What are the most types of cars getting rented? And from Where?

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Introduction:

The car rental industry is an essential component of the global transportation market, offering short-term vehicle leasing solutions for both personal and business use. It provides a convenient alternative to car ownership, serving tourists, business travelers, and individuals requiring temporary access to vehicles.

From a business perspective, car rental companies are influenced by demand fluctuations tied to tourism, corporate travel, and urban mobility trends. Profitability is driven by rental fees, add-on services like insurance and GPS systems, and new subscription options.

Success in this sector depends on efficient fleet management, strong customer service, and partnerships with travel aggregators.

Project Objectives:

In this project, I will be investigating the following questions:

1- Which cars are most rented based on their type, model, make and year?
2- What are the top 5 states for car rentals?
3- Who are the top 5 car owners?
4- What are the distributions of the cars based on their fuel type? And which cars are getting more rented based on their fuel type?
5- Which is the top car type earning the most daily rate?
6- Show the car ratings.

Analysis Methodology Used:

I build my analysis based on the Cross-Industry Standard Process for Data Mining (**CRISP-DM**) framework. This framework covers the following 6 phases:

- Business understanding
- Data understanding
- Data preparation
- Modeling
- Evaluation
- Deployment/communication

Dataset Details:

- Dataset Name:

    Cornell Car Rental Dataset.
- Dataset description:

    The **Cornell Car Rental Dataset** is designed to analyze patterns and trends in car rental operations, providing comprehensive information about customer behavior, rental transactions, and vehicle inventory management.
- Dataset columns structure and types:

    Dataset Columns Description:

    fuelType : Type of Fuel Used by Car.

    rating : Cumulative Ratings Given for the Car.

    renterTripsTaken : No. of total trips taken for the Car (period unknown).

    reviewCount : No. of reviews given for the Car.

    location.city : City Location of Car.

    location.country : Country Location of the Car.

    location.latitude : Latitude of Car's Location.

    location.longitude : Longitude of Car's Locaiton.

    location.state : State in Which the Car is Located.

    owner.id : Owner's ID.

    rate.daily : the car rental cost per day (in U.S $).

    vehicle.make : make of the car.

    vehicle.model : model of the car.

    vehicle.type : type of the car.

    vehicle.year : make year of the car.

Analysis Results & Findings:

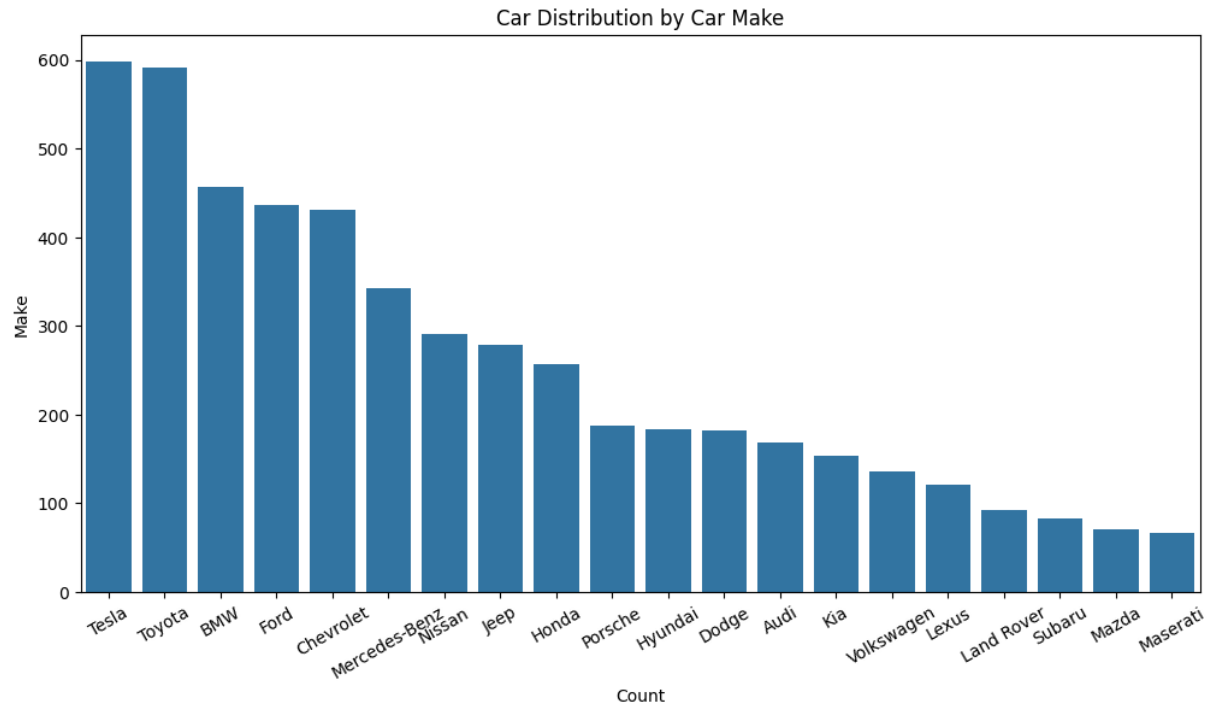**1- Car Rental Analysis based on car type, model, make and year:**

