

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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[ ]:
```