TRAFFIX

AI-Optimized Traffic Management System

-OVERVIEW

- The Traffic Management System is a project aimed at optimizing traffic flow at intersections through the use of computer vision, real-time data processing, and machine learning. The system dynamically adjusts traffic signals, provides real-time insights into congestion, and enhances overall traffic management.

Traditional traffic System

1 Traffic Congestion Impact (40%):

- Becomes a significant issue with a high volume of vehicles on roadways.
- Queue at intersections grows notably with increasing road traffic.

2 Inadequacy of Traditional Traffic Lights (30%):

- Traditional traffic lights struggle to manage the escalating congestion.
- Synchronization mechanism lacks adaptability, causing challenges during heavy traffic

3 Limitation of Signal Change Interval (30%):

- Traditional circulation lighting systems employ fixed intervals for changing light signals.
- This approach is effective when roads have low traffic but falters during high-traffic scenarios.

IMPACTS ON LIFE

30%

Air Pollution

25%

Physical Health Risks

20%

Noise Pollution

10%

Road Safety Concerns

Solution

is

TRAFFIX

AI-Optimized Traffic Management System

What TRAFFIX DO?

Utilizes computer vision to analyze live video streams from intersection cameras. Detects and tracks vehicles, pedestrians, and other relevant objects

Segments the intersection into paths and calculates the time spent by vehicles in each path. Identifies maximum time durations, aiding in congestion analysis.

Adapts traffic signal timings in real-time based on current traffic conditions. Optimizes signal control to reduce congestion and improve overall traffic flow

Incorporates machine learning models to predict traffic patterns based on historical and real-time data. Enhances the system's ability to adapt to changing traffic conditions

How does TRAFFIX work?

Data Collection

- Real-time video capture using static cameras.

Data Preprocessing

- Colour image to grayscale.
- Applying blurring techniques on grayscale images.
- Depth-based foreground-background separation performed using morphological techniques to improve the overall quality of separation.

Algorithm Building

- Calculated a maximum traffic signal time for each path of the intersection.
- Uses AIMD (Additive Increase and Multiplicative Decrease) for optimizing the green light signal timing.

Integration

- Seamless integration with either existing cameras or installing new ones, using microcomputers like Raspberry Pi, leveraging their computational simplicity.