    a. The below image shows the distribution of the different car types. CAR type is the dominant type representing about 62.5% followed by the SUV type which represents about 29.3 %.
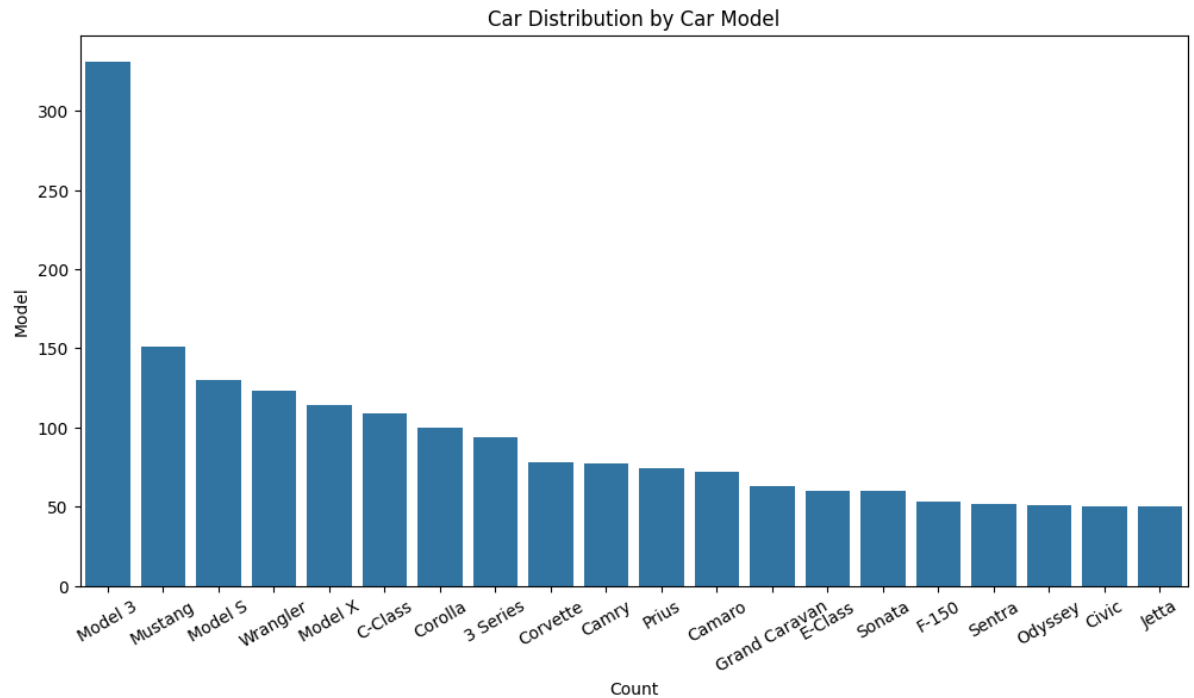

