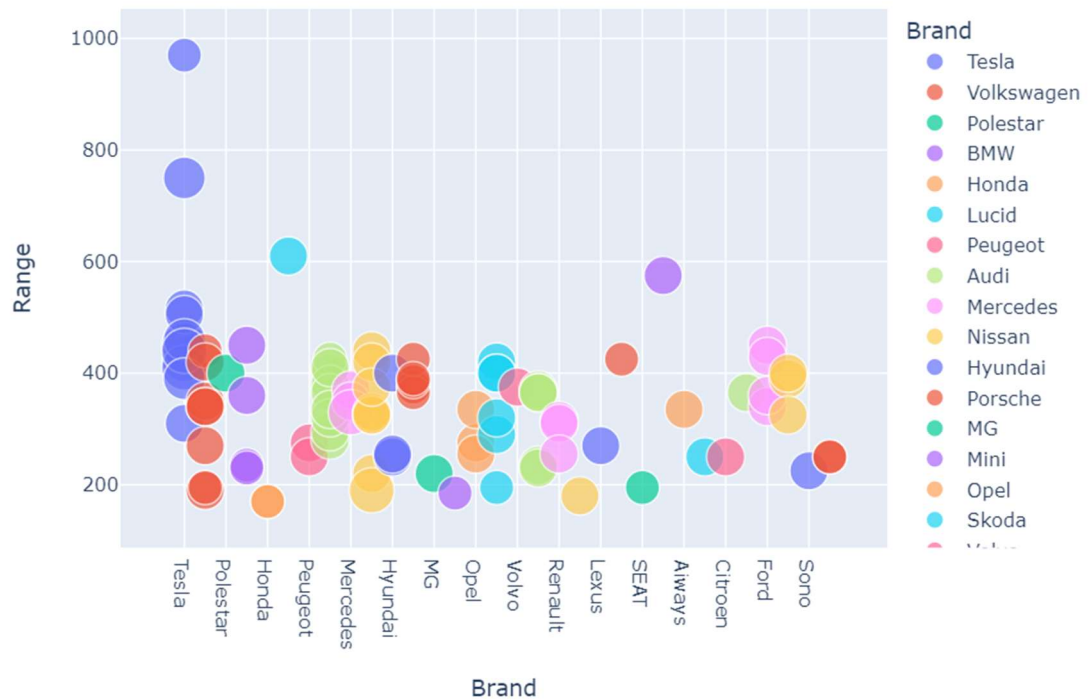
The Brand Values of the electrical car are following:



The 3D plot for the price of different cars on the basis of their brand and acceleration:



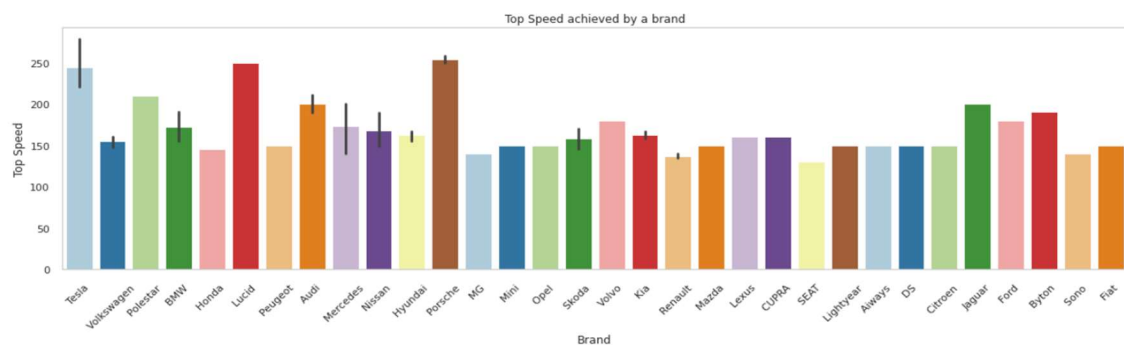
The Range of different Cars on the basis of their brand and Seats:



