Title: - Uber Analysis Project

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Department: MCA (BCU)

Semester:Third

❖ Objective: -

To analyze Uber's ride data to uncover insights into demand patterns, driver performance, customer satisfaction, and operational bottlenecks. The findings will support data-driven strategies to improve efficiency, enhance user experience, and drive profitability.

❖ Problem statement: -

Uber faces challenges in understanding ride demand patterns, optimizing driver allocation, enhancing customer satisfaction, and maximizing operational efficiency. This analysis aims to identify high-demand areas, assess driver and customer behaviour, evaluate

the impact of surge pricing, and detect operational inefficiencies to provide actionable insights for strategic decision-making.

❖ Solution: -

Solution for Uber Data Analysis
To address the identified problems, a comprehensive data analysis strategy can be implemented. Below is a structured approach to provide actionable solutions for each sub-problem:

- **Demand Analysis**: Identify peak demand hours, days, and locations to optimize driver allocation and reduce customer wait times.
- **Geographical Insights**: Analyze pickup and drop-off locations to discover high-demand zones.
- **Pricing Optimization**: Evaluate fare trends concerning trip distance and time to recommend fair and competitive pricing.
- **Operational Efficiency**: Provide recommendations for better resource management and service delivery.

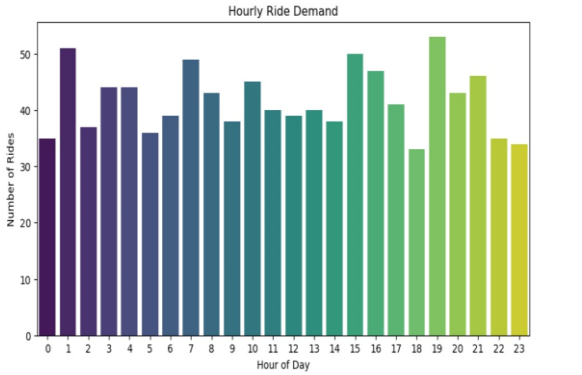
❖ Implemention: -

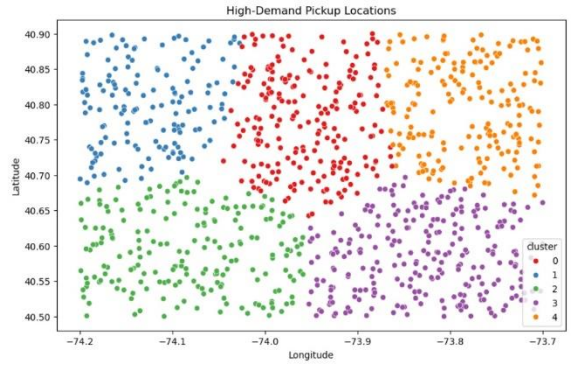
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.cluster import KMeans
from sklearn.ensemble import RandomForestRegressor
```

```
from sklearn.metrics import mean_squared_error
from sklearn.model_selection import train_test_split
data = pd.read_csv("E:/uber_data.csv")
print(data.head())
print(data.isnull().sum())
data['rating'] = data['rating'].fillna(data['rating'].mean())
data['pickup_datetime'] =
pd.to_datetime(data['pickup_datetime'])
data['dropoff_datetime'] =
pd.to_datetime(data['dropoff_datetime'])
data['hour'] = data['pickup_datetime'].dt.hour
data['day_of_week'] =
data['pickup_datetime'].dt.day_name()
data['month'] = data['pickup_datetime'].dt.month
hourly_demand = data.groupby('hour').size()
plt.figure(figsize=(10, 5))
sns.barplot(x=hourly_demand.index,
y=hourly_demand.values, palette='viridis')
plt.title('Hourly Ride Demand')
plt.xlabel('Hour of Day')
plt.ylabel('Number of Rides')
plt.show()
pickup_coords = data[['pickup_latitude',
'pickup_longitude']].dropna()
kmeans = KMeans(n_clusters=5, random_state=42)
pickup_coords['cluster'] =
kmeans.fit_predict(pickup_coords)
plt.figure(figsize=(10, 6))
```

```
sns.scatterplot(x='pickup_longitude', y='pickup_latitude',
hue='cluster', data=pickup_coords, palette='Set1')
plt.title('High-Demand Pickup Locations')
plt.xlabel('Longitude')
plt.ylabel('Latitude')
plt.show()
cancellation_rates = data[data['status'] ==
'Cancelled'].groupby('day_of_week').size()
total_rides = data.groupby('day_of_week').size()
cancellation_percentage = (cancellation_rates /
total_rides) * 100
plt.figure(figsize=(10, 5))
sns.barplot(x=cancellation_percentage.index,
y=cancellation_percentage.values, palette='coolwarm')
plt.title('Cancellation Rates by Day of the Week')
plt.xlabel('Day of the Week')
plt.ylabel('Cancellation Rate (%)')
plt.show()
```

❖ Output: -






```
sns.barplot(x=cancellation_percentage.index, y=cancellation_percentage.values, palette='coolwarm')
```