Car Distribution by Car Type
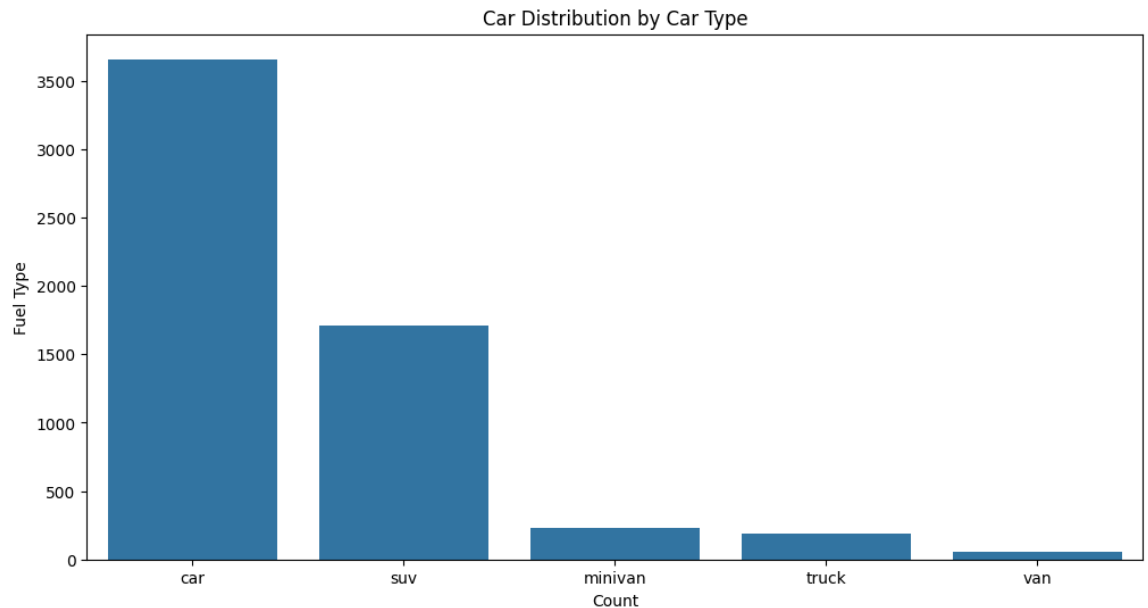
    b. As we can see from the below image, Gasoline cars are much more rented than the other car types.
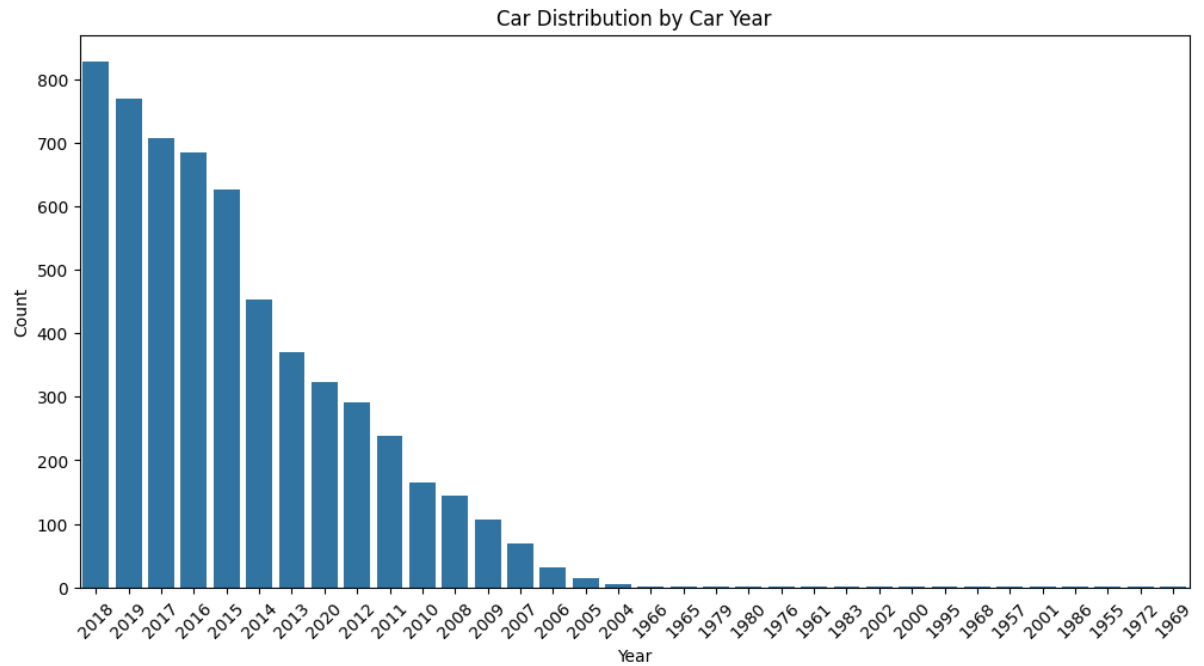

