Assignment_Working With Time Series and Plotting Data

October 24, 2024

[2]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

[3]:
```
# Create a sample DataFrame with time series data
date_rng = pd.date_range(start='2023-01-01', end='2023-01-31', freq='D')
data = np.random.rand(len(date_rng))  # Random data for demonstration
df = pd.DataFrame({'Date': date_rng, 'Value': data})
df.set_index('Date', inplace=True)
```

[7]:
```
print(df.head())
```

```
              Value
Date
2023-01-01  0.102643
2023-01-02  0.711561
2023-01-03  0.492217
2023-01-04  0.615669
2023-01-05  0.734323
```

[8]:
```
# Calculate the mean value of 'Value' column for January 2023
mean_value_january = df['Value'].mean()
print(f"Mean value for January 2023: {mean_value_january}")
```

```
Mean value for January 2023: 0.528190195449263
```

[9]:
```
# Extract and display data for the week of January 15, 2023, to January 21, 2023
week_data = df.loc['2023-01-15':'2023-01-21']
print("\nData for January 15, 2023 to January 21, 2023:\n", week_data)
```

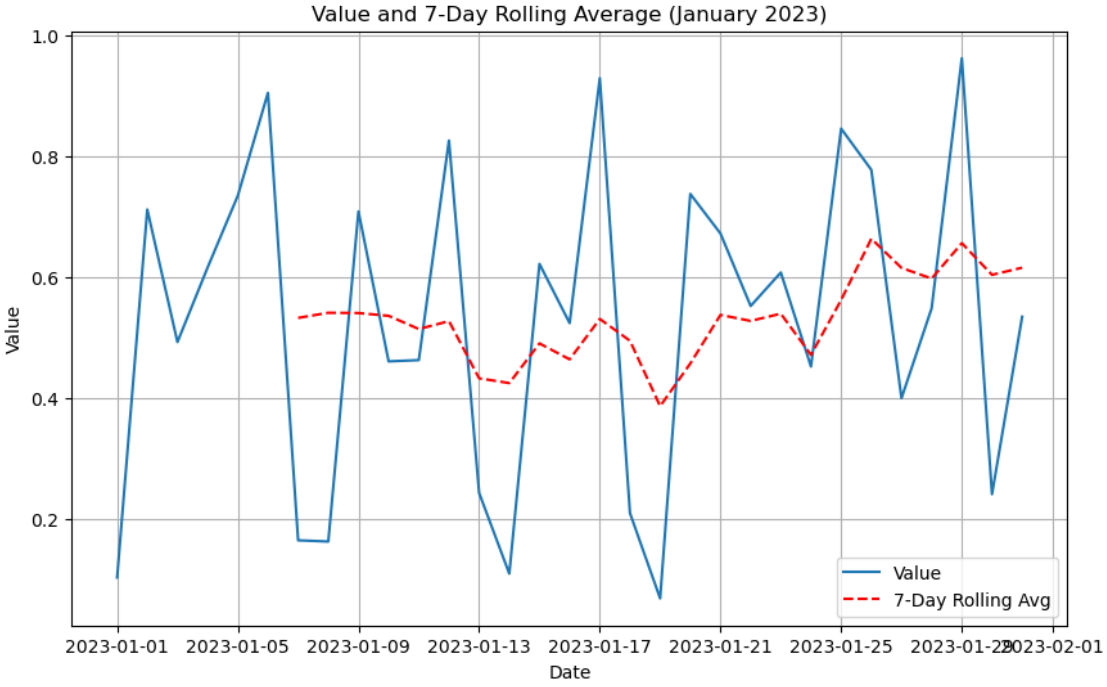
```

Data for January 15, 2023 to January 21, 2023:
              Value
Date
2023-01-15  0.621579
2023-01-16  0.523539
2023-01-17  0.928777
2023-01-18  0.209233
2023-01-19  0.067992
```

```
2023-01-20  0.737334
2023-01-21  0.671846
```

[10]:
```
# Calculate the rolling 7-day average and create a new DataFrame with original data and rolling average
df['Rolling 7-day Avg'] = df['Value'].rolling(window=7).mean()
print("\nDataFrame with Rolling 7-day Average:\n", df.head(14))  # Display first 14 rows to see the rolling average
```

```
DataFrame with Rolling 7-day Average:
                Value  Rolling 7-day Avg
Date
2023-01-01  0.102643                NaN
2023-01-02  0.711561                NaN
2023-01-03  0.492217                NaN
2023-01-04  0.615669                NaN
2023-01-05  0.734323                NaN
2023-01-06  0.904668                NaN
2023-01-07  0.164200           0.532183
2023-01-08  0.162206           0.540692
2023-01-09  0.708347           0.540233
2023-01-10  0.460289           0.535672
2023-01-11  0.462382           0.513774
2023-01-12  0.825688           0.526826
2023-01-13  0.242589           0.432243
2023-01-14  0.109027           0.424361
```

[11]:
```
# Plot 'Value' and 'Rolling 7-day Avg' columns
plt.figure(figsize=(10,6))
plt.plot(df.index, df['Value'], label='Value')
plt.plot(df.index, df['Rolling 7-day Avg'], label='7-Day Rolling Avg', linestyle='--', color='red')
plt.title('Value and 7-Day Rolling Average (January 2023)')
plt.xlabel('Date')
plt.ylabel('Value')
plt.legend()
plt.grid(True)
plt.show()
```


Value and 7-Day Rolling Average (January 2023)
1.0
0.8
0.6
0.4
0.2
Value
2023-01-01
2023-01-05
2023-01-09
2023-01-13
2023-01-17
2023-01-21
2023-01-25
2023-01-29
2023-02-01
Date
Value
7-Day Rolling Avg