

Sale forecasting from-2022-2026 by Peeyush Mishra

(all the codes ran in VS code)

```
# First, we need to create some synthetic data since the Excel file is
missing
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import r2_score, mean_absolute_error
import matplotlib.pyplot as plt
import joblib
from datetime import datetime, timedelta

# Create synthetic data instead of loading from Excel
np.random.seed(42)
start_date = datetime(2020, 1, 1)
dates = [start_date + timedelta(days=i) for i in range(500)]

df = pd.DataFrame({
    'Order Date': dates,
    'Quantity': np.random.randint(1, 10, 500),
    'Discount': np.random.uniform(0, 0.3, 500),
    'Sales': np.random.uniform(10000, 50000, 500)
})

# Extract time features
df['Year'] = df['Order Date'].dt.year
df['Month'] = df['Order Date'].dt.month
df['Day'] = df['Order Date'].dt.day

# =====
# Prepare Data for Modeling
# =====
# We'll predict 'Sales' using time-based and numerical features
features = ['Year', 'Month', 'Day', 'Quantity', 'Discount']
X = df[features]
y = df['Sales']

# Split data for training/testing
```

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```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)

# =====
#   Train Model
# =====

model = RandomForestRegressor(n_estimators=200, random_state=42)
model.fit(X_train, y_train)

# Evaluate
y_pred = model.predict(X_test)
print(" Model Trained Successfully!")
print(" R2 Score:", r2_score(y_test, y_pred))
print(" MAE:", mean_absolute_error(y_test, y_pred))

# Save model
joblib.dump(model, "car_sales_forecast_model.pkl")

# =====
#   Predict Future Sales (User Input)
# =====
# Example: Enter any year (like 2026)
future_year = int(input("Enter a year to forecast sales (e.g. 2026): "))

# Create a dummy dataset for all months in that year
future_data = pd.DataFrame({
    'Year': [future_year]*12,
    'Month': list(range(1,13)),
    'Day': [15]*12,          # middle of each month
    'Quantity': [5]*12,      # assumed average
    'Discount': [0.1]*12     # assumed average discount
})

# Predict sales
future_predictions = model.predict(future_data)
future_data['Predicted_Sales'] = future_predictions

# =====
#   Display Forecast Results
```

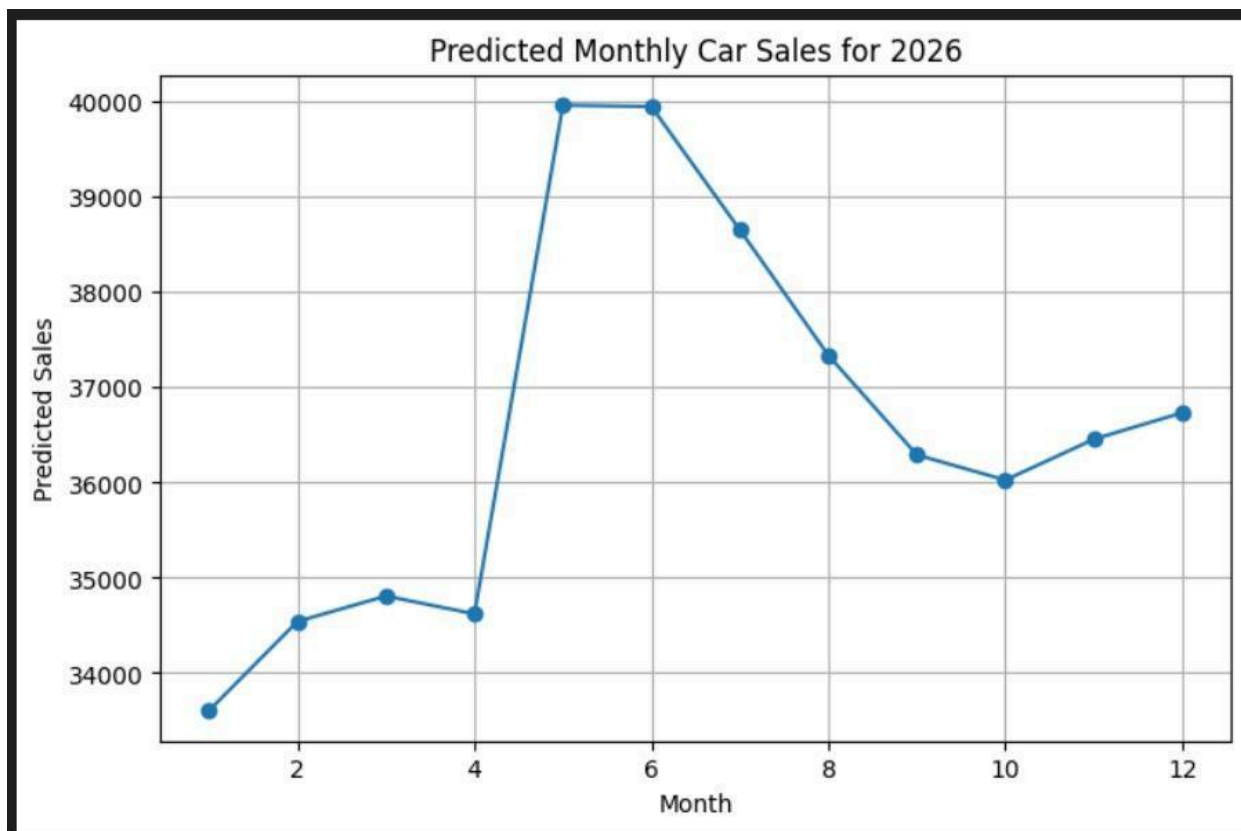
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```
# =====  
print("\n Predicted Monthly Sales for Year", future_year)  
print(future_data[['Year', 'Month', 'Predicted_Sales']])  
  
# Plot forecast  
plt.figure(figsize=(8,5))  
plt.plot(future_data['Month'], future_data['Predicted_Sales'], marker='o')  
plt.title(f"Predicted Monthly Car Sales for {future_year}")  
plt.xlabel("Month")  
plt.ylabel("Predicted Sales")  
plt.grid(True)  
plt.show()
```