Car Distribution by Car Fuel Type
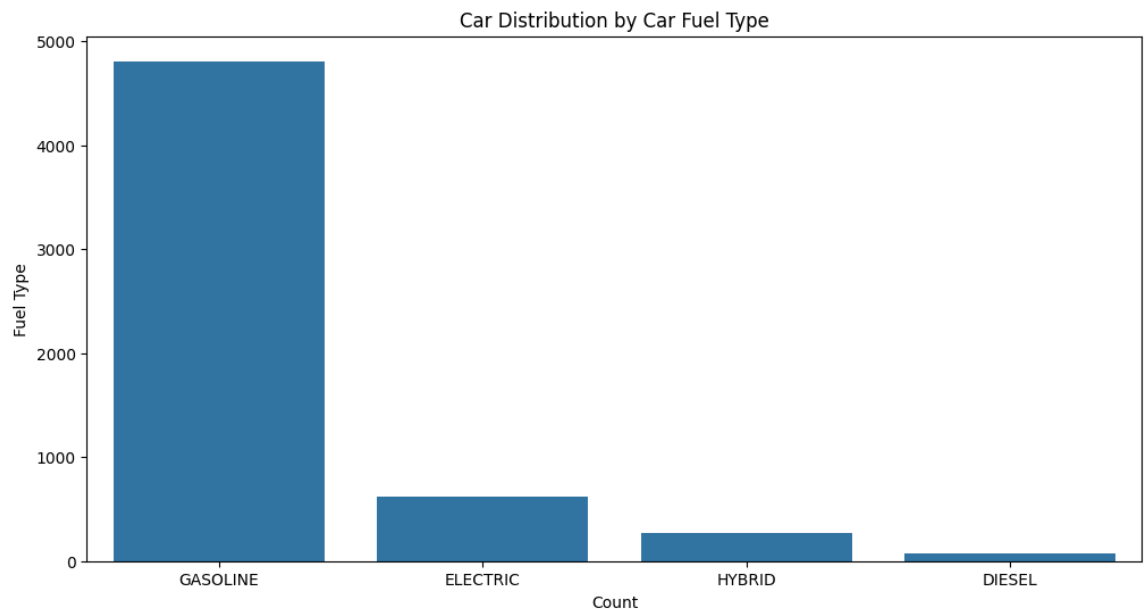
c. The below image shows that the top 5 rented cars by make are Tesla, Toyota, BMW, Ford and Chevrolet.