Heatmap to show the correlation of the data

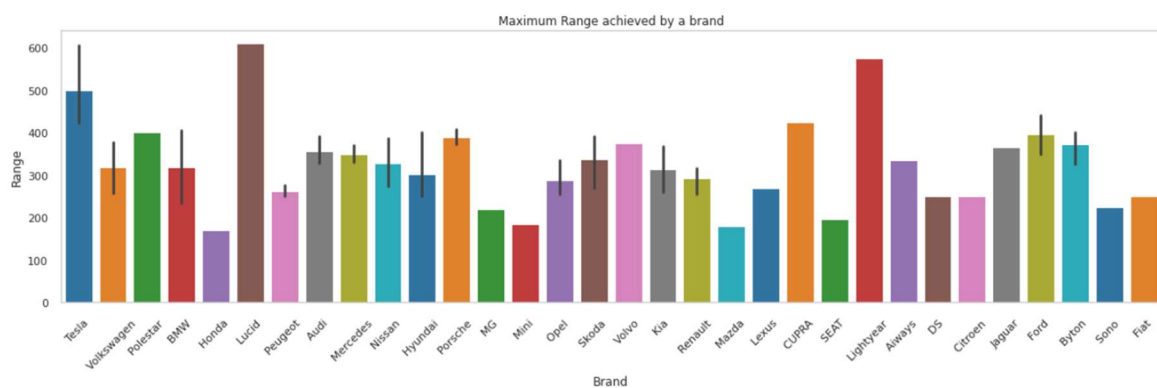


Top speeds achieved by the cars of a brand:



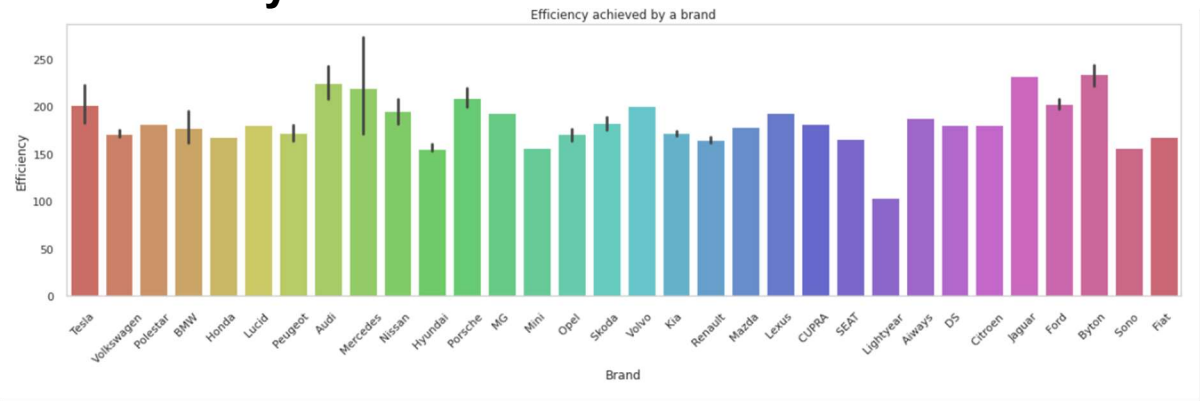
Porsche, Lucid and Tesla produce the fastest cars and Smart the lowest

Range a car can achieve



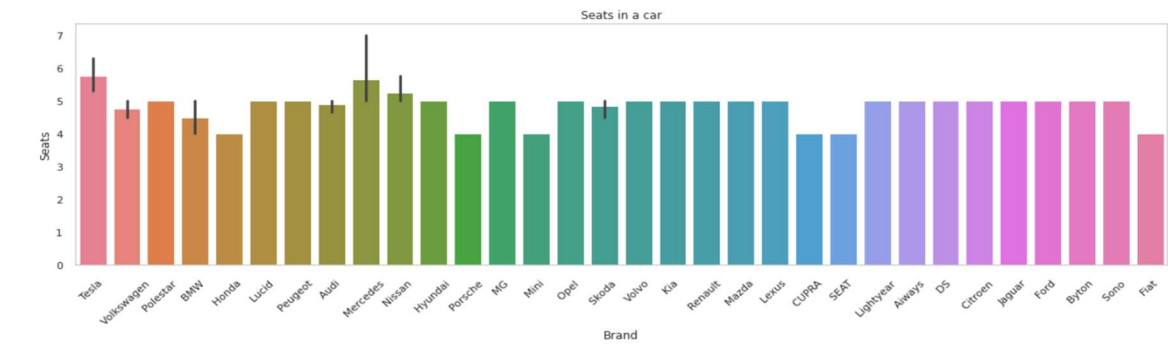
Lucid, Lightyear and Tesla have the highest range and Smart the lowest