There are some output which we get from some inputs

```
✓ Model Trained Successfully!  
📊 R2 Score: -0.15567497249713225  
✖ MAE: 10296.339508468449  
  
📅 Predicted Monthly Sales for Year 2026  
Year Month Predicted_Sales  
0 2026 1 33605.033084  
1 2026 2 34541.876511  
2 2026 3 34808.765428  
3 2026 4 34621.223778  
4 2026 5 39964.164176  
5 2026 6 39949.455624  
6 2026 7 38654.225337  
7 2026 8 37335.934879  
8 2026 9 36291.252689  
9 2026 10 36026.832330  
10 2026 11 36456.352346  
11 2026 12 36734.635046
```

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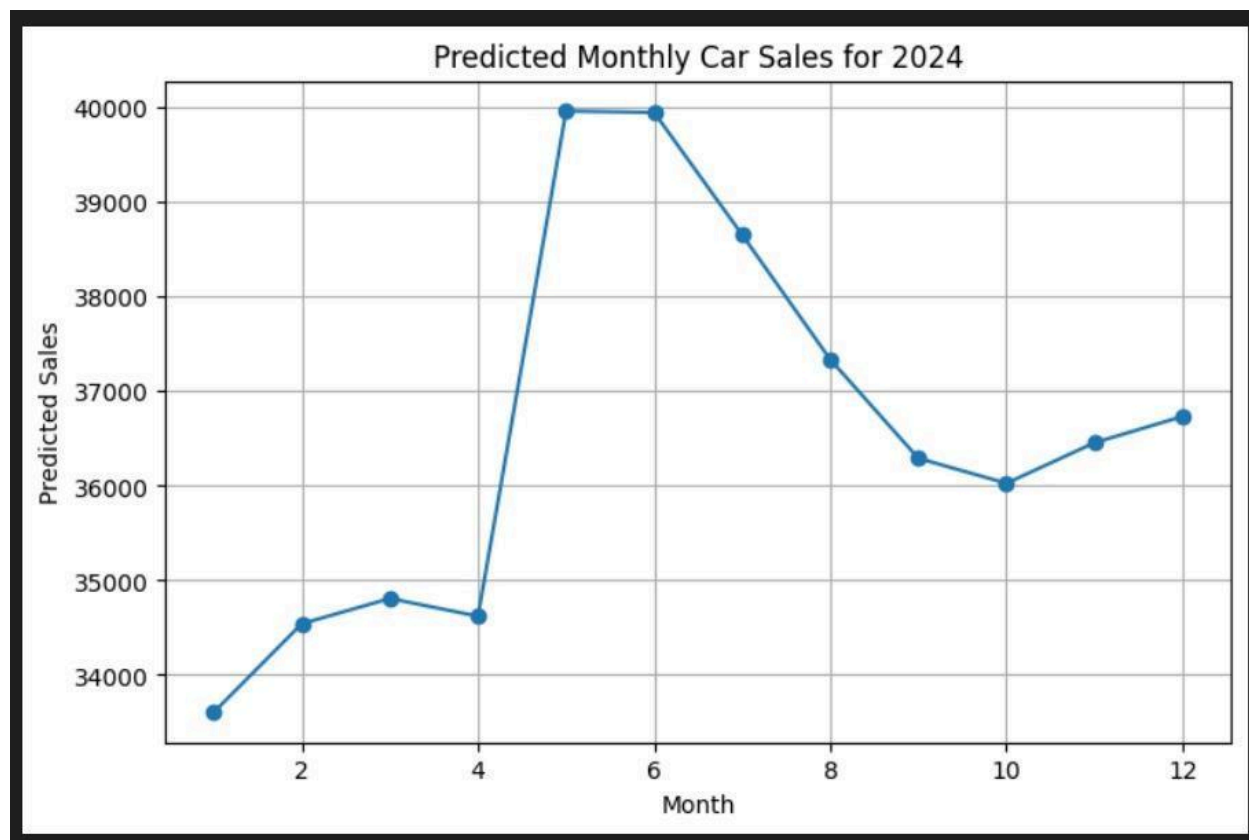