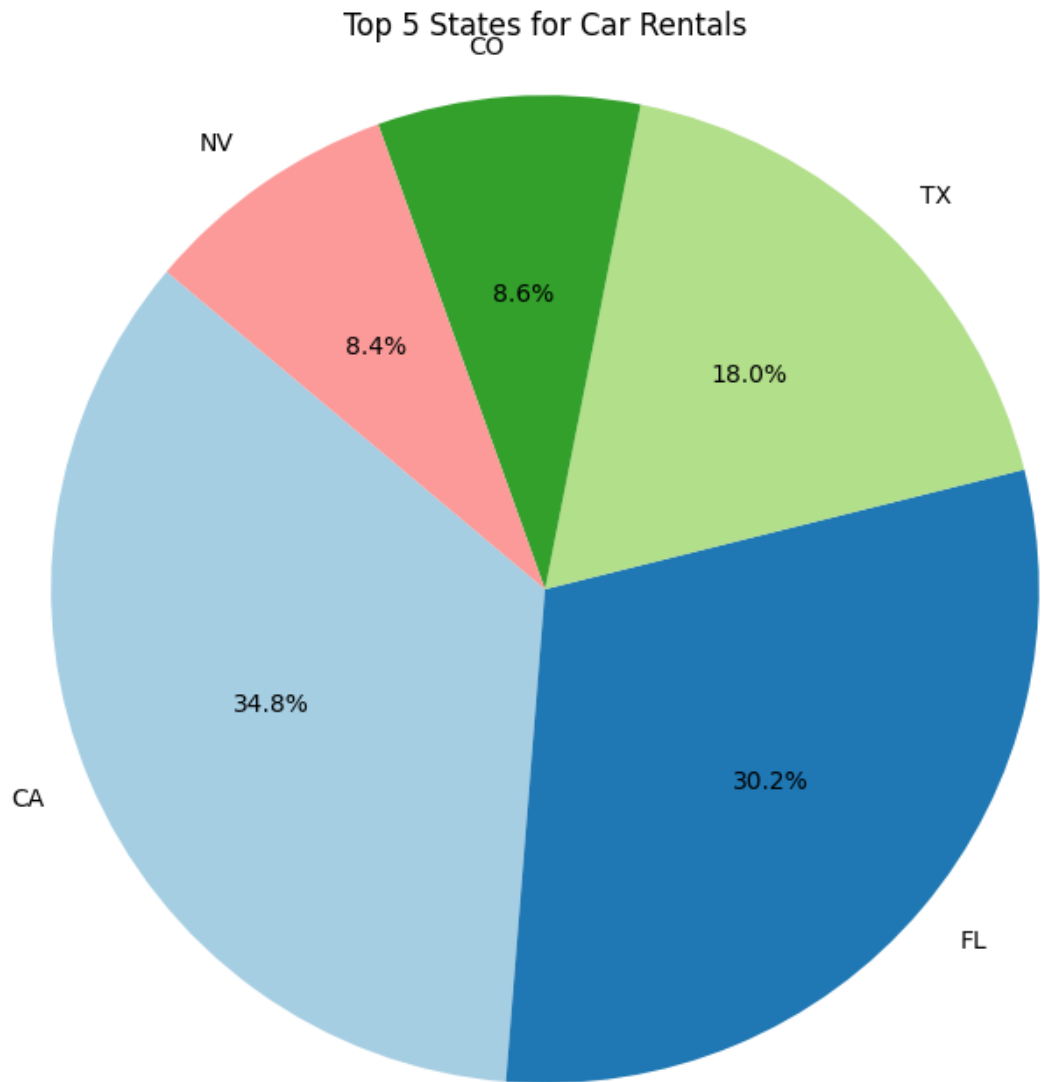d. When it comes to car model, Tesla Model 3 is the most rented car.

e. It is also clear that people tend to rent new cars more than older cars.

Car Distribution by Car Year

2- **Car Rental Analysis based on Location:**

    a. The below image shows the top 5 states for car rental. It very clear that California followed by Florida have the highest rental rates.

Top 5 States for Car Rentals

b. Here is a full picture showing the other states.