Car efficiency



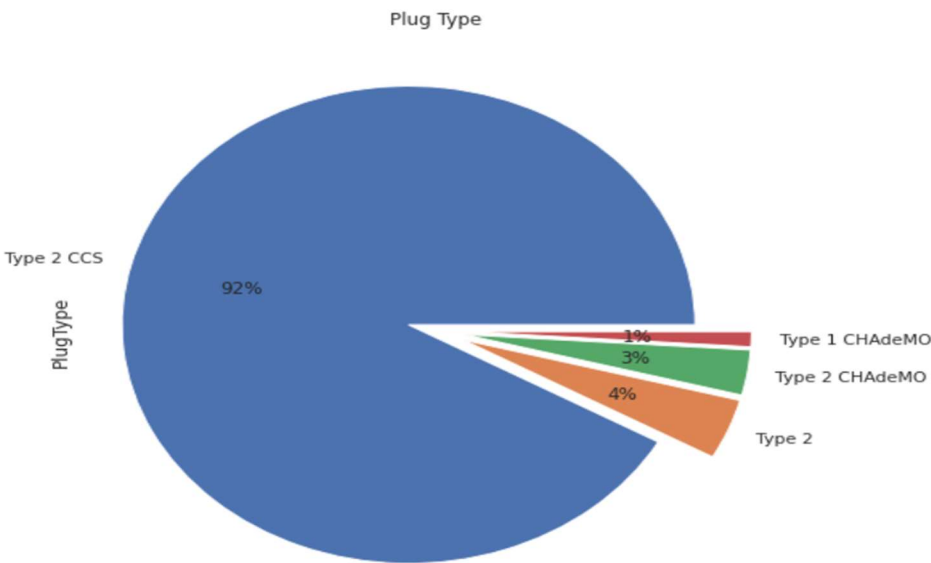
Byton , Jaguar and Audi are the most efficient and Lightyear the least

