Uber Supply-Demand Gap Analysis

Contribution: Individual
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Project Type: EDA

Project Summary

This EDA project aims to uncover insights from Uber ride request data to identify key supply-demand issues. By analyzing ride status, request times, and pickup locations, we aim to understand when and where cancellations or unavailability are most common.

The insights will help recommend strategies to reduce unfulfilled rides and improve driver allocation.

Business Objective

To analyze Uber trip request data and provide actionable insights on:

- When most ride cancellations or no-availability occurs
- Which pickup points face more demand pressure
- How trip completion varies by time and location

Final goal: Reduce unfulfilled requests and improve efficiency.

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

sns.set(style='whitegrid')
```

```
# Upload the CSV in the left panel (Files) first
df = pd.read_csv("Uber Request Data Cleaned.csv")
df.head()
```

	Request Id	Pickup Point	Driver Id	Status	Request Timestamp	Drop Timestamp	Request Hour	Trip Duration (min)	Drived Assigned	Trip Completed	Request Date
0	619	Airport	1.0	Trip Completed	11-07-16 11:51	11-07-16 13:00	11	69.0	Yes	Yes	11-07-16
1	867	Airport	1.0	Trip Completed	11-07-16 17:57	11-07-16 18:47	17	50.0	Yes	Yes	11-07-16
2	1807	City	1.0	Trip Completed	12-07-16 9:17	12-07-16 9:58	9	41.0	Yes	Yes	12-07-16
3	2532	Airport	1.0	Trip Completed	12-07-16 21:08	12-07-16 22:03	21	55.0	Yes	Yes	12-07-16
				Trip		13-07-16					

Next steps: Generate code with df | View recommended plots | New interactive sheet

```
df['Request Timestamp'] = pd.to_datetime(df['Request Timestamp'], errors='coerce')
df['Drop Timestamp'] = pd.to_datetime(df['Drop Timestamp'], errors='coerce')

df['Hour'] = df['Request Timestamp'].dt.hour
df['Day'] = df['Request Timestamp'].dt.day
df['Day Name'] = df['Request Timestamp'].dt.day_name()
df['Trip Completed'] = df['Drop Timestamp'].notna()
```

```
/tmp/ipython-input-4-3659758621.py:1: UserWarning: Could not infer format, so each element will be parsed individually, falling back to
  df['Request Timestamp'] = pd.to_datetime(df['Request Timestamp'], errors='coerce')
/tmp/ipython-input-4-3659758621.py:2: UserWarning: Could not infer format, so each element will be parsed individually, falling back to
  df['Drop Timestamp'] = pd.to_datetime(df['Drop Timestamp'], errors='coerce')
```

Chart 1: Trip Status Distribution

Why this chart?

To understand how many requests were completed vs cancelled or had no cars available.

Business Impact:

Helps understand the scale of unfulfilled demand.

```
plt.figure(figsize=(7,4))
sns.countplot(x='Status', data=df, palette='Set2')
plt.title('Trip Status Count')
plt.xlabel('Status')
plt.ylabel('Count')
plt.show()
```

```
/tmp/ipython-input-5-3767604285.py:2: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend

  sns.countplot(x='Status', data=df, palette='Set2')
```

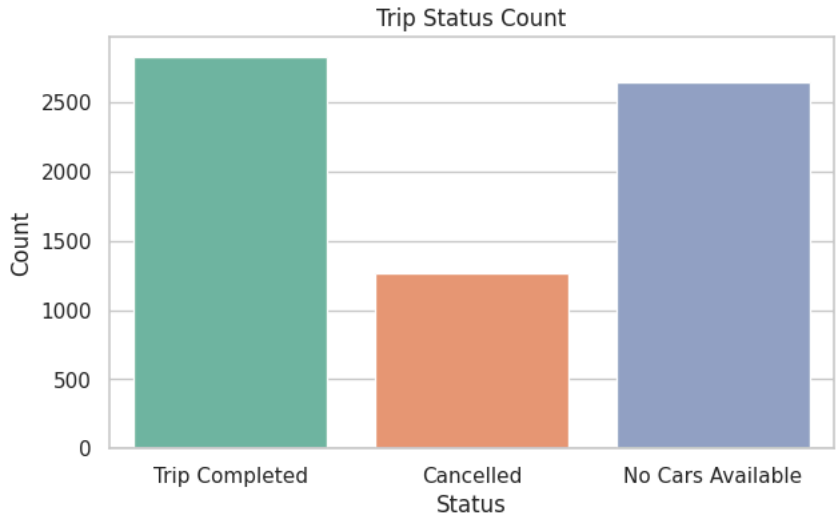


Chart 2: Requests by Hour

Why this chart?

To identify when most ride requests happen.

Business Impact:

Helps allocate more drivers during high-demand hours.

