

# Traffic Signal Violation Detection System

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**Abstract-** *Managing traffic at busy intersections has become increasingly challenging due to frequent signal violations by drivers. Ignoring red signals often leads to unsafe road conditions and traffic disturbances. To address this issue, this project proposes an automated monitoring system that observes vehicle movement near traffic signals without continuous human supervision. A key feature of this system is its ability to support emergency ambulances. When an ambulance approaches the signal, the system detects it and gives immediate priority by allowing it to pass without delay. This reduces waiting time in critical situations and improves emergency response efficiency.*

**Keywords:** Traffic Signal Violation Detection, Computer Vision, Image Processing, Real-Time Monitoring, Emergency Vehicle Priority, Ambulance Detection, Smart Traffic System, License Plate Recognition.

## I. INTRODUCTION

In our daily life, we have observed that traffic is not properly managed at road signals. At times, people are driving their vehicles even when the signal is red. Due to this, confusion arises on the road, and at times, accidents occur. We have observed this issue in different areas, so we decided to work on a solution for this issue. We have also taken into consideration emergency situations. At times, ambulances are stuck in traffic, which may create problems. To solve this issue, we have included a feature in our system. When an ambulance is nearby, our system gives priority to the ambulance so that it can move without waiting at the traffic signal. Our main aim is to make traffic control simple and useful. We have developed a system. What we are trying to do in our project is to come up with a system that can check the traffic that helps in reducing violations.

Instead of relying on the traffic police for this purpose, the system itself will keep a view on the road using a camera. The camera will focus on the area where the stop line is located.

## II. GETPEER REVIEWED

While working on this project, we studied different method used earlier for traffic control systems. In many older system simple sensors were used on roads to detect the presence of vehicles. These system could only sense whether a vehicle present or not, but were not able to properly detect rule violations like crossing during a red signal. After that, we looked at some camera-based systems. These systems use video monitoring to observe traffic at signals. They are better than sensor-based systems because they can see actual vehicle movement some of these systems also try to capture images when a vehicle crosses the stop line. We also found that in some advanced systems, number plate recognition is used. This helps in identifying the vehicle involved in the violation. However, many of these systems mainly focus on detection violations and consider emergency situations.

## III. IMPROVEMENT AS PER

### REVIEWER COMMENTS

In today's time, traffic has become a common problem in almost every city. The number of vehicles on the road is increasing continuously, which makes traffic control more difficult, especially at busy intersections. Traffic signals are used to manage this flow, but in real situations, many drivers do not strictly follow the rules. Crossing the signal during a red light is one of the most frequent problems seen on roads.

When such violations happen, it not only disturbs the normal flow of vehicles but also increases the chances of accidents. Sometimes, even a small mistake at a signal can create confusion among drivers and lead to unsafe situations. This shows that proper monitoring of traffic signals is very important. Traditionally, traffic police are responsible for handling these situations. They try their best to control traffic and ensure that rules are followed. However, it is not possible for them to be present at every signal all the time. Due to this limitation, many violations are not noticed, and strict action is not always taken. Looking at all these problems, there is a

need for a better system that can work automatically and handle multiple situations at the same time.

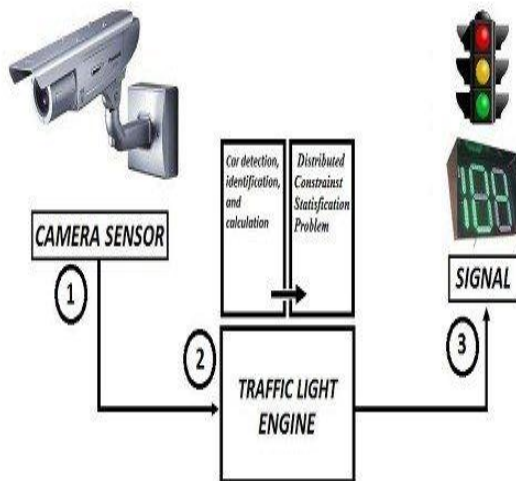
**IV.METHODOLOGY**

In this project, the system works step by step to monitor traffic and detect violations automatically. The complete process is based on observing vehicle movement using a camera and acting based on signal conditions.

First, a camera is placed near the traffic signal to capture continuous video of the road. This video acts as the main input for the system. The system always checks the signal status to know whether it is red or green.

In addition to violation detection, the system also includes ambulance support. The system continuously checks for the presence of an ambulance near the signal. When an ambulance is detected, the system gives priority by allowing it to pass without waiting for the normal signal timing. This helps in reducing delays during emergency situations.