Number of seats in each car

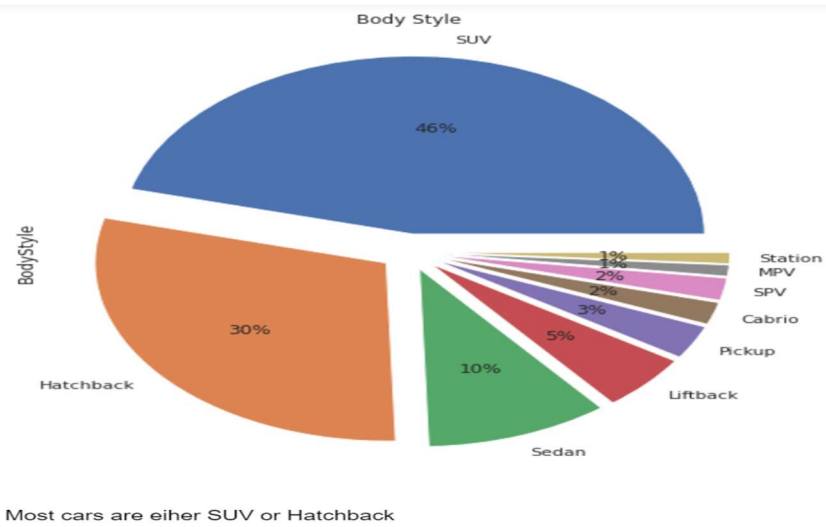


Mercedes, Tesla and Nissan have the highest number of seats and Smart the lowest

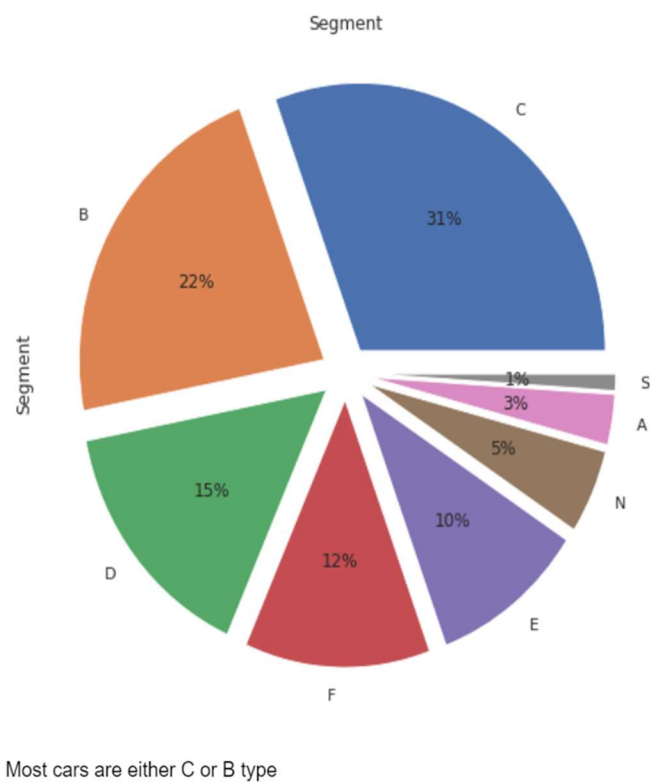
Type of Plug used for charging



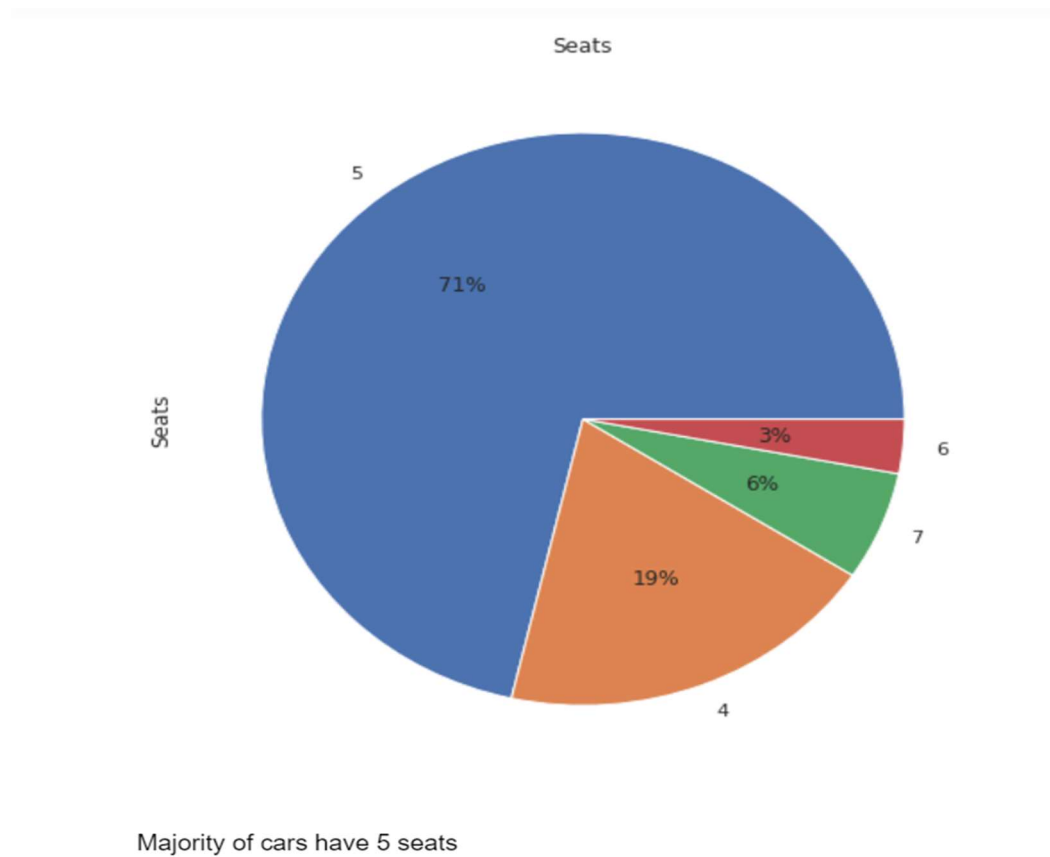
Cars and their body style



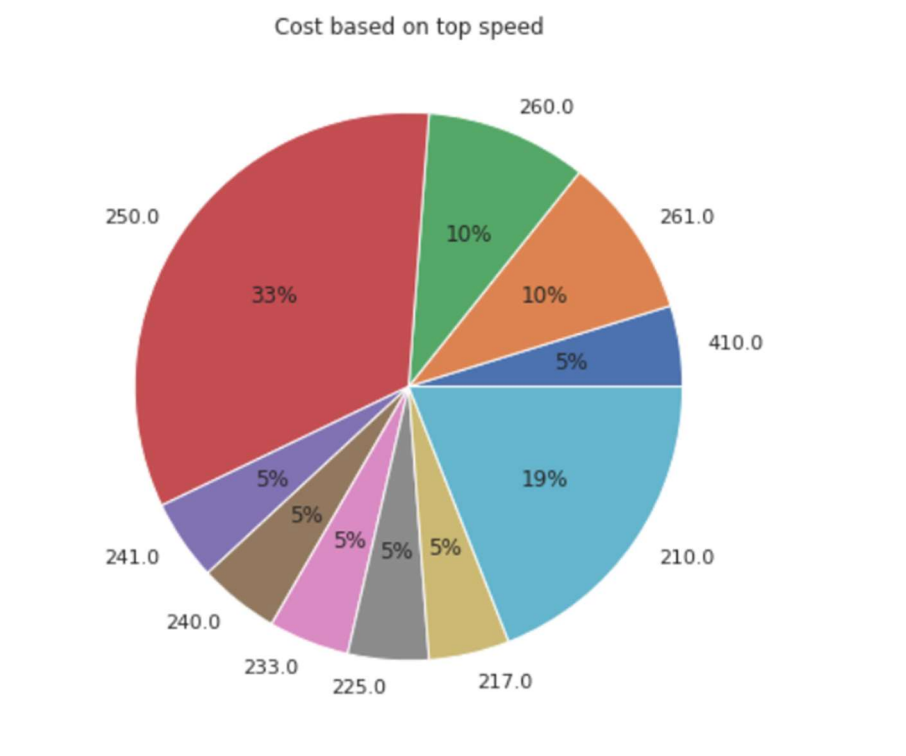
Segment in which the cars fall under



Number of Seats



Cost Based on Top Speed:



Clustering:

Clustering (or cluster analysis) is a technique that allows us to find groups of similar objects, objects that are more related to each other than to objects in other groups. Examples of business-oriented applications of clustering include the grouping of documents, music, and movies by different topics, or finding customers that share similar interests based on common purchase behaviors as a basis for recommendation engines. The k-means algorithm belongs to the category of prototype-based clustering. Prototype-based clustering means that each cluster is represented by a prototype, which can either be the centroid (average) of similar points with continuous features, or the medoid (the most representative or most frequently occurring point) in the case of categorical features. While k-means is very good at identifying clusters with a spherical shape, one of the drawbacks of this clustering algorithm is that we have to specify the number of clusters, k , a priori. An inappropriate choice for k can result in poor clustering performance. We can understand the working of K-Means clustering algorithm with the help of following steps

Step 1 – First, we need to specify the number of clusters, K , need to be generated by this algorithm.

Step 2 – Next, randomly select K data points and assign each data point to a cluster. In simple words, classify the data based on the number of data points.

Step 3 – Now it will compute the cluster centroids.

Step 4 – Next, keep iterating the following until we find optimal centroid which is the assignment of data points to the clusters that are not changing any more.

