EX -5
27/03/2025

Implement programs for estimating & eliminating trend in time series data- aggregation, smoothing.

AIM :

Implement programs for estimating & eliminating trend in time series data- aggregation, smoothing.

Procedure and Code :

Step 1 - Import the Files and Libraries .

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Step 2 - Describe and Read the Data

```
df=pd.read_csv('/content/drive/MyDrive/TimeSereisDatasets/
daily-website-vvisitors.csv)
```

```
df.head(10)
```

```
df.shape
```

```
(2167, 8)
```

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Step 3 -The original time series

```
# Plot the original time series
plt.figure(figsize=(12, 6))
plt.plot(ts, label='Original')
plt.title('Original Time Series')
plt.xlabel('Date')
plt.ylabel('Unique Visits')
plt.legend()
plt.show()
```

Step 4 - Aggregation Methods

```
monthly = ts.resample('M').mean()

# Quarterly aggregation
quarterly = ts.resample('Q').mean()

# Plot aggregated series
plt.figure(figsize=(12, 6))
plt.plot(monthly, label='Monthly Mean')
plt.plot(quarterly, label='Quarterly Mean')
plt.title('Aggregated Time Series')
plt.xlabel('Date')
plt.ylabel('Unique Visits')
plt.legend()
plt.show()
```

Step 5 -Smoothing Methods

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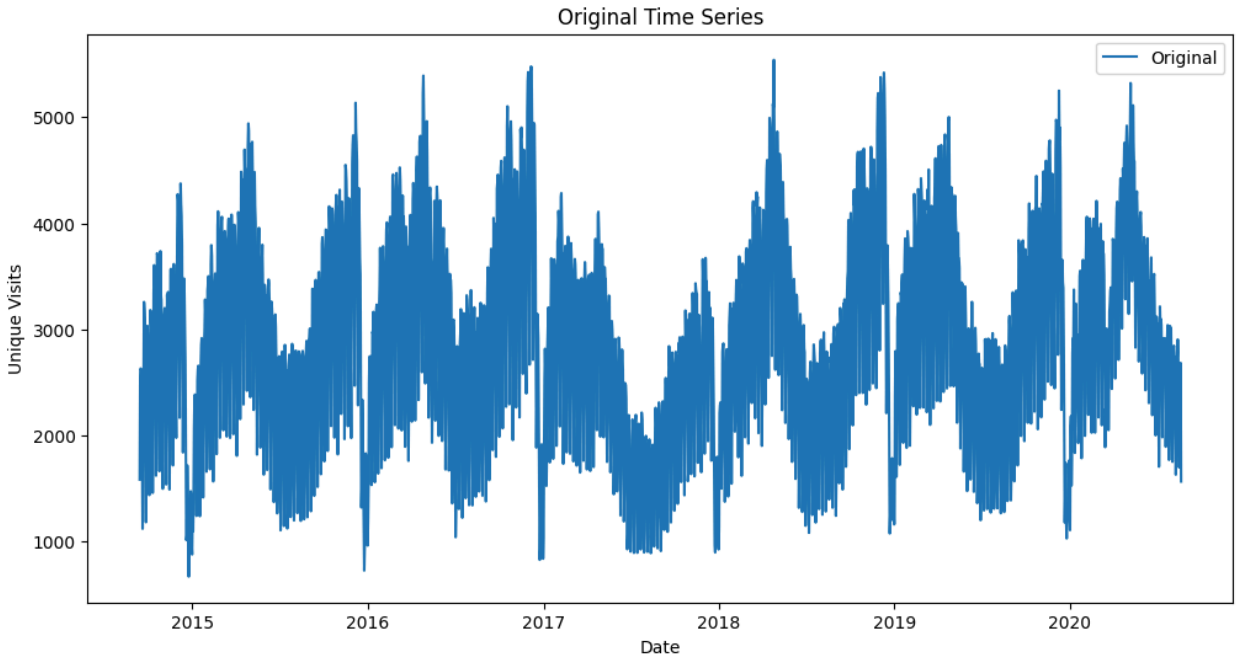
```
# Simple Moving Average (7-day window)
sma_7 = ts.rolling(window=7).mean()

# Simple Moving Average (30-day window)
sma_30 = ts.rolling(window=30).mean()

# Exponentially Weighted Moving Average
ewma = ts.ewm(span=30, adjust=False).mean()

# Plot smoothed series
plt.figure(figsize=(12, 6))
plt.plot(ts, label='Original', alpha=0.3)
plt.plot(sma_7, label='7-Day SMA')
plt.plot(sma_30, label='30-Day SMA')
plt.plot(ewma, label='EWMA')
plt.title('Smoothed Time Series')
plt.xlabel('Date')
plt.ylabel('Unique Visits')
plt.legend()
plt.show()
```



