6. IMPLEMENT PROGRAM TO APPLY MOVING AVERAGE SMOOTHING FOR DATA PREPARATION AND TIME SERIES FORECASTING.

AIM:

Implement program to apply moving average smoothing for data preparation and time series forecasting.

PROCEDURE:

1. Import The Necessary Libraries :

```
import numpy as np

import pandas as pd

import matplotlib.pyplot as plt


# Generate sample petrol price data (for demonstration)

np.random.seed(42)

dates = pd.date_range(start="2024-01-01", periods=100, freq="D")

prices = np.cumsum(np.random.randn(100)) + 100  # Simulated petrol prices
```

2. Load the dataset :

```
df = pd.DataFrame({"Date": dates, "Price": prices})

df.set_index("Date", inplace=True)
```

3. Ensure relevant columns exist :

```
def moving_average(series, window):
    return series.rolling(window=window).mean()
```

4. Apply Moving Average Smoothing :

```
window_size = 7  # Weekly moving average

df["Smoothed"] = moving_average(df["Price"], window_size)
```

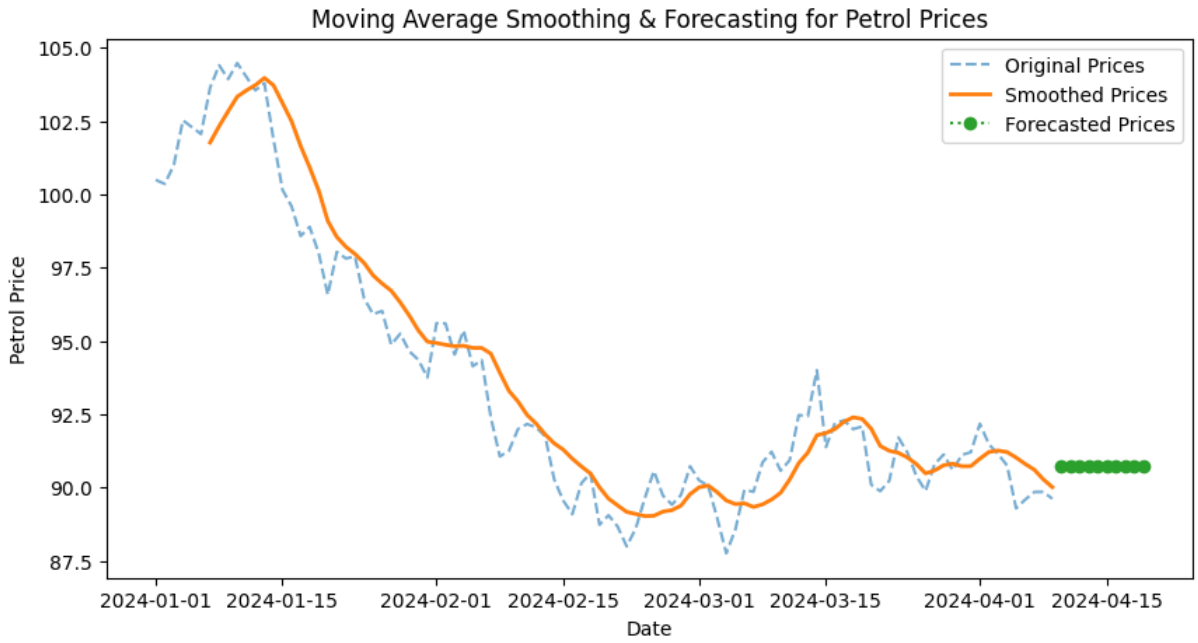
5. Forecast using Moving Average

```
future_steps = 10

future_dates = pd.date_range(start=df.index[-1] + pd.Timedelta(days=1), periods=future_steps, freq="D")

future_prices = [df["Smoothed"].iloc[-window_size:].mean()] * future_steps
```

6. Plotting The Result:

```
plt.figure(figsize=(10, 5))

plt.plot(df.index, df["Price"], label="Original Prices", linestyle="dashed", alpha=0.6)

plt.plot(df.index, df["Smoothed"], label="Smoothed Prices", linewidth=2)

plt.plot(future_dates, future_prices, label="Forecasted Prices", linestyle="dotted", marker="o")


plt.xlabel("Date")

plt.ylabel("Petrol Price")

plt.legend()

plt.title("Moving Average Smoothing & Forecasting for Petrol Prices")

plt.show()
```

OUTPUT :



RESULT:

The program to implement to apply moving average smoothing on the autism screening dataset has been implemented successfully.