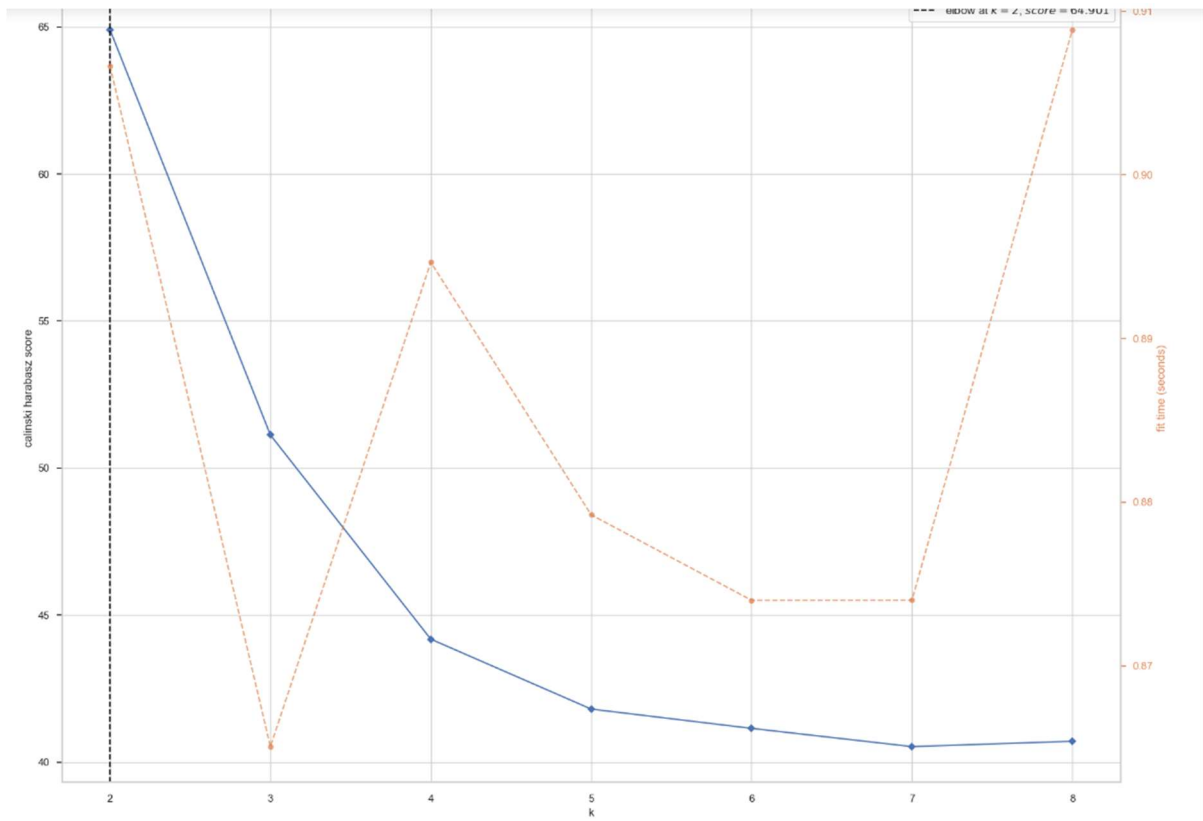
Segmentation:

Using K Means:

By using K Means Cluster we can divide the whole dataset within 4 cluster as

Following:

```
model = KMeans(random_state=40)
visualizer = KElbowVisualizer(model, k=(2,9), metric='calinski_harabasz', timings=True)
visualizer.fit(t)          # Fit the data to the visualizer
visualizer.show()          # Finalize and render the figure
```



Here it is clear and verified using Elbow method that there is 4 cluster in the dataset.

Target segment :

So from the analysis we can see that the optimum customer base or the targeted customers could be purchase a car from range of 2M - 8M in INR.

Marketing Mix:

Pricing our items requires both art and science. The most crucial thing is to comprehend and be aware of your cost of production. You can then modify based on the qualities of the product, a certain pricing strategy, customer price sensitivity, customer values, and other variables. When consumers see a product price, it conveys messages to them about quality, fit with the market outlet, expectations for support, etc. Price helps shape how people perceive your goods. You can set a pricing and make required adjustments by keeping precise and thorough records that account for all processes, including production, packaging, storage, promotion, transportation/distribution, and sales.

4Ps of Marketing Mix

The 4Ps helps companies to review and define key issues that affect the marketing of its products and services and is often now referred to as the 7Ps framework for the digital marketing mix.

Marketing as a whole relies on all seven Ps.

It is essential to consider them as a whole, and not in isolation. Customers must experience a coherent view of your company and your product, and that can only come from viewing the customer experience from end-to-end across all seven Ps.

Importance of Marketing Mix

It helps understand what our product or service can offer to our customers and helps plan a successful product offering. Helps with planning, developing and executing effective marketing strategies. Help determine whether your product or service is suitable for your customers.

Product: Since the company is starting with the dairy product so we can't comment about the product.

Price:-As we have dairy products only so their price would be according to the availability from the source and price may vary as the market goes up or down.

Place:- Through the analysis we have seen that bangalore is the best suitable for any startup or online goods delivering company.

Promotion:

Promotion can be based on the analysis. More offers and promotions can be given to the segments that are more valuable to the company

Codes:

<https://github.com/sumeet0701/EV-market-segment-analysis>

References:

<https://www.kaggle.com/code/agarwalvishal00/ev-dataset-eda-and-regression/data>