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

# Sample Data - simulating traffic counts at different times of the day
data = {
    'timestamp': pd.date_range('2025-05-07 00:00', periods=24, freq='H'),
    'traffic_count': [30, 35, 40, 42, 45, 50, 60, 65, 70, 80, 95, 110, 120, 130,
140, 160, 170, 160, 150, 140, 135, 120, 100, 90]
}

# Create DataFrame
df = pd.DataFrame(data)

# Set timestamp as index
df.set_index('timestamp', inplace=True)

# Print data
print("Sample Traffic Data:")
print(df)

# Plot the traffic pattern
plt.figure(figsize=(10, 6))
plt.plot(df.index, df['traffic_count'], marker='o', color='b', linestyle='-',
label='Traffic Volume')
plt.title('Traffic Pattern Analysis (Hourly)')
plt.xlabel('Time of Day')
plt.ylabel('Vehicle Count')
plt.xticks(rotation=45)
plt.grid(True)
plt.legend()
plt.tight_layout()
plt.show()

# Analysis: Peak hours (Time with highest traffic)
peak_hour = df['traffic_count'].idxmax()
peak_value = df['traffic_count'].max()
print(f"\nPeak Traffic Time: {peak_hour.strftime('%H:%M')} with a traffic count
of {peak_value} vehicles")

# Analysis: Average Traffic Count
average_traffic = df['traffic_count'].mean()
print(f"\nAverage Traffic Count: {average_traffic:.2f} vehicles")

# Identify quiet hours (Low traffic)
quiet_hour = df['traffic_count'].idxmin()
quiet_value = df['traffic_count'].min()
print(f"\nQuietest Traffic Time: {quiet_hour.strftime('%H:%M')} with a traffic
count of {quiet_value} vehicles")
```

## Output



Traffic Pattern Analysis (Hourly)