Website Traffic Analysis Report

Program Statement: This project analyzes website traffic data using Python, Pandas, and Matplotlib to visualize key metrics such as page views, unique visitors, and bounce rates over time. The generated dataset consists of 50 days of traffic data with randomly simulated values.

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Introduction

Website traffic analysis is essential for understanding visitor behavior, optimizing user experience, and improving digital marketing strategies. This project generates a dataset with 50 days of traffic data and visualizes trends in page views, unique visitors, and bounce rates. The analysis helps identify peak traffic periods and user engagement levels.

Methodology

1. **Data Generation:** A dummy dataset with 50 rows is created, containing columns for date, page views, unique visitors, and bounce rates.
2. **Data Processing:** The dataset is converted into a Pandas DataFrame and sorted by date.
3. **Visualization:** Line graphs are plotted using Matplotlib to represent the trends over time.
4. **Analysis:** Insights are drawn based on the visual representations of user engagement and site performance.

CODE

```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np

# Generate a 50x50 dummy dataset
dates = pd.date_range(start='2024-01-01', periods=50, freq='D')
page_views = np.random.randint(1000, 5000, size=50)
unique_visitors = np.random.randint(500, 4000, size=50)
bounce_rate = np.random.randint(20, 70, size=50)

# Create a DataFrame
df = pd.DataFrame({
    'date': dates,
    'page_views': page_views,
    'unique_visitors': unique_visitors,
    'bounce_rate': bounce_rate
})

# Convert date column to datetime
df['date'] = pd.to_datetime(df['date'])
df = df.sort_values(by='date')
```

```
# Display the first few rows
print("Dataset Preview:")
print(df.head())

# Plot page views over time
plt.figure(figsize=(10, 5))
plt.plot(df['date'], df['page_views'], marker='o', linestyle='-', label='Page Views')
plt.xlabel('Date')
plt.ylabel('Page Views')
plt.title('Website Traffic - Page Views Over Time')
plt.legend()
plt.xticks(rotation=45)
plt.grid()
plt.show()

# Plot unique visitors over time
plt.figure(figsize=(10, 5))
plt.plot(df['date'], df['unique_visitors'], marker='s', linestyle='-', color='green', label='Unique Visitors')
plt.xlabel('Date')
plt.ylabel('Unique Visitors')
plt.title('Website Traffic - Unique Visitors Over Time')
```

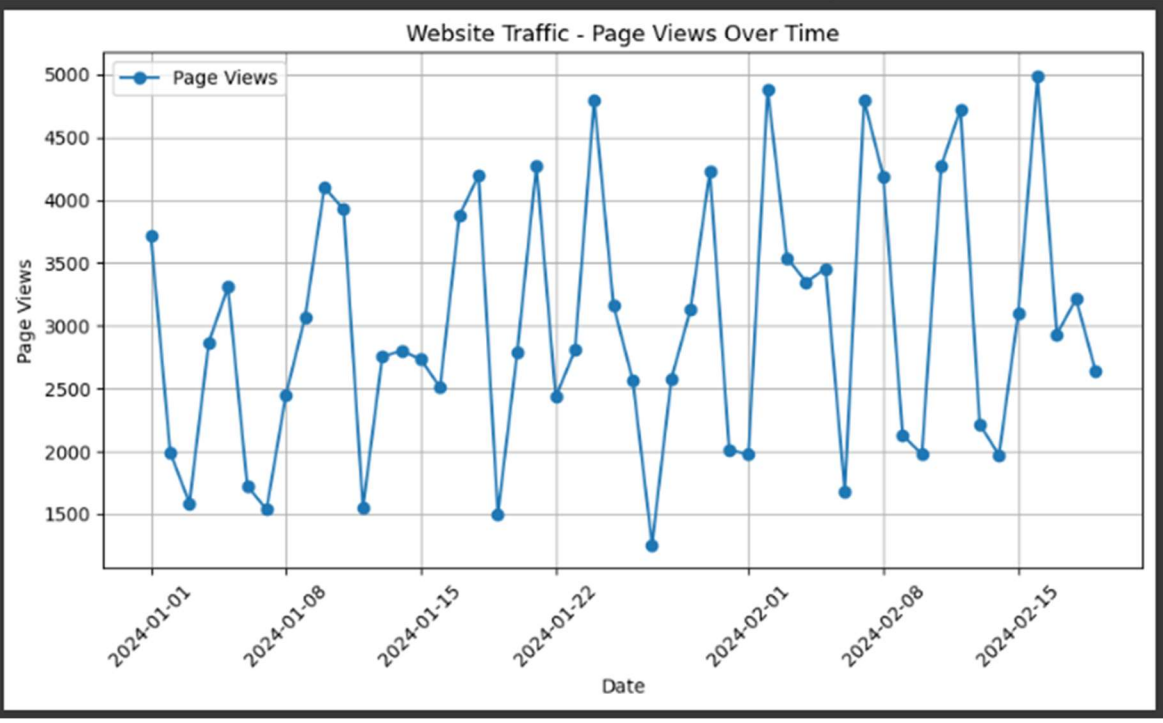
```
plt.legend()
plt.xticks(rotation=45)
plt.grid()
plt.show()

# Plot bounce rate over time
plt.figure(figsize=(10, 5))
plt.plot(df['date'], df['bounce_rate'], marker='d', linestyle='-', color='red', label='Bounce Rate')
plt.xlabel('Date')
plt.ylabel('Bounce Rate (%)')
plt.title('Website Traffic - Bounce Rate Over Time')
plt.legend()
plt.xticks(rotation=45)
plt.grid()
plt.show()

print("Analysis Complete!")
```

