

## SMART TRAFFIC MANAGEMENT FOR AMBULANCE

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DOI : <https://www.doi.org/10.56726/IRJMETS37427>

### I. ABSTRACT

In emergency situations, every second counts, and timely medical assistance can mean the difference between life and death. However, with the increasing number of vehicles on the road and the ever-growing traffic congestion, ambulance response times are getting longer. To tackle this issue, a smart traffic management system for ambulance has been developed, which aims to optimize ambulance routes, reduce response times, and ultimately, save lives. The proposed system utilizes real-time data on traffic conditions, ambulance locations, and hospital availability to provide the most efficient and fastest route to the patient's location. The system also incorporates an intelligent traffic light control system that gives priority to ambulances, allowing them to pass through intersections quickly and safely. To evaluate the effectiveness of the system, a simulation study was conducted, which demonstrated that the smart traffic management system for ambulance can reduce response times by up to 50% compared to the traditional response system. Additionally, the system can handle multiple emergency cases simultaneously while still ensuring that the response times are optimized. In conclusion, the Smart Traffic Management System for Ambulance is a game-changer in emergency response, providing a faster and more efficient way of getting medical assistance to those in need. The impact of this system on emergency response times and ultimately on patient outcomes cannot be overstated, making it a crucial tool for emergency medical services in the future.

**Keywords:** Tracking, Ambulance, Traffic Jam.

### II. INTRODUCTION

Ambulance response time is a crucial factor in the survival of patients during life-threatening situations. The time taken for an ambulance to reach a patient is directly proportional to the patient's chances of survival. However, traffic congestion is a significant barrier to reducing response times, particularly in urban areas. Smart traffic management systems have the potential to reduce these response times by providing ambulances with real-time traffic information and priority in traffic signals. This paper aims to review the current state-of-the-art technologies in smart traffic management for ambulances and explore future directions for research and development in this field.