```
plt.figure(figsize=(10,4))
sns.countplot(x='Hour', data=df, palette='coolwarm')
plt.title('Requests by Hour of Day')
plt.xlabel('Hour')
plt.ylabel('Requests')
plt.show()
```

```
/tmp/ipython-input-6-2970545235.py:2: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend

  sns.countplot(x='Hour', data=df, palette='coolwarm')
```

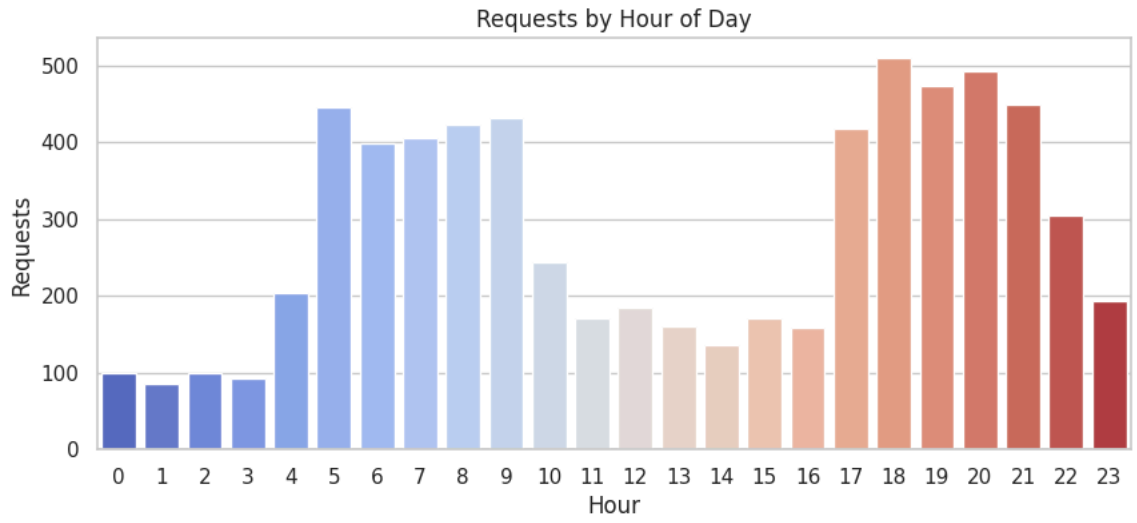


Chart 3: Pickup Point vs Status

Why this chart?

To identify which pickup point faces more cancellations or no-car-available issues.

Business Impact:

Helps direct more drivers to areas with poor service.

```
plt.figure(figsize=(8,4))
sns.countplot(x='Pickup Point', hue='Status', data=df)
plt.title('Pickup Point vs Status')
plt.xlabel('Pickup Point')
plt.ylabel('Count')
plt.show()
```

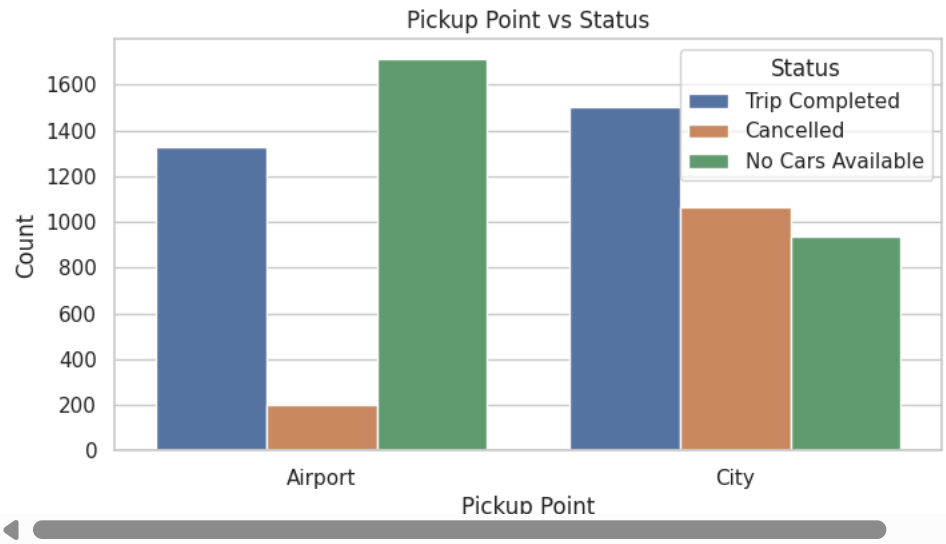


Chart 4: Hourly Trip Status Distribution

Why this chart?

To explore how trip status varies throughout the day.

Business Impact:

Helps identify specific hours when cancellations or unavailability peak — so Uber can target those hours for supply planning.

```
plt.figure(figsize=(12,5))
sns.countplot(x='Hour', hue='Status', data=df, palette='Set1')
plt.title('Trip Status by Hour')
plt.xlabel('Hour of Day')
plt.ylabel('Request Count')
plt.show()
```

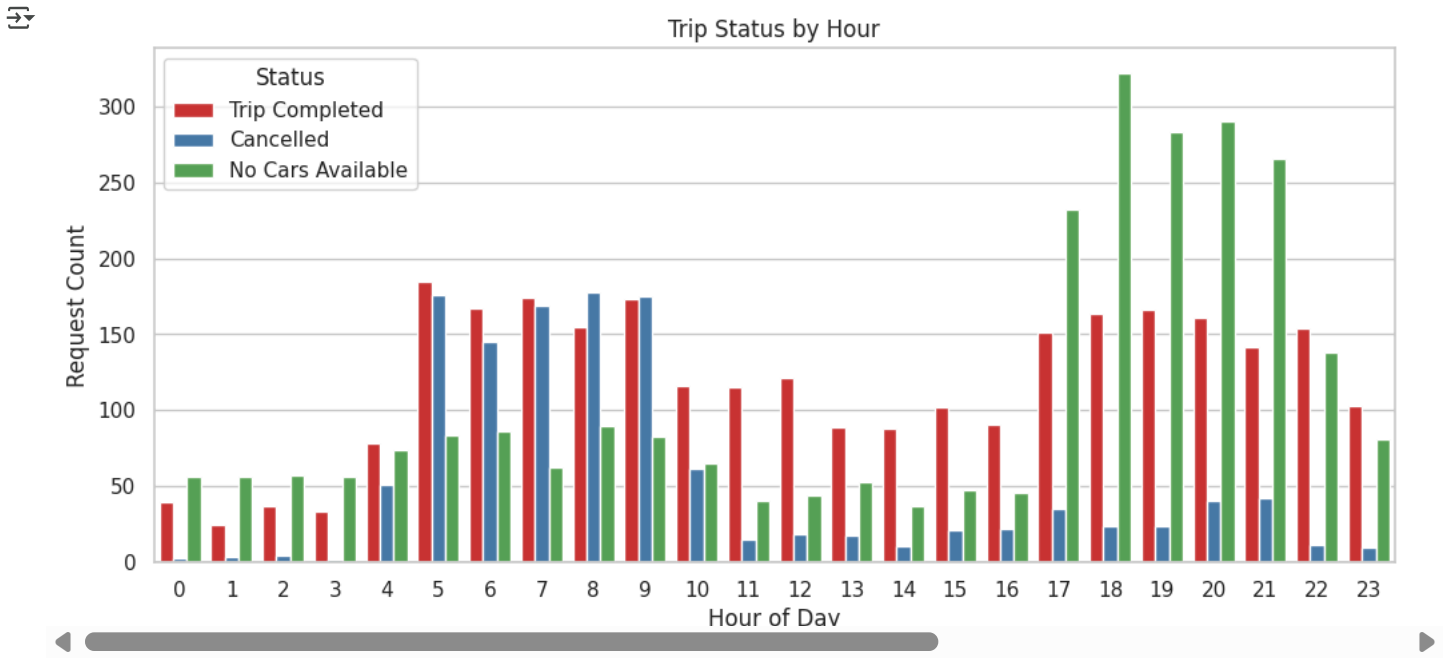


Chart 5: Trip Completion Rate

Why this chart?

To visualize the ratio of completed vs uncompleted rides.

Business Impact:

This shows Uber's overall service success rate, which is a key metric in operations.

```
# Count values and convert to percentages
completion_rate = df['Trip Completed'].value_counts(normalize=True) * 100

plt.figure(figsize=(6,4))
completion_rate.plot(kind='bar', color=['red', 'green'])
plt.xticks(ticks=[0, 1], labels=['Incomplete', 'Completed'], rotation=0)
plt.title('Trip Completion Rate (%)')
plt.ylabel('Percentage')
plt.ylim(0, 100)  # Set y-axis limit to 0-100%
plt.show()
```

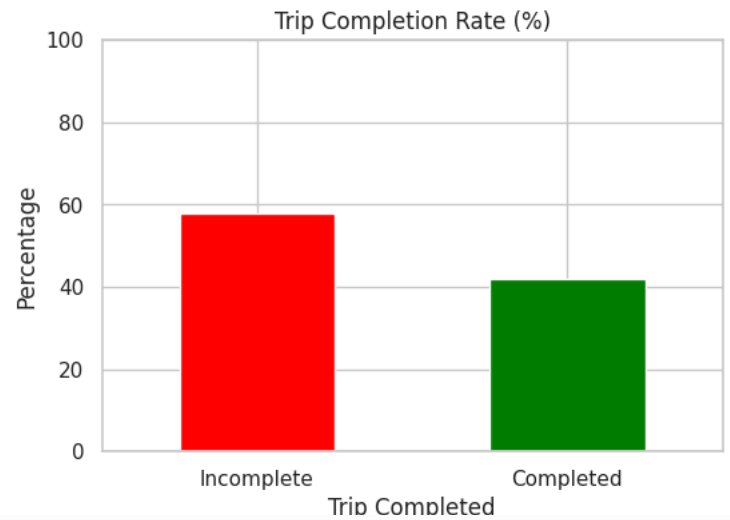


Chart 7: No Cars Available Trend by Hour

Why this chart?

To identify hours with the worst car availability.

Business Impact:

Reveals the need for night shifts or more drivers during specific time slots.

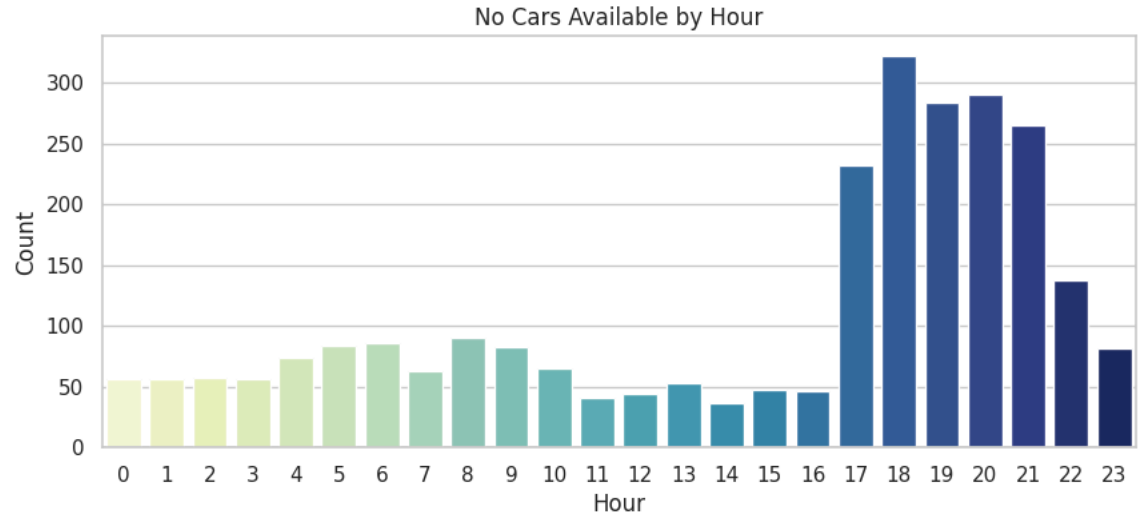
```
no_car_df = df[df['Status'] == 'No Cars Available']

plt.figure(figsize=(10,4))
sns.countplot(x='Hour', data=no_car_df, palette='YlGnBu')
plt.title('No Cars Available by Hour')
plt.xlabel('Hour')
plt.ylabel('Count')
plt.show()
```

```
/tmp/ipython-input-31-1345545465.py:4: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend

  sns.countplot(x='Hour', data=no_car_df, palette='YlGnBu')
```



Conclusion

Based on the exploratory data analysis of Uber ride request data, we can conclude the following:

- A significant number of rides were **not completed** (only 42% completion rate), primarily due to cancellations and no car availability.

- The **highest demand** for rides occurs during the **early morning (5 AM – 9 AM)** and **late night (9 PM – 1 AM)** time slots.
- **No cars available** is the dominant issue during **night hours**, especially for pickups from the **Airport**, indicating a supply shortage at that time.
- **Cancellations are more common in early morning and morning hours**, with most cancelled rides starting from the **Airport**.
- The **City pickup point** has more overall requests but **fewer cancellations**, showing more efficient service compared to the Airport.
- **Driver availability** is mismatched with actual demand patterns, leading to a supply-demand imbalance.