

KOMUKAMA TRACY

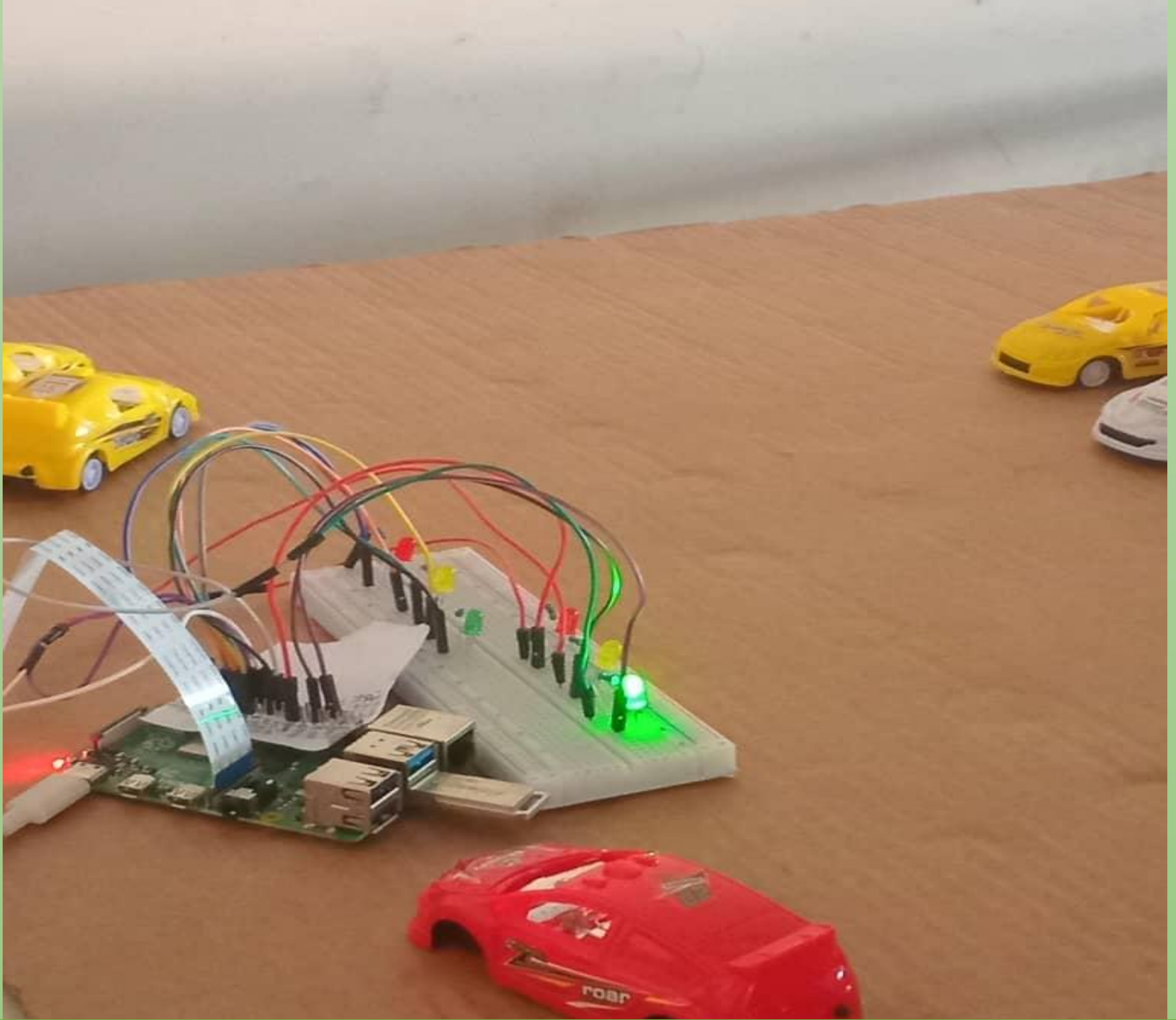
KATO AGABA ARNOLD

MADETTE HECTOR

NABAGGALA MARION

Problem		
Kamapala faces severe traffic congestion, especially during peak hours, due to a growing vehicle population and outdated fixed-time lights. This causes long delays, overreliance on traffic police, and increased pollution. Without an adaptive system, the situation will worsen as the city continues to grow.		
Problem Objective		
<div><div>1. Reduce traffic delays.</div><div>2. Automate traffic light control.</div><div>3. Minimize reliance on traffic police.</div><div>4. Improve traffic flow.</div><div>5.Develop a low-cost, scalable solution for Kampala's traffic system.</div></div>		
Project Requirements.		
<div><div>1. Picamera</div><div>2.Toy cars</div><div>3. Breadboard.</div><div>4. LED lights and Wiress.</div><div>5. Raspberry Pi</div></div>		
Target Users.		
Traffic Police	Daily Road Users.	Engineers.
<div><div>1. Use system alerts to assist in traffic control.</div><div>2.Reduced manual work at junctions.</div></div>	<div><div>1. Drivers of cars, boda-bodas, and trucks.</div><div>Benefit from reduced delays and smoother traffic flow.</div></div>	<div><div>1 .Handle installation and troubleshooting.</div><div>2. Maintain and improve the system.</div></div>

Results
<div><div>1.Reduced Traffic Delays.</div><div>Real-time image detection enabled smarter light switching, cutting average waits times by 20-30%</div><div>2.Improved Traffic Flow.</div><div>Vehicle prioritization based on lane density improved movement at busy intersections like jinja Road and Wandegeya.</div><div>3.Lower Reliance on Manual control.</div><div>Reduced need for traffic police at intersections, allowing redeployment of personnel.</div><div>4.Environmental impact.</div><div>Shorter idling time decreased fuel use and cut emission by 10-15% improving air quality.</div><div>5.Successful Prototype.</div><div>The prototype, using Raspberry Pi and a camera module, successfully detected vehicles and dynamically controlled traffic lights based on density.</div></div>
Future Work.
<div><div>1. Scaling this project to Kampala Central Business district.</div><div>2. Creating a central controller for all traffic lights in Kampala city.</div><div>3. Delivering realtime traffic jam updates to drivers in Kampala through a mobile app.</div></div>

Project Design

Conclusion.
<p>This proposed system shows that using real-time image processing and adaptive traffic lights can significantly reduce congestion in Kampala. The results support the hypothesis that smart, automated control improves traffic flow, reduces delays, and lowers emissions. With further development, the system can scale across the city forlong-term impact.</p>
References.
<div><div>•Uganda Bureau of Statistics (UBOS). (2023). <i>Annual transport and infrastructure report</i>. UBOS.</div><div>https://www.ubos.org/reports/transport-2023 Provides data on Kampala’s vehicle population growth.</div></div>