

# **SMART TRAFFIC SIGNAL SYSTEM**

## **CODING MONSTERS**

# TEAM MEMBERS

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# Problem Statement:

- ▶ Rigid fixed-time traffic signals :
  - Congestion
  - Longer waiting times
  - Increased fuel consumption
  - Higher emissions
- ▶ Inefficient traffic management at busy junctions

# Limitations of Existing Solutions:

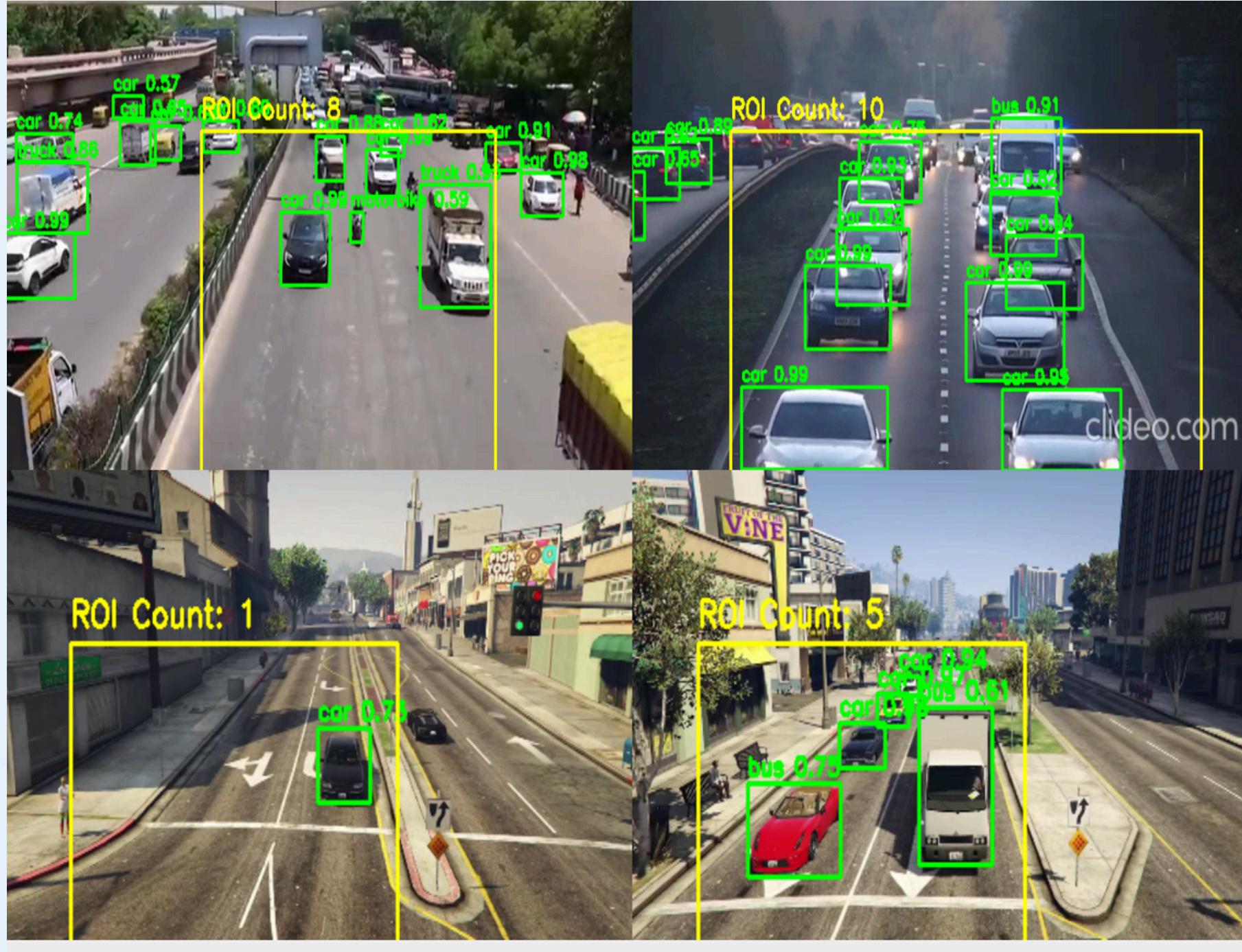
- ▶ Non adaptable to dynamic traffic conditions
  - Outdated technology
  - Missing real time analysis
- ▶ High inefficiency
  - Commuter frustration
  - Incentivises rash driving
- ▶ Environmental impact
- ▶ Limited scalability in fluid urban traffic patterns.

