

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']])

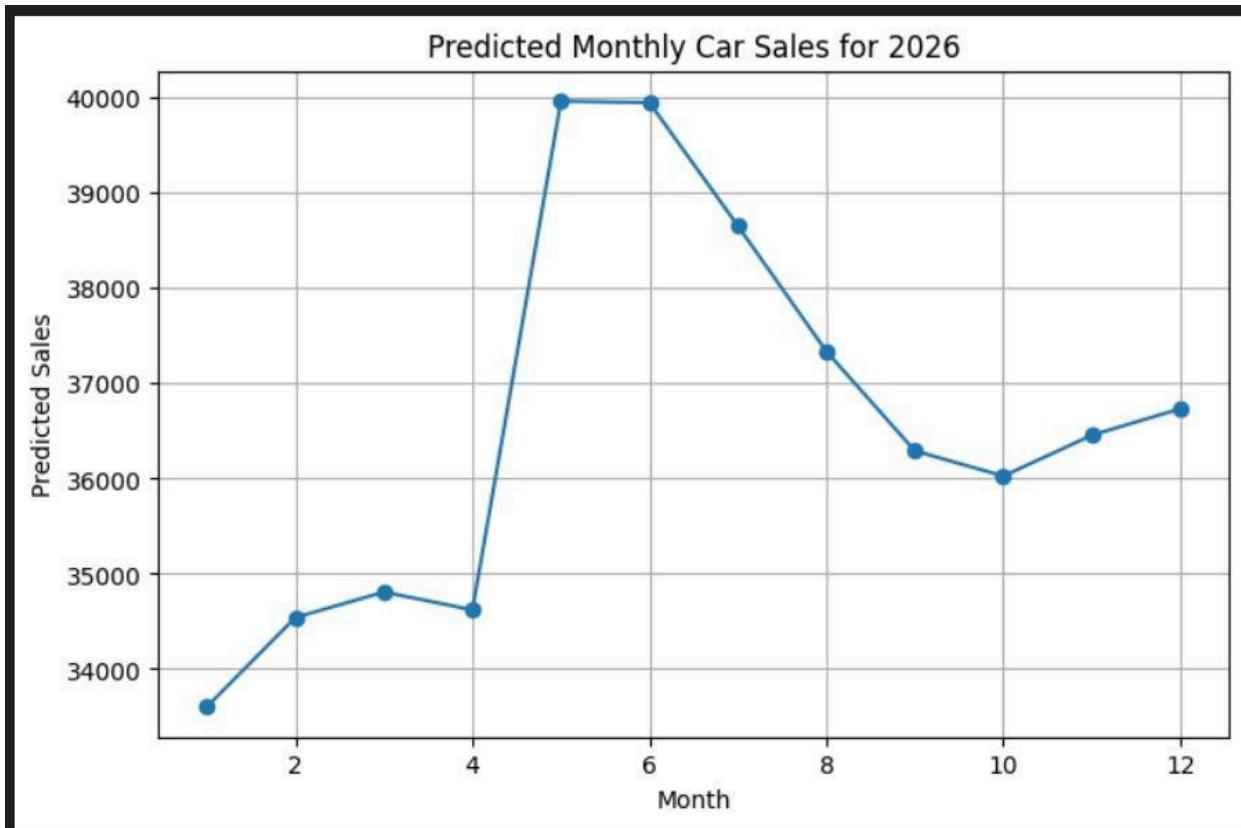
# Plot forecast
plt.figure(figsize=(8,5))
plt.plot(future_data['Month'], future_data['Predicted_Sales'], marker='o')
plt.title(f"Predicted Monthly Car Sales for {future_year}")
plt.xlabel("Month")
plt.ylabel("Predicted Sales")
plt.grid(True)
plt.show()
```