TRAFFIX's Efficiency

Air Pollution will be reduced from

30%

15%

The average Traffic light scheduling Cycle is reduced from

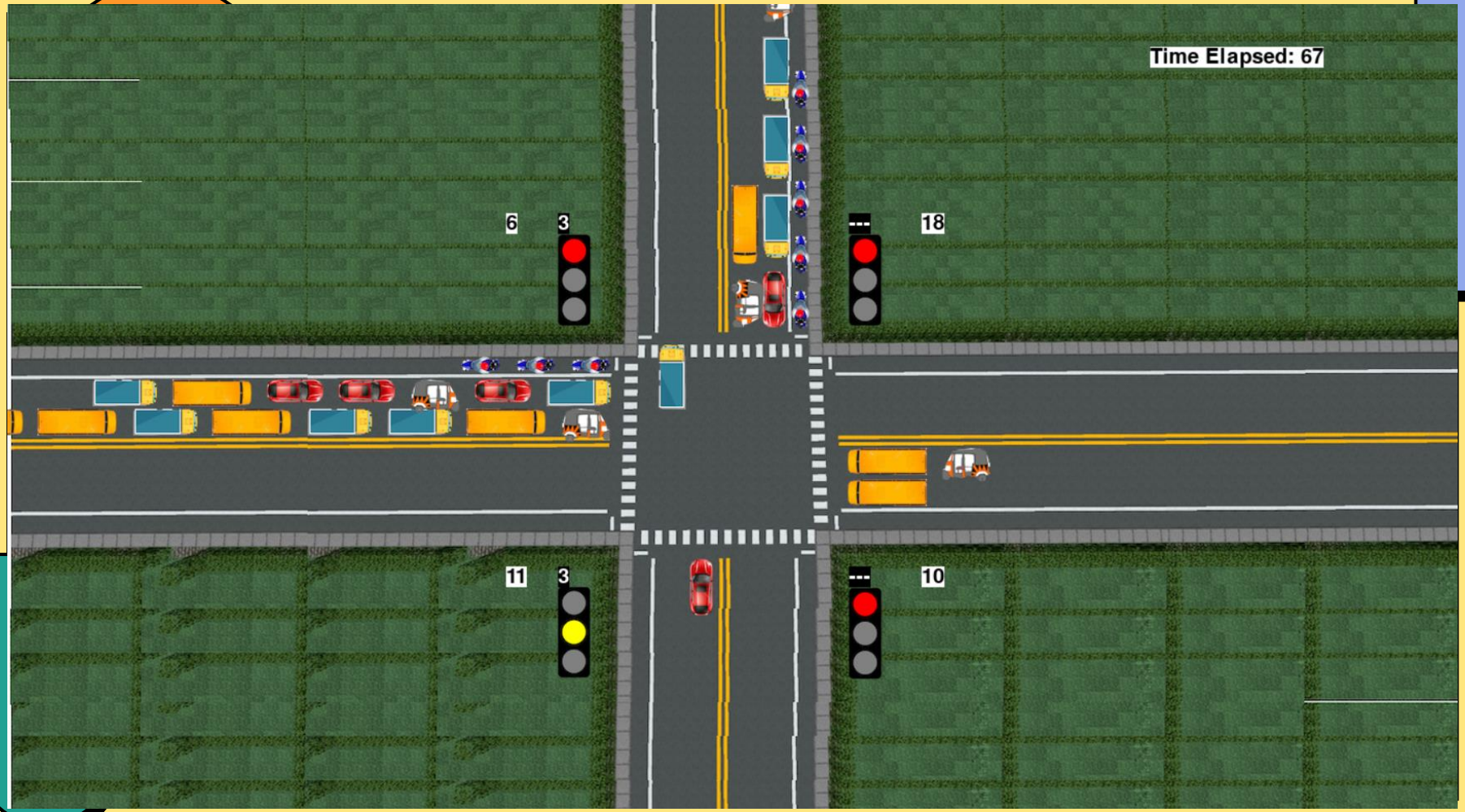
7 Min

2-3min

Noise pollution will be reduced upto

50%

Images from Our Simulation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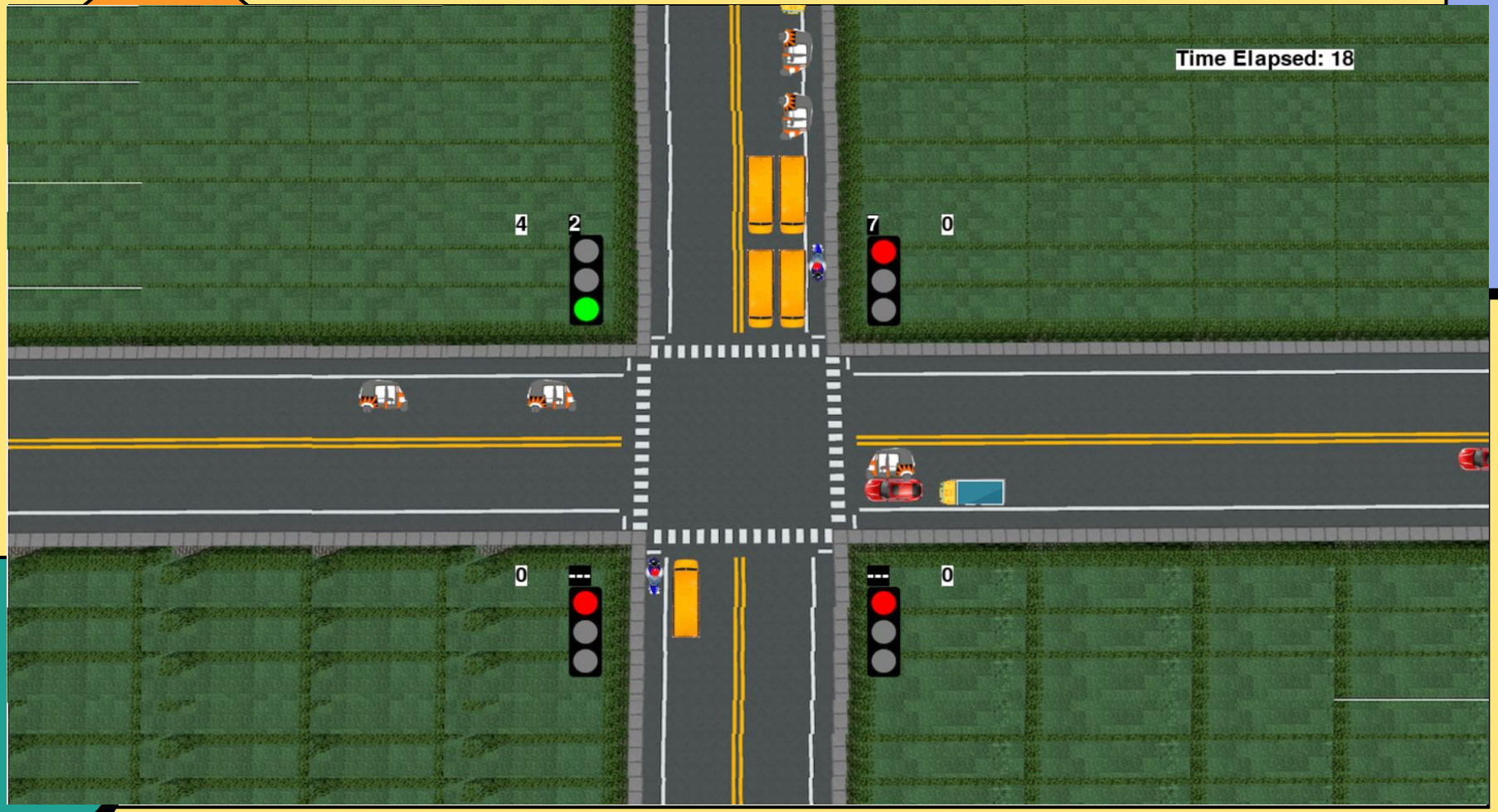
3