# Our Smart Traffic Signal System (Solution):

- ▶ Real-Time Data Acquisition
- ▶ Hardware-Based Control
- ▶ Immediate Response

# Plan:

- Data Processing
- Vehicals Detection
- Signal Control
- Scalability Planning

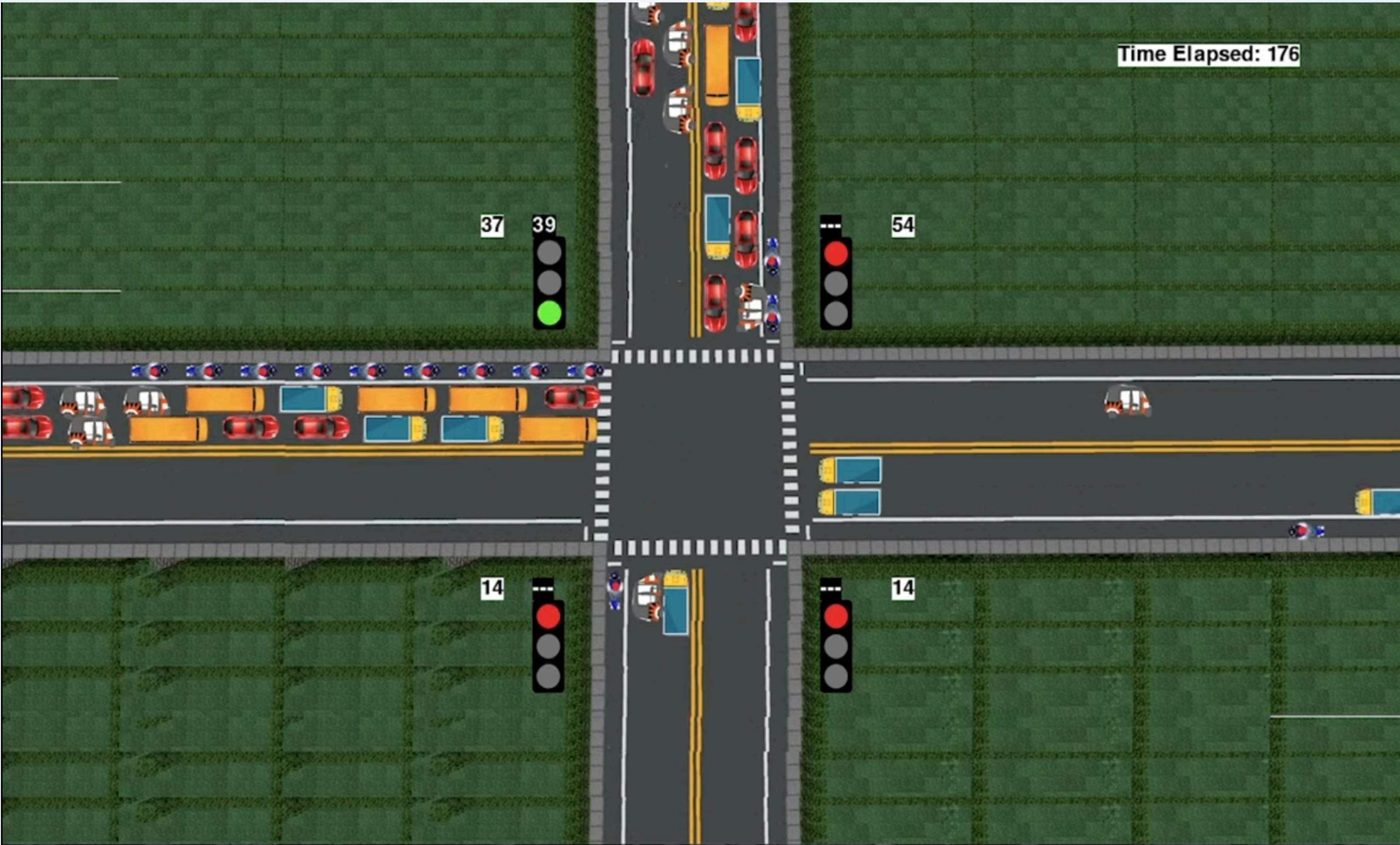


# Accuracy: 67%

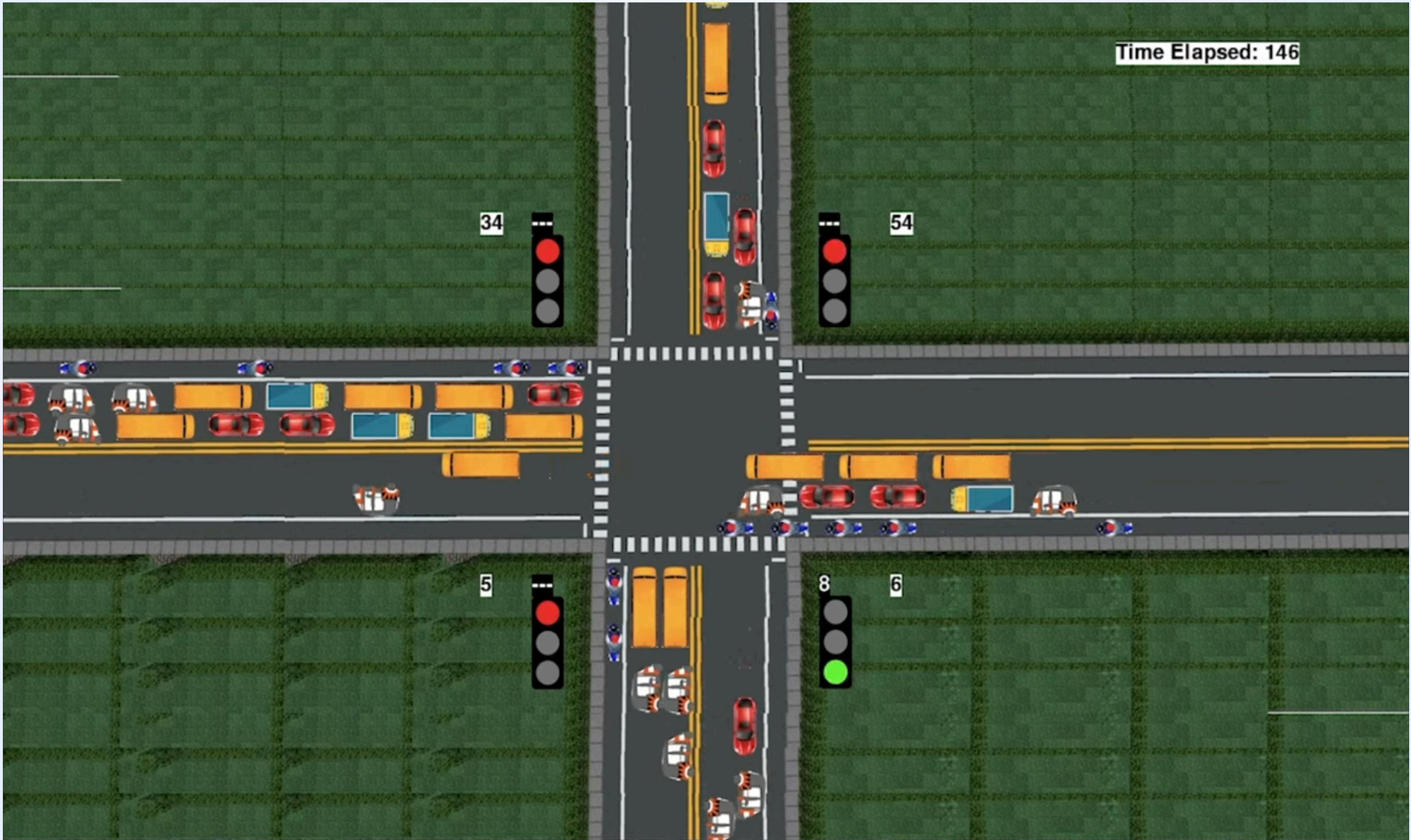
Camera No.	Visible cars	Detected cars
1	6	8
2	14	10
3	1	1
4	8	6

Total video samples: 10

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# Tech Stack

## ➤ **Hardware & IoT Components :**

- **Sensors:** Camera (Detect real-time vehicle count, speed, and lane occupancy)
- **Microcontroller:** Arduino (Handles signal adjustments based on sensor data).

