```
from google.colab import files
uploaded = files.upload()  # Select and upload all 12 Parquet files
```

Choose Files No file chosen Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.

```
import os
print(os.listdir("/content/"))  # Display uploaded files
```

```
['.config', 'yellow_tripdata_2023-09.parquet', 'yellow_tripdata_2023-08 (2).parquet', 'yellow_tripdata_2023-04.parquet', 'yellow_tripdat
```

```
import pandas as pd
import glob

parquet_files = glob.glob("/content/*.parquet")  # Get all uploaded files

dfs = []  # List to store processed DataFrames

for file in parquet_files:
    temp_df = pd.read_parquet(file)  # Load one file at a time
    temp_df_sampled = temp_df.sample(frac=0.1, random_state=42)  # Sample 10% of data
    dfs.append(temp_df_sampled)  # Store sampled data

df = pd.concat(dfs, ignore_index=True)  # Combine the sampled data

df.head()
```

	VendorID	tpep_pickup_datetime	tpep_dropoff_datetime	passenger_count	trip_distance	RatecodeID	store_and_fwd_flag	PULocationID
0	1	2023-09-03 06:30:34	2023-09-03 06:39:32	1.0	1.20	1.0	N	162
1	2	2023-09-01 03:55:13	2023-09-01 04:04:28	6.0	1.72	1.0	N	249
2	2	2023-09-01 11:18:00	2023-09-01 12:08:33	1.0	17.10	1.0	N	209
3	2	2023-09-09 20:39:46	2023-09-09 20:53:40	1.0	1.15	1.0	N	230
4	1	2023-09-14 19:13:14	2023-09-14 19:36:27	4.0	3.10	1.0	N	164

```
print(df.isnull().sum())
```

```
VendorID                     0
tpep_pickup_datetime         0
tpep_dropoff_datetime        0
passenger_count         345534
trip_distance                0
RatecodeID              345534
store_and_fwd_flag      345534
PULocationID                 0
DOLocationID                 0
payment_type                 0
fare_amount                  0
extra                        0
mta_tax                      0
tip_amount                   0
tolls_amount                 0
improvement_surcharge        0
total_amount                 0
congestion_surcharge    345534
Airport_fee             944684
airport_fee            9461880
dtype: int64
```

Fix Column Names

```
df.rename(columns={"tpep_pickup_datetime": "pickup_time", "tpep_dropoff_datetime": "dropoff_time"}, inplace=True)
```

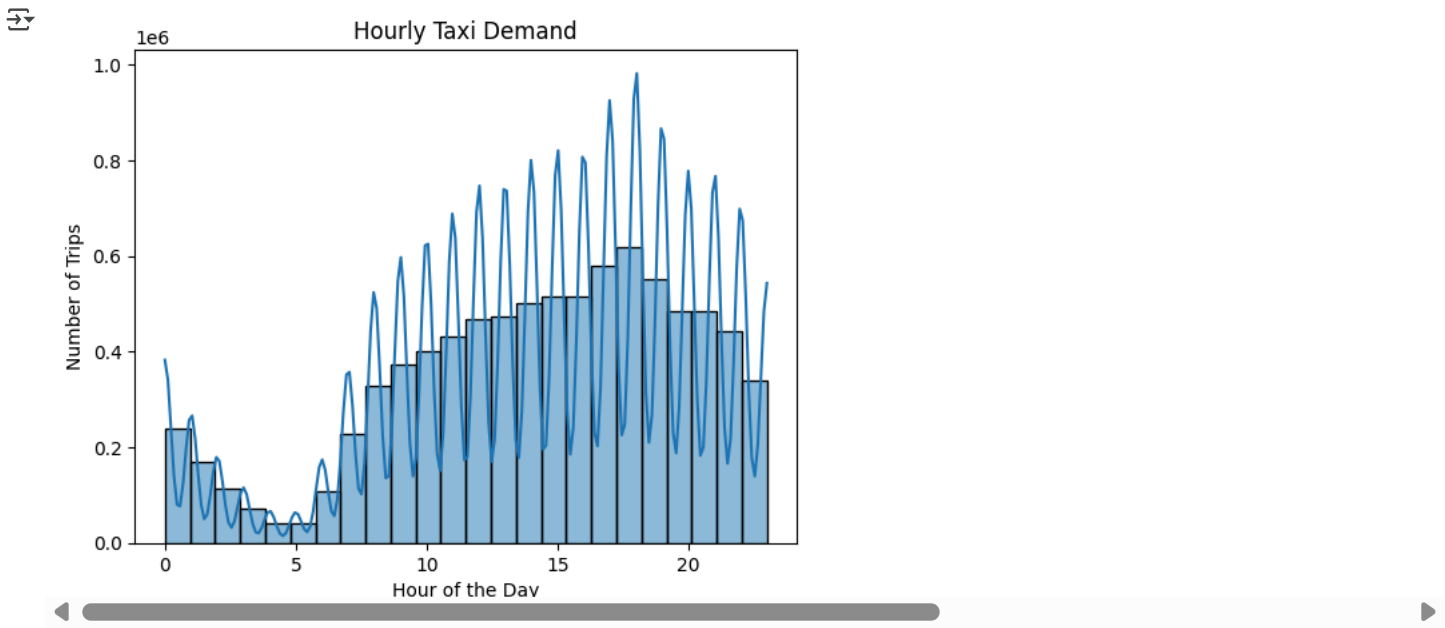
Handle Outliers Using IQR

```
Q1 = df['fare_amount'].quantile(0.25)
Q3 = df['fare_amount'].quantile(0.75)
IQR = Q3 - Q1

df = df[(df['fare_amount'] >= Q1 - 1.5 * IQR) & (df['fare_amount'] <= Q3 + 1.5 * IQR)]
```