10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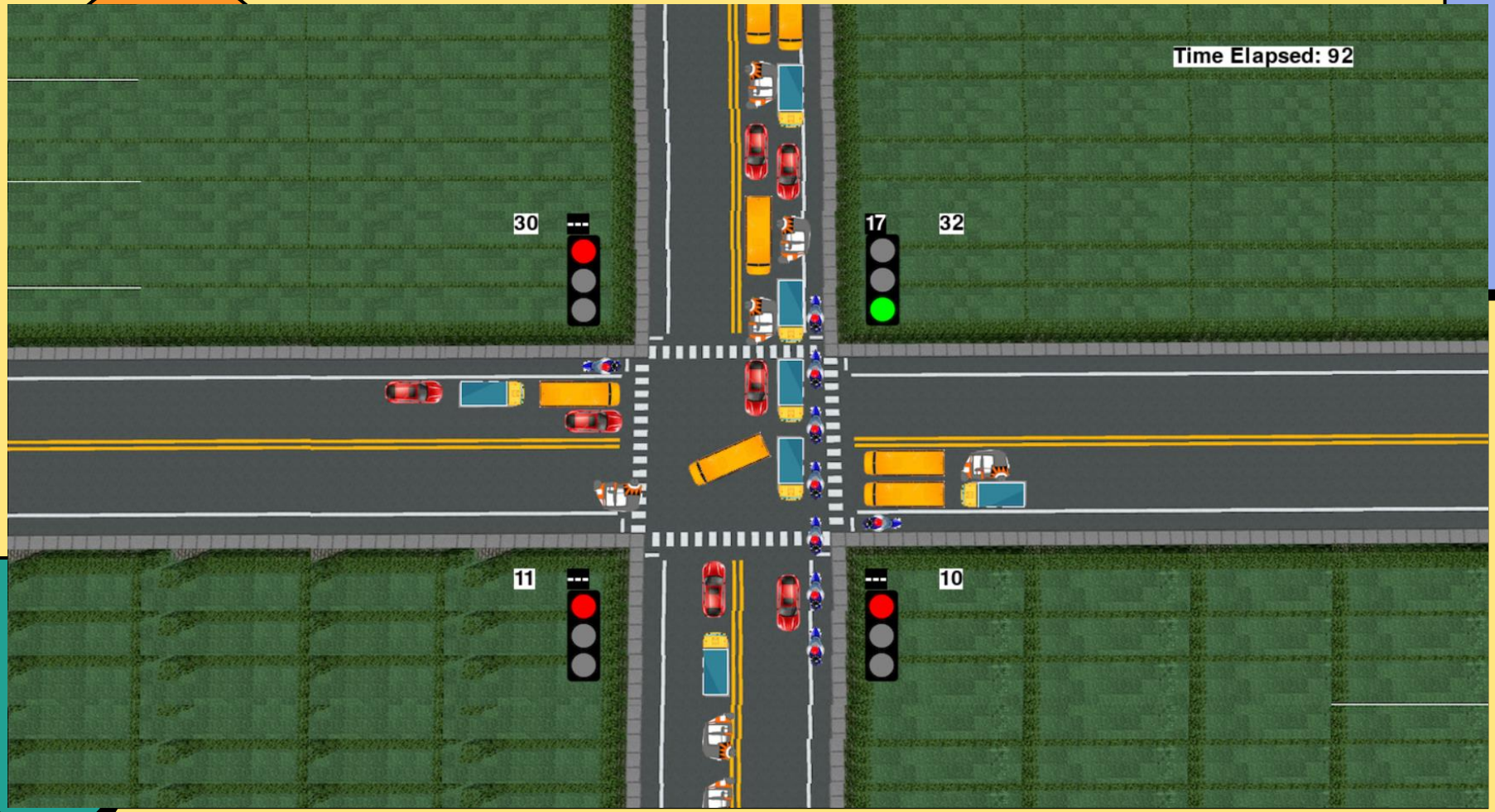
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11

10