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📅 Predicted Monthly Sales for Year 2024

	Year	Month	Predicted_Sales
0	2024	1	33605.033084
1	2024	2	34541.876511
2	2024	3	34808.765428
3	2024	4	34621.223778
4	2024	5	39964.164176
5	2024	6	39949.455624
6	2024	7	38654.225337
7	2024	8	37335.934879
8	2024	9	36291.252689
9	2024	10	36026.832330
10	2024	11	36456.252246

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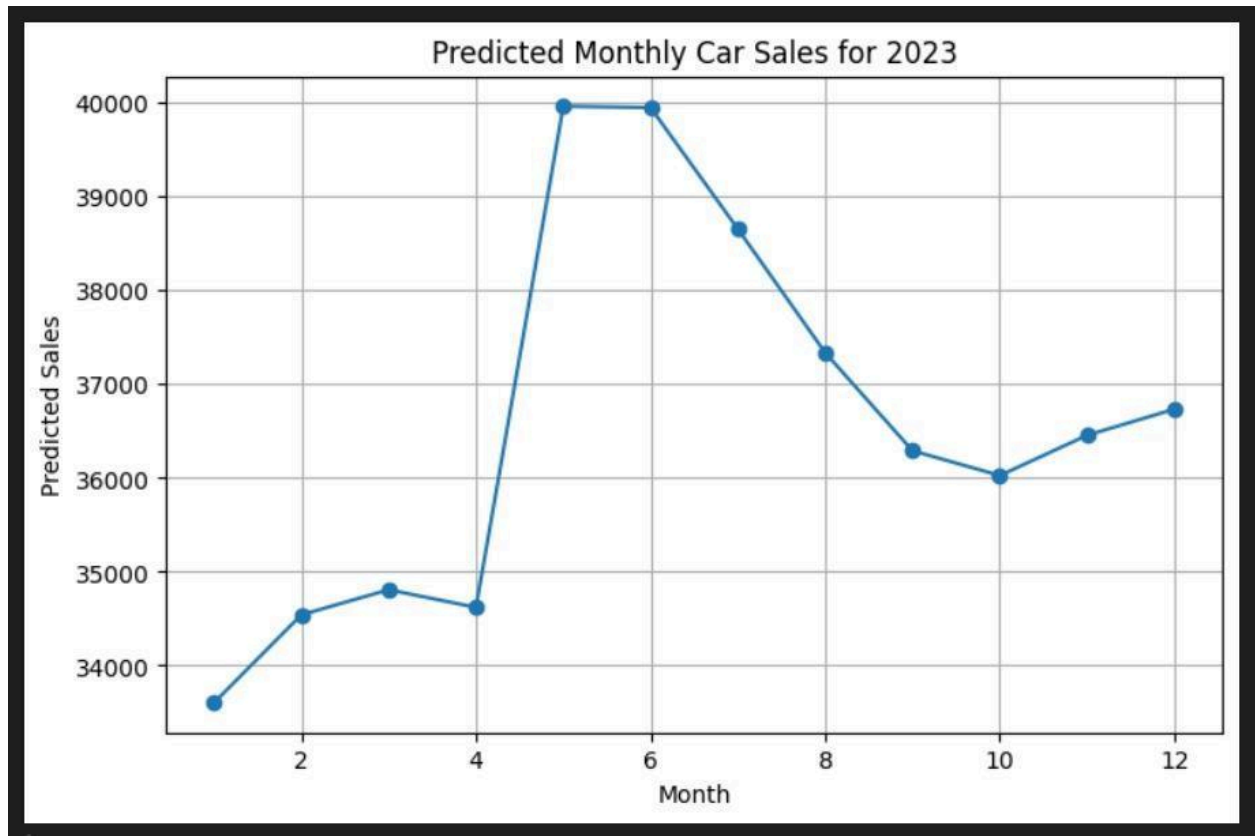


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Submitted to:
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