Code Result

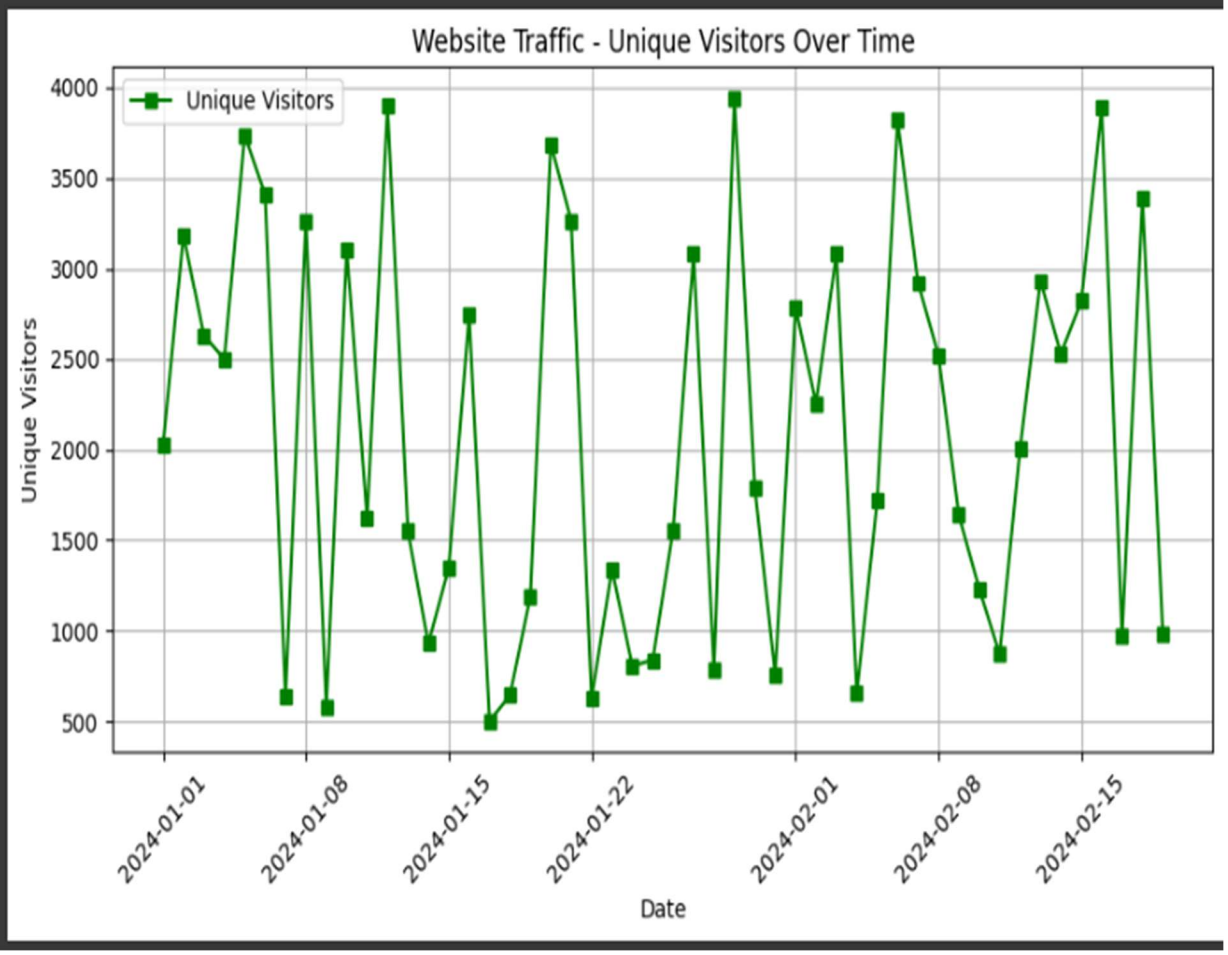
```
# Display the first few rows
print("Dataset Preview:")
print(df.head())
```

```
Dataset Preview:
        date  page_views  unique_visitors  bounce_rate
0 2024-01-01        3717             2023           33
1 2024-01-02        1993             3186           68
2 2024-01-03        1587             2627           49
3 2024-01-04        2868             2498           26
4 2024-01-05        3308             3736           43
```