Frequency Distribution of States
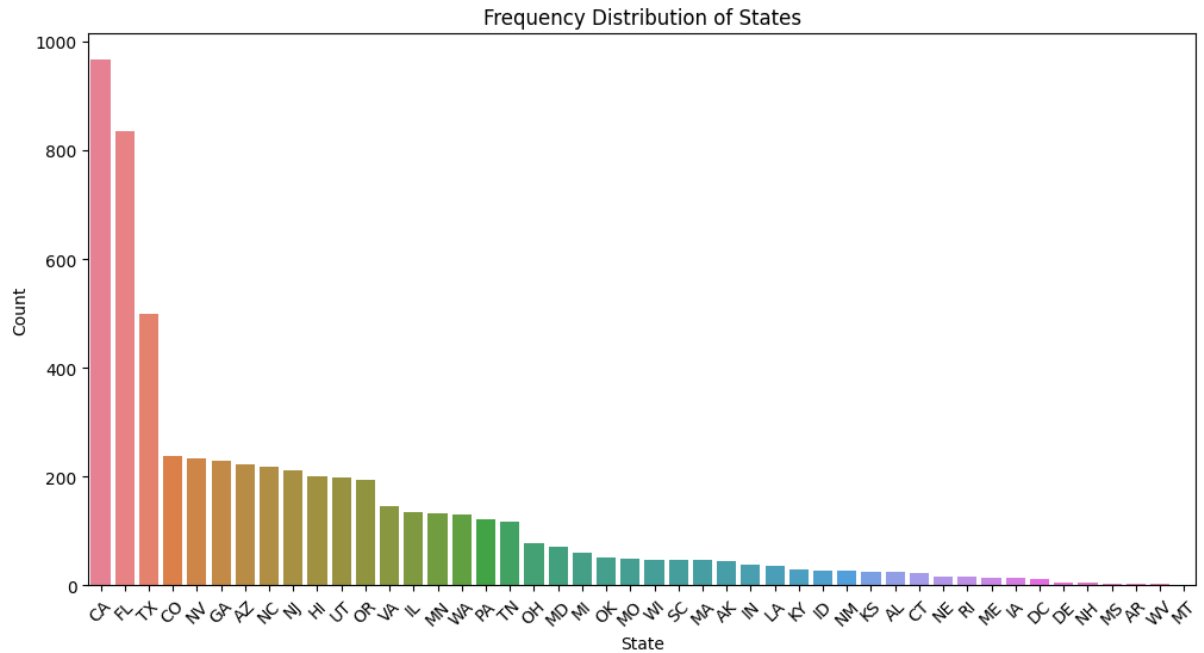
3- **Car Rental Analysis based on Car Owners:**

   a. The below stats show the top 5 car owners and how many cars each has.

| Car Owner ID	Number of Cars
1300675	49
4009047	47
64265	40
2459011	38
1300139	33

4- **Which car type is making the highest daily rate:**

   a. The below image shows that Vans make the highest daily rate compared to the other car types.
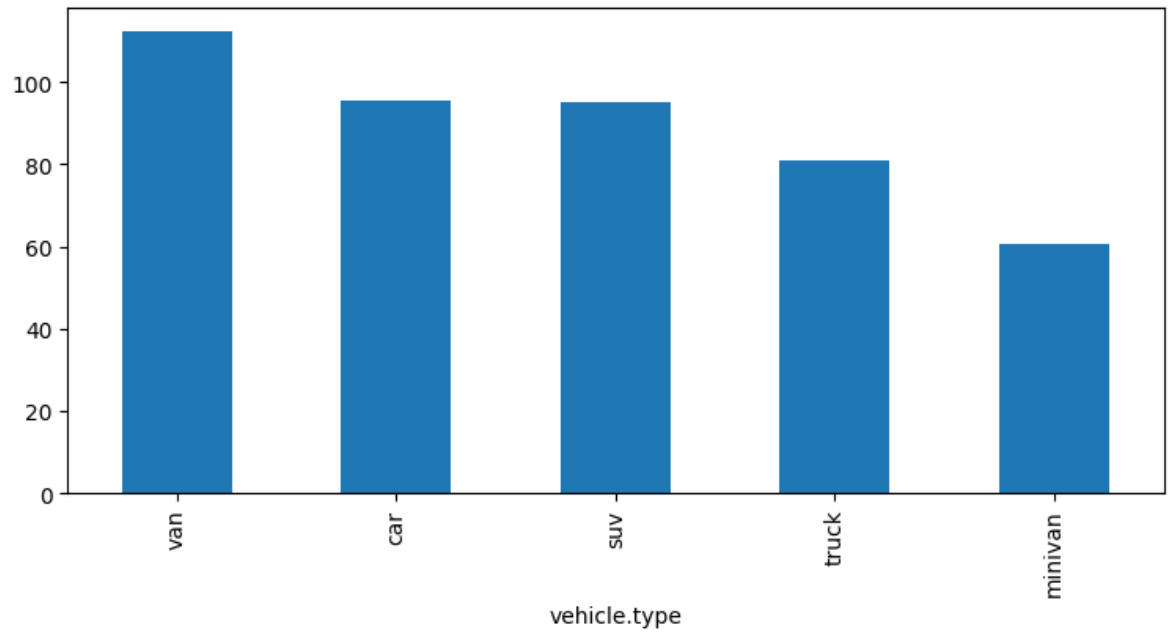
5- Car Rental Service Rating:

a. It seems that most people are happy with the rental service as the below image shows that most people gave high rating.

