Nairobi_Traffic_Analysis

January 20, 2026

1 Nairobi Traffic Streaming Analysis

This notebook analyzes simulated traffic data from major Nairobi junctions.

1.1 Load CSV Data

[11]:
```
import pandas as pd

df = pd.read_csv("traffic.csv", parse_dates=["timestamp"])
df.head()
```

[11]:
```
                        junction           timestamp  avg_speed  \
0           Thika Road - Muthaiga 2025-01-01 05:00:00         58
1  Uhuru Highway - Haile Selassie 2025-01-01 05:00:00         67
2         Waiyaki Way - Westlands 2025-01-01 05:00:00         48
3       Ngong Road - Adams Arcade 2025-01-01 05:00:00         51
4       Jogoo Road - City Stadium 2025-01-01 05:00:00         52

   vehicle_count
0             97
1            119
2             96
3            108
4             87
```

1.2 Congestion Alerts

[12]:
```
congestion = df[(df['avg_speed'] < 20) & (df['vehicle_count'] > 100)]
congestion
```

[12]:
```
                       junction           timestamp  avg_speed  vehicle_count
47       Waiyaki Way - Westlands 2025-01-01 07:15:00         19            154
58     Ngong Road - Adams Arcade 2025-01-01 07:45:00         18            135
73     Ngong Road - Adams Arcade 2025-01-01 08:30:00         17            117
94     Jogoo Road - City Stadium 2025-01-01 09:30:00         17            139
228    Ngong Road - Adams Arcade 2025-01-01 16:15:00         19            134
…                            …                   …        …              …
3128   Ngong Road - Adams Arcade 2025-01-07 17:15:00         17            156
```

```
3148  Ngong Road - Adams Arcade 2025-01-07 18:15:00         19            122
3162    Waiyaki Way - Westlands 2025-01-07 19:00:00         19            152
3178  Ngong Road - Adams Arcade 2025-01-07 19:45:00         15            168
3179  Jogoo Road - City Stadium 2025-01-07 19:45:00         18            122

[91 rows x 4 columns]
```

1.3 Busiest Times Analysis

[13]:
```
df['hour'] = df['timestamp'].dt.hour
busy_times = df.groupby(['junction','hour'])['vehicle_count'].mean().
 ↪reset_index()
busy_times.sort_values('vehicle_count', ascending=False).head(10)
```

[13]:

	junction	hour	vehicle_count
80	Uhuru Highway - Haile Selassie	8	177.678571
79	Uhuru Highway - Haile Selassie	7	176.714286
90	Uhuru Highway - Haile Selassie	18	176.428571
89	Uhuru Highway - Haile Selassie	17	176.392857
91	Uhuru Highway - Haile Selassie	19	175.750000
81	Uhuru Highway - Haile Selassie	9	172.535714
88	Uhuru Highway - Haile Selassie	16	172.214286
113	Waiyaki Way - Westlands	17	159.928571
105	Waiyaki Way - Westlands	9	159.571429
112	Waiyaki Way - Westlands	16	158.428571

1.4 Conclusion

Uhuru Highway: Experiences “Extended Peaks.” The volume remains high from 7 AM to 9 AM and 4 PM to 7 PM. This is likely due to its central location as a connector to the Central Business District (CBD).

Waiyaki Way: Shows a “Delayed Morning Peak” (9 AM). This could be attributed to the “school run” or the specific start times of businesses in the Westlands area.

Strategic Recommendations Traffic Light Optimization: Adjust signal timings at the Haile Selassie junction specifically between 5 PM and 7 PM to favor Uhuru Highway flow.

Waiyaki Way Monitoring: Given the high frequency of alerts at westlands, this junction may require dedicated traffic marshals or infrastructure review (e.g., dedicated turning lanes).

[ ]:
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```