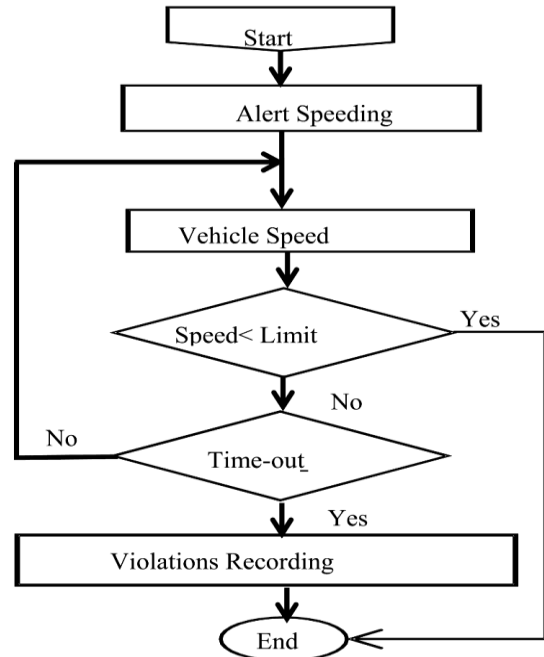
Overall, the methodology is designed in a simple way so that the system can work continuously, reduce human effort, and improve traffic control in real-life conditions.



**Fig: Architecture of Traffic Signal Violation Detection**

This video is sent to the traffic light engine, where vehicle movement is analyzed. If a vehicle crosses the stop line during a red signal the system detects and records the event. At the same time, the system checks for emergency vehicles and ambulances. When an ambulance is identified, priority is given by allowing it to pass quickly.

**V. FLOWCHART**



**Fig. Signal Detection of Flowchart**

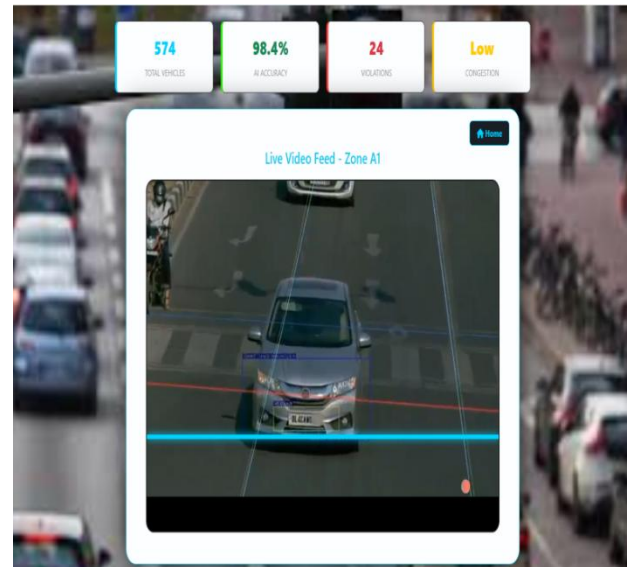
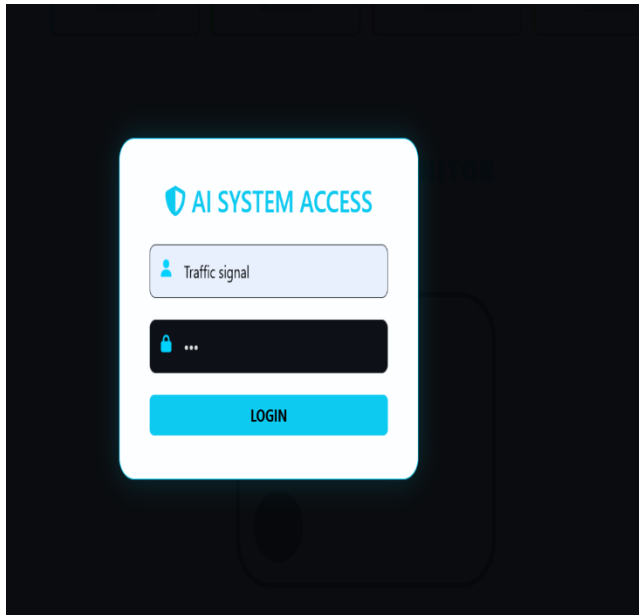
**VI. OBJECTIVES**

- To design a system that can monitor traffic signals automatically.
- To detect vehicles that cross the stop line during a red signal.
- To reduce dependency on manual traffic control.
- To improve safety at road intersections.
- To record violation data for further action.
- To provide priority for ambulances during emergency situations.
- To monitor traffic signals automatically.

**VII. FUTURE SCOPE**

In the coming years, this system can be improved by implementing smarter technologies to increase its efficiency and trust. These improvements can make the system more useful in real-life situations and help in better road safety management. The system can also be upgraded to identify ambulances more quickly by combining visual detection with location-based tracking methods.

**VIII. OUTPUT**



**IX. CONCLUSION**

In this work, we developed a system to handle traffic signal violations in a way. It observes vehicle movement at signals and identifies when rules are not followed. This helps in reducing the need for manual checking and improves overall control at busy intersections.

The system also focuses on helping ambulances during emergency situations. By giving them quick access through signals, it reduces unnecessary waiting time and supports faster response. This makes the system more practical for real-life use.

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