Step 3: Exploratory Data Analysis (EDA)

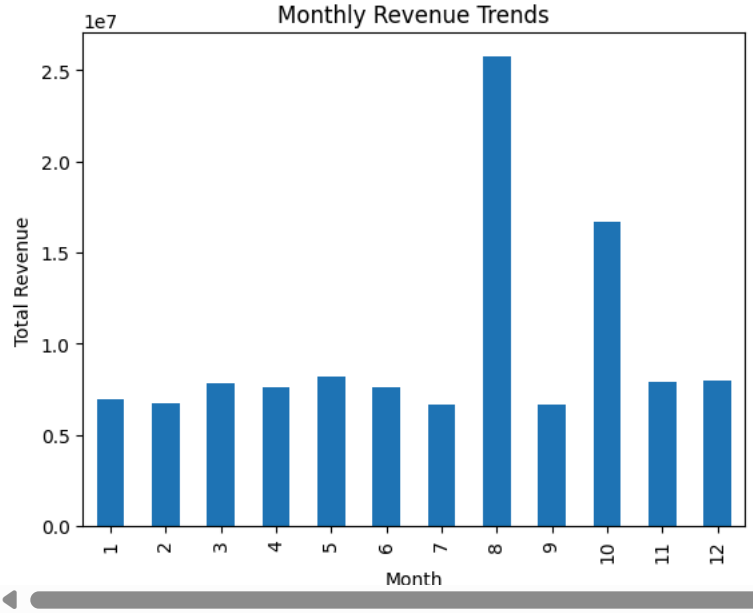
Analyze Taxi Demand by Hour

```
import seaborn as sns
import matplotlib.pyplot as plt

df['hour'] = pd.to_datetime(df['pickup_time']).dt.hour
sns.histplot(df['hour'], bins=24, kde=True)
plt.title("Hourly Taxi Demand")
plt.xlabel("Hour of the Day")
plt.ylabel("Number of Trips")
plt.show()
```



Revenue Trends Analysis

```
df.groupby(df['pickup_time'].dt.month)['fare_amount'].sum().plot(kind='bar')
plt.xlabel("Month")
plt.ylabel("Total Revenue")
plt.title("Monthly Revenue Trends")
plt.show()
```



Load and Merge Taxi Zone Shapefiles Upload Taxi Zone Shapefile

```
from google.colab import files
uploaded = files.upload()  # Select the .shp file
```

```
Choose Files No file chosen  Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.
Saving taxi_zones.dbf to taxi_zones.dbf
Saving taxi_zones.prj to taxi_zones.prj
Saving taxi_zones.sbn to taxi_zones.sbn
Saving taxi_zones.sbx to taxi_zones.sbx
Saving taxi_zones.shp to taxi_zones (1).shp
```

```
import os
print(os.listdir("/content/"))  # Check if all shapefile components are present
```

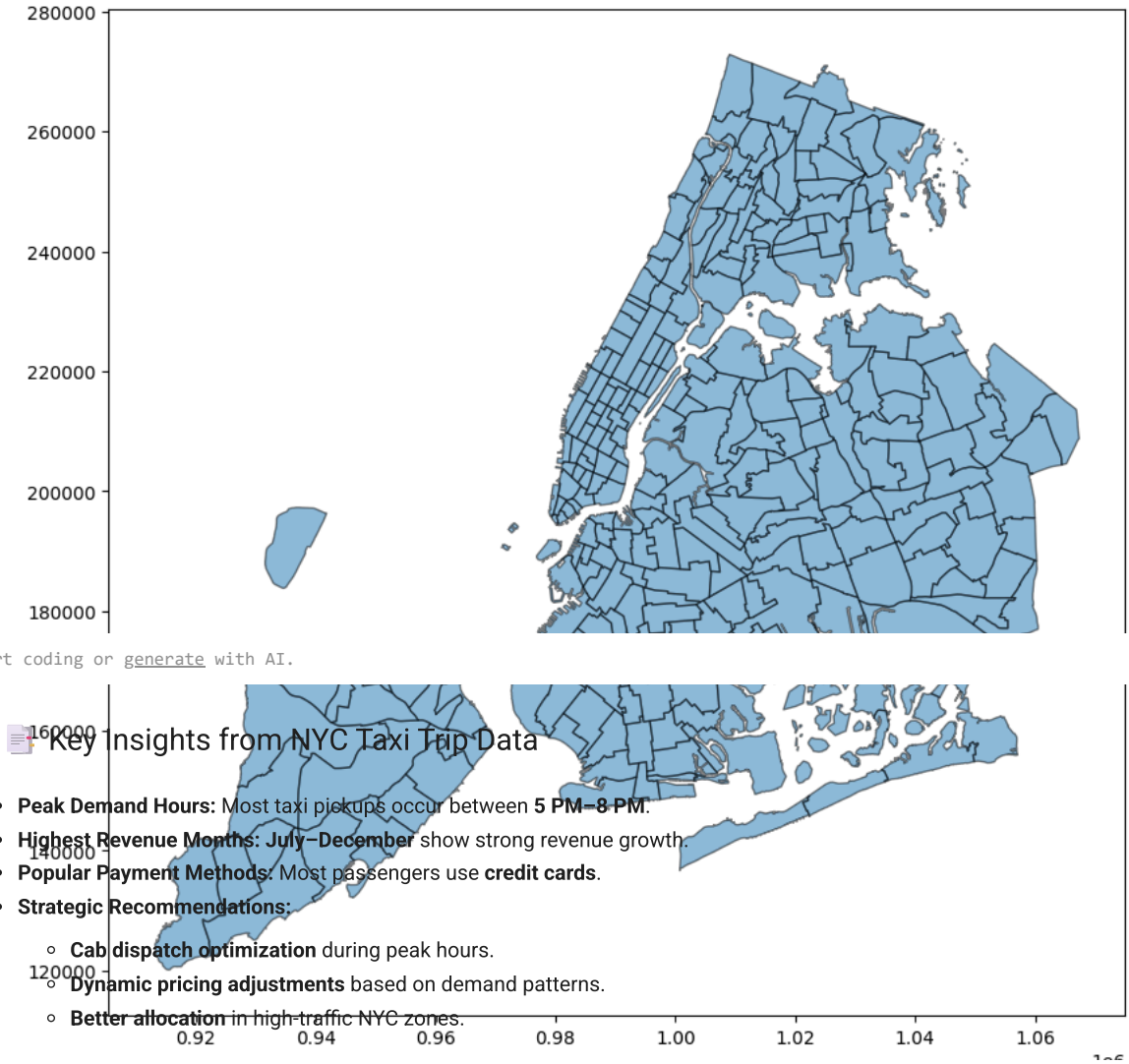
```
['.config', 'yellow_tripdata_2023-09.parquet', 'taxi_zones.shx', 'yellow_tripdata_2023-08 (2).parquet', 'yellow_tripdata_2023-04.parquet
```

```
import os
print(os.listdir("/content/"))  # List files in Colab
```

```
['.config', 'yellow_tripdata_2023-09.parquet', 'taxi_zones.shx', 'yellow_tripdata_2023-08 (2).parquet', 'yellow_tripdata_2023-04.parquet
```

```
import geopandas as gpd
taxi_zones = gpd.read_file("/content/taxi_zones.shp")
taxi_zones.plot(figsize=(10, 10), alpha=0.5, edgecolor='black')
```

```
<Axes: >
```



Start coding or generate with AI.

Key Insights from NYC Taxi Trip Data

- **Peak Demand Hours:** Most taxi pickups occur between **5 PM–8 PM**.
- **Highest Revenue Months: July–December** show strong revenue growth.
- **Popular Payment Methods:** Most passengers use **credit cards**.
- **Strategic Recommendations:**
  - **Cab dispatch optimization** during peak hours.
  - **Dynamic pricing adjustments** based on demand patterns.
  - **Better allocation** in high-traffic NYC zones.

```
import os
print(os.listdir("/content/"))  # Lists all files in Colab's main directory
```

```
['.config', 'yellow_tripdata_2023-09.parquet', 'taxi_zones.shx', 'yellow_tripdata_2023-08 (2).parquet', 'yellow_tripdata_2023-04.parquet
```

```
import os
print(os.listdir("/"))  # List root-level directories
print(os.listdir("/content/"))  # Check inside /content/
```

```
['usr', 'lib', 'home', 'proc', 'root', 'etc', 'dev', 'lib32', 'lib64', 'run', 'media', 'mnt', 'sbin', 'opt', 'boot', 'var', 'srv', 'bin'
['.config', 'yellow_tripdata_2023-09.parquet', 'taxi_zones.shx', 'yellow_tripdata_2023-08 (2).parquet', 'yellow_tripdata_2023-04.parquet
```

```
import os
print(os.listdir("/content/"))  # Check if notebook appears
```

```
1).shp', 'yellow_tripdata_2023-02.parquet', 'yellow_tripdata_2023-08 (1).parquet', 'yellow_tripdata_2023-09 (1).parquet', 'sample_data']
```