## ➤ **Software Components :**

- Programming Languages: Python3
- Embedded C++
- Computer Vision & Data Processing: OpenCV
- YOLOv3

# Tech Stack

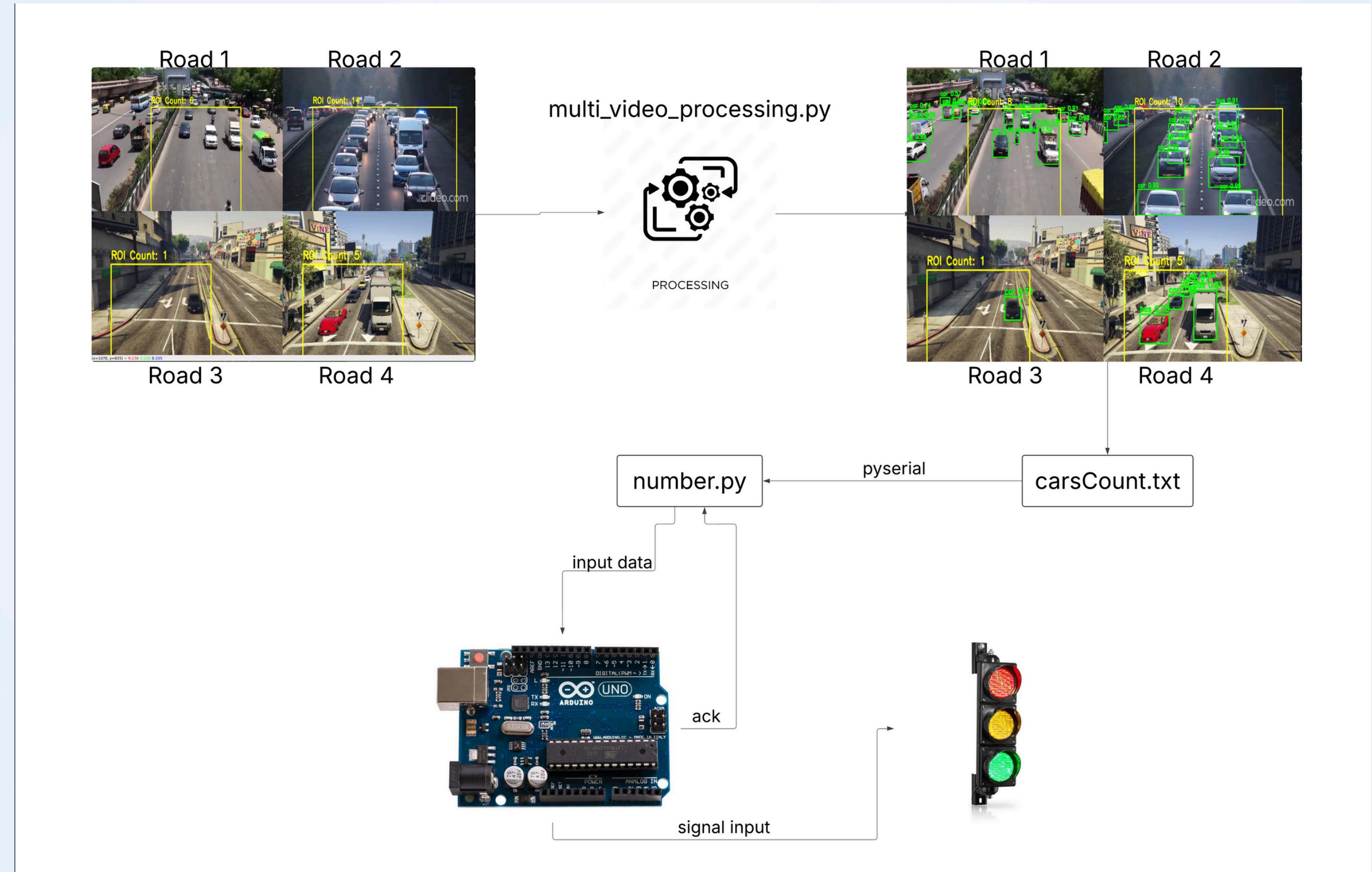
## ► Communication & Data Handling

- Serial Communication: PySerial
- File-Based Data Exchange: CarsCount.txt

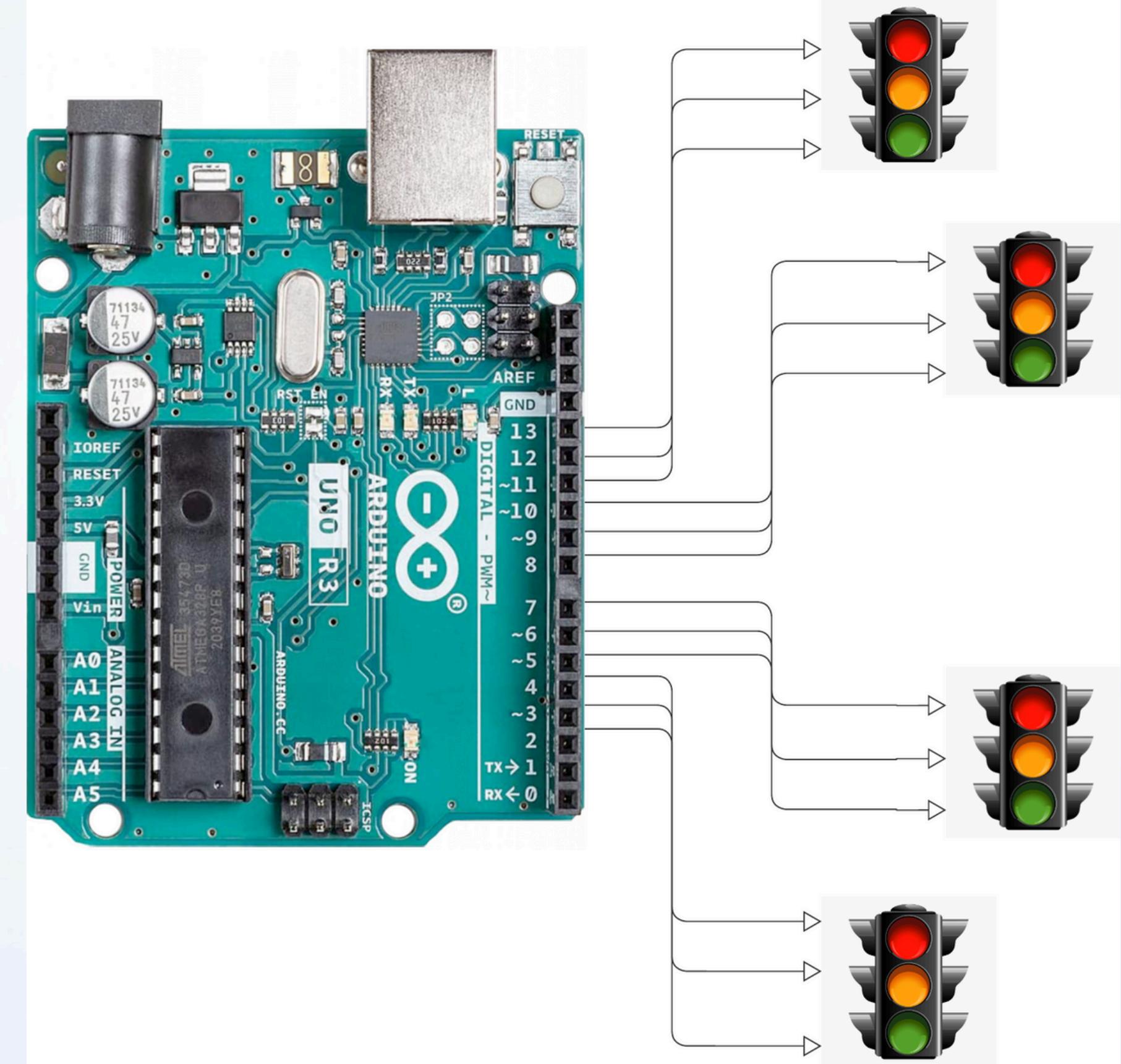
## ► Implementation Workflow

- Sensors collect real-time data.
- Script reads count from text file and transfers to Arduino.
- Arduino processes data and dynamically adjusts signal timings.
- Serial communication ensures synchronization between the system and traffic signals.

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# Circuit Diagram:



## Limitations:

- Dependence on Camera Quality & Weather Conditions
- Limited to Vehicle Detection
- Hardware Constraints
- No Emergency Vehicle Detection

## Future Scope:

- Predictive Analytics
- Enhanced Connectivity
- Broader Sensor Integration
- Cybersecurity Enhancements
- Zebra Crossing Signal Integration