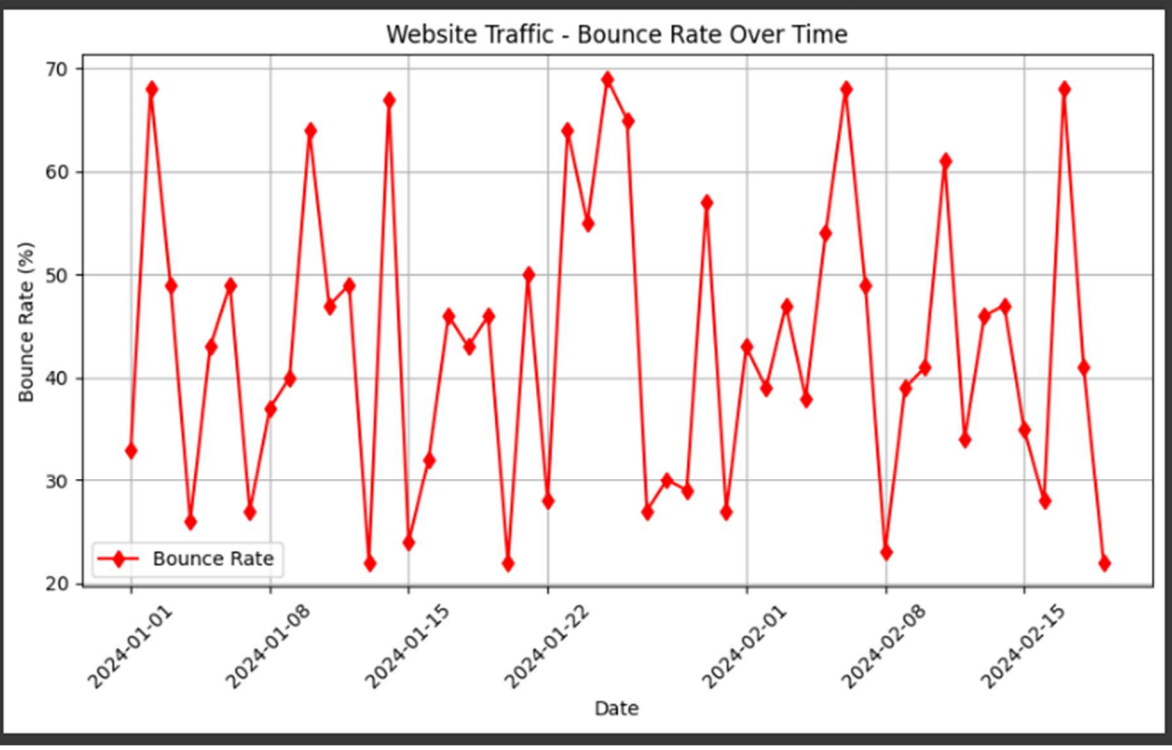
```
[6] # Plot page views over time
    plt.figure(figsize=(10, 5))
    plt.plot(df['date'], df['page_views'], marker='o', linestyle='-', label='Page Views')
    plt.xlabel('Date')
    plt.ylabel('Page Views')
    plt.title('Website Traffic - Page Views Over Time')
    plt.legend()
    plt.xticks(rotation=45)
    plt.grid()
    plt.show()
```



```python
# Plot unique visitors over time
plt.figure(figsize=(10, 5))
plt.plot(df['date'], df['unique_visitors'], marker='s', linestyle='-', color='green', label='Unique Visitors')
plt.xlabel('Date')
plt.ylabel('Unique Visitors')
plt.title('Website Traffic - Unique Visitors Over Time')
plt.legend()
plt.xticks(rotation=45)
plt.grid()
plt.show()
```



```python
# Plot bounce rate over time
plt.figure(figsize=(10, 5))
plt.plot(df['date'], df['bounce_rate'], marker='d', linestyle='-', color='red', label='Bounce Rate')
plt.xlabel('Date')
plt.ylabel('Bounce Rate (%)')
plt.title('Website Traffic - Bounce Rate Over Time')
plt.legend()
plt.xticks(rotation=45)
plt.grid()
plt.show()
```



References/Credits

- Dataset: Randomly generated using NumPy.
- Libraries used: Pandas, Matplotlib, NumPy.
- Images: If any external images are used, they should be credited appropriately.