Histogram of Ratings
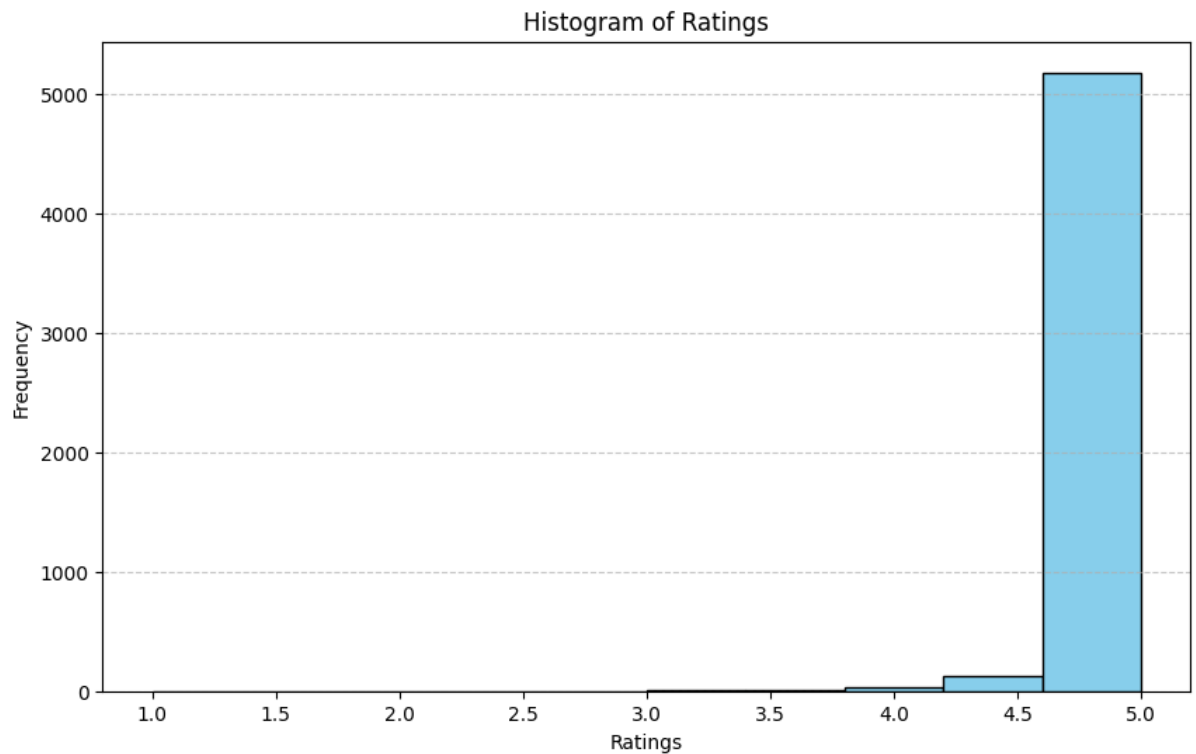
Conclusion:

The above exploratory data analysis of the car rental dataset provided valuable insights into the patterns, trends, and relationships within the data. Key findings include:

1. **Demand on Car Type**: The analysis revealed that most customers tend to rent gasoline cars.

2. **Car Make & Model Preferences**: It was very clear that most customers preferred to rent Tesla & Toyota with new models.

3. **Geographical Insights**: California & Florida are the top states for car rentals.

4. **Customer Satisfaction**: the customers ratings indicate that they are very happy with the rental service.

Resources:

- Chat GPT
- https://www.kaggle.com/datasets/kushleshkumar/cornell-car-rental-dataset
- https://www.kaggle.com/code/yassershrief/car-rental-eda-including-dashboard
- https://medium.com/@ericvenarusso2/what-are-the-most-common-programming-languages-used-in-brazil-8d630b76df2f
- https://github.com/ericvenarusso/Write-a-Data-Science-Blog-Post/blob/master/README.md