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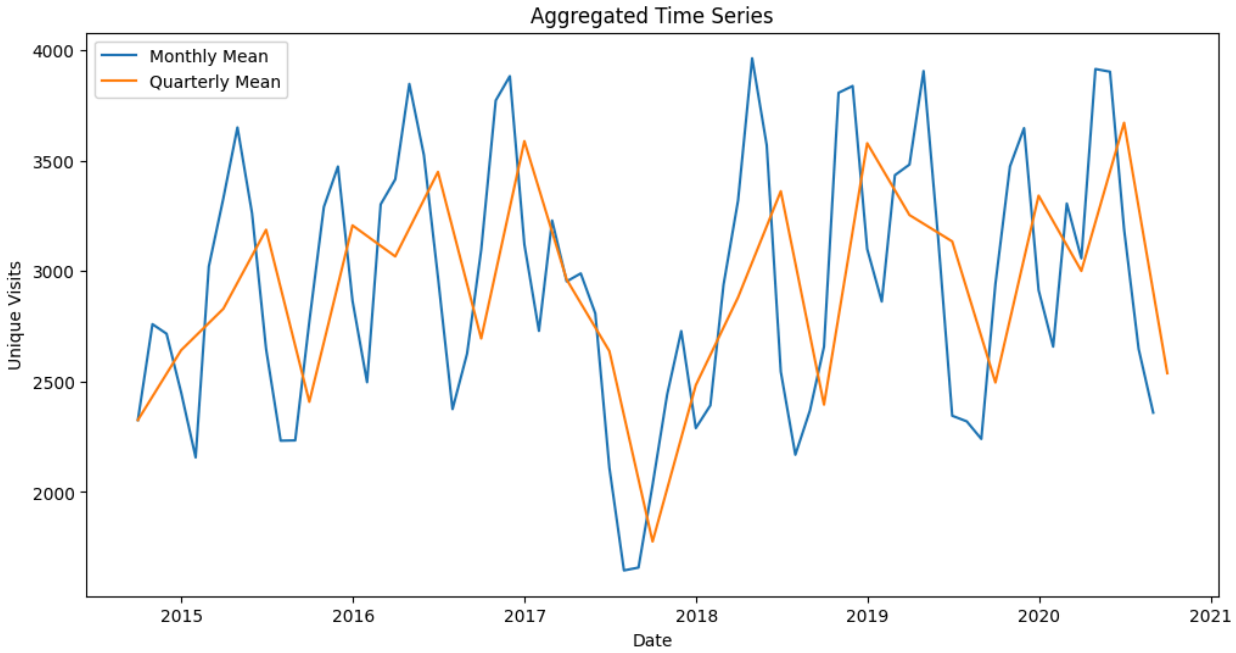

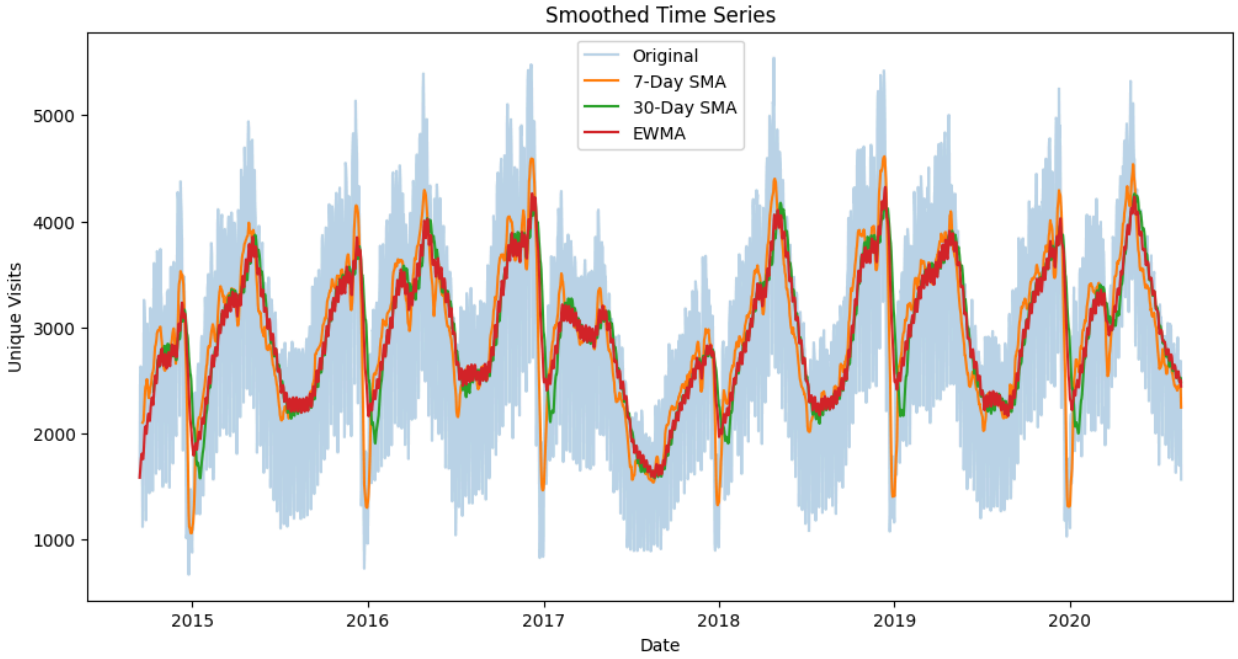

Result:

Thus the Program has been Executed Successfully.

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