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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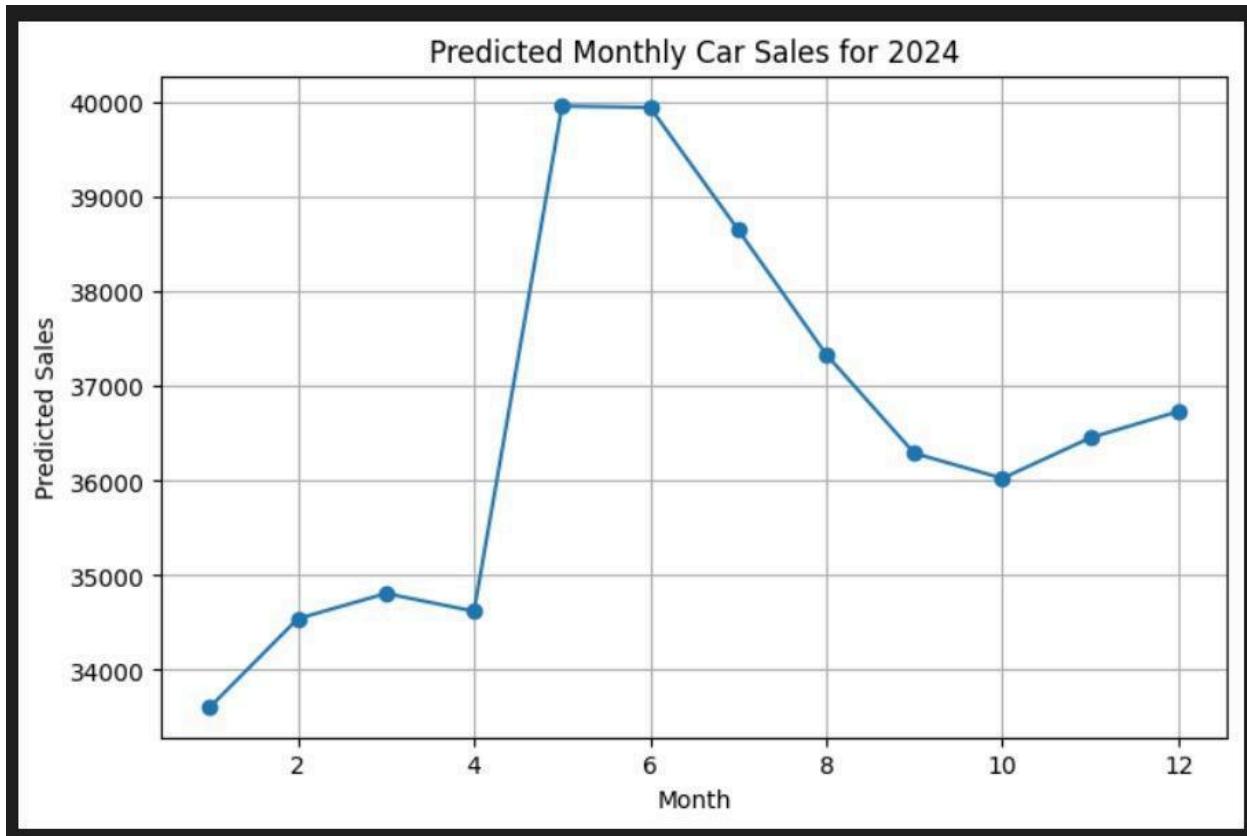
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Predicted Monthly Sales for Year 2024

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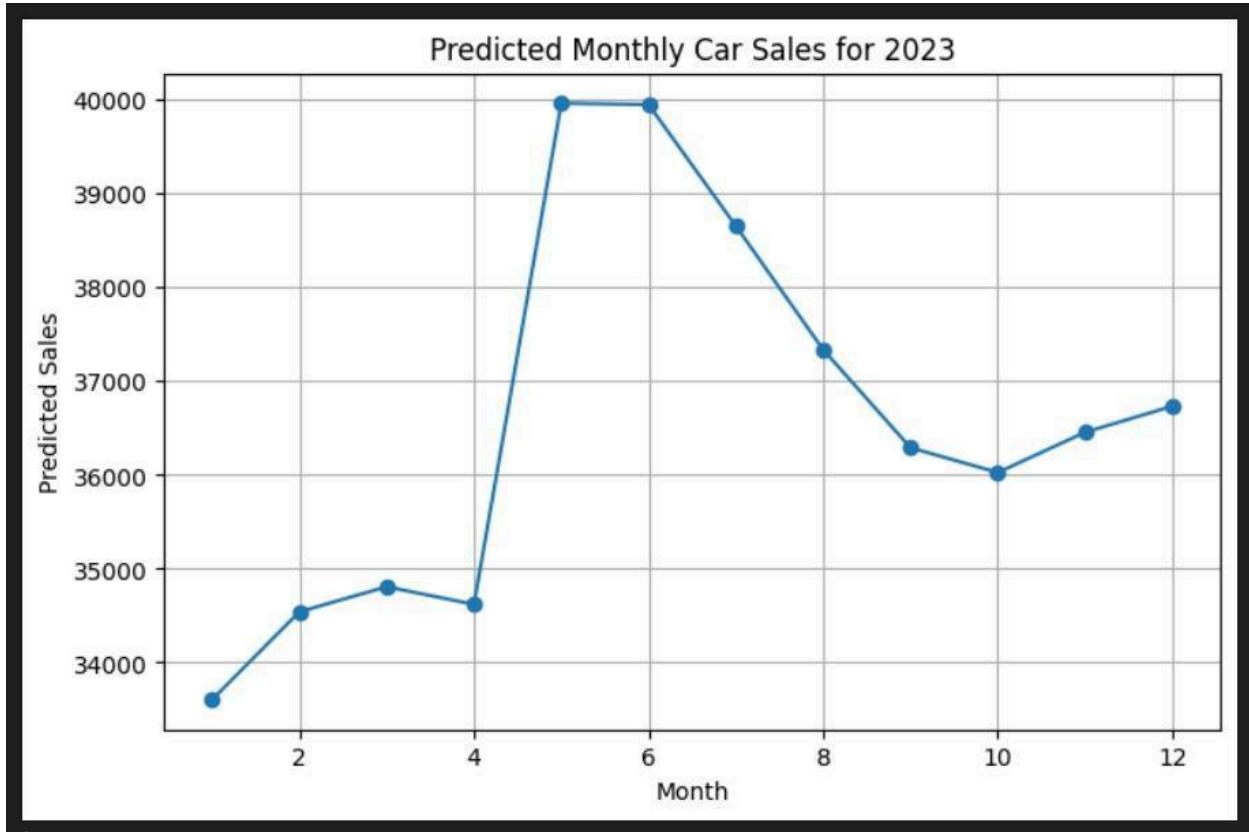


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Submitted to:
Naviotech

Submitted By:
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