### III. IMPLEMENTATION OF THE SYSTEM

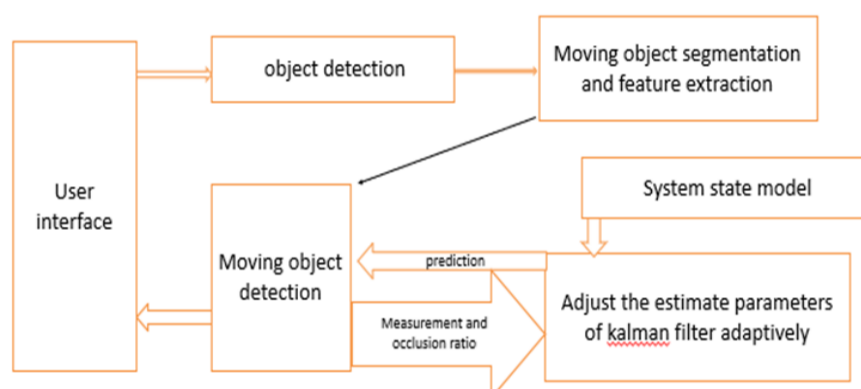


Fig. 1. Interface Design

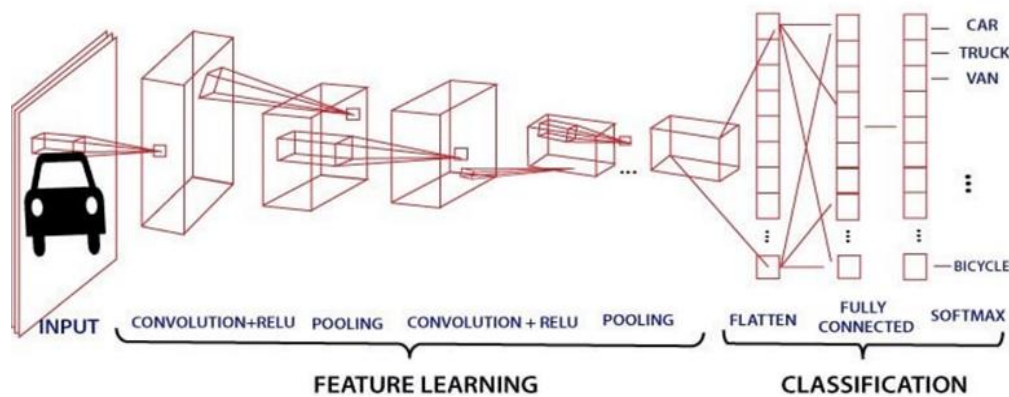


Fig. 2 Workflow

The CCTV's which is already functional set up by the traffic department for monitoring offences in traffic signals will be used for this project. The live video stream which is coming from this CCTV's is fed as input to the algorithm. The algorithm converts these videos into image frames and starts scanning for the ambulances. If the algorithm detects any image of ambulance which matches with the datasets given to the algorithm prior then it alerts the traffic signal receiver. The receiver at the traffic signal pole after receiving the alert turns the signal from red to green allowing the ambulance which is stuck in the traffic. This system is installed in all the traffic signals so that the ambulance reaches the destination without further stoppages.

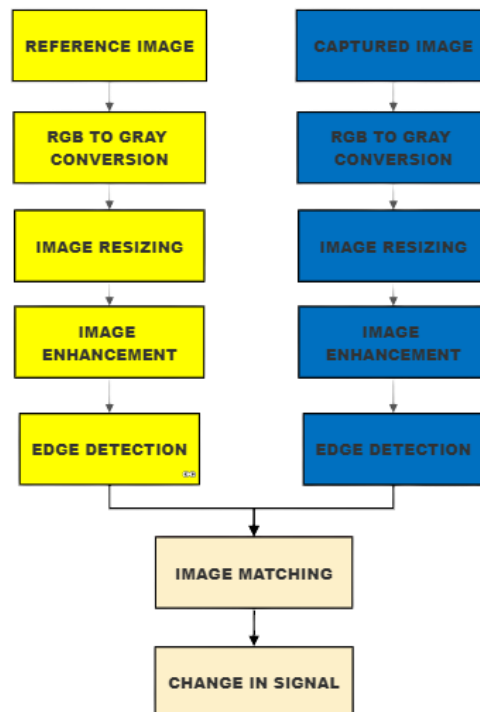


Fig. 3 Implementation of Flow chart

#### IV. COMPONENTS

The main components required for the functioning of the above proposed solution are elucidated below.

##### A. Arduino Uno

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started

### B. Led Lights

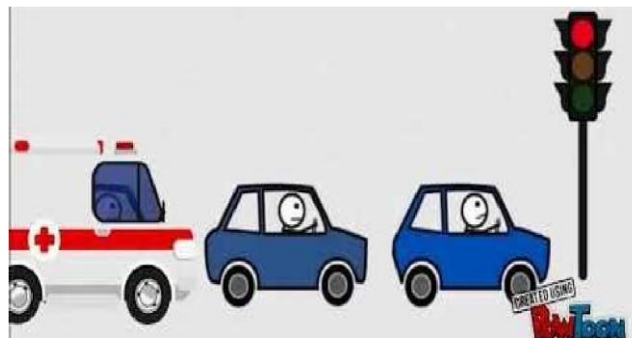
5v led lights of green and red colour for indicating the traffic like signal on the model.

### C. USB Camera

- Lens type : 3.6 mm
- Lens port : M12
- Closest focus distance : 0.7 m
- Power supply : 5V

## V. RESULTS AND DISCUSSIONS

Emergency vehicle stuck in a traffic condition is detected with detection algorithm and then the traffic signal gets an alert by which it changes the signal to green from red. For the video part we use the already setup CCTV which is used by the traffic department for traffic violations. This live stream is broken into image frames and then the algorithm is run which searches with the dataset images and then alerts if a match is found from the image frames.



**Fig. 5** Sketch of the System model

## VI. APPLICATIONS

- It can be implemented in the city which has heavy traffic density.
- We can share the alert to nearby hospitals from the signal that an ambulance is coming and for the hospital staff to be ready.
- This technology can be implemented in any emergency cases like fire engine truck, VIP vehicles.

## VII. CONCLUSION

In this paper, an idea is proposed for saving a patient's life in a faster way possible. It is beneficial for users in case of emergencies as it saves time. With this Application, the ambulance can reach the patients as fast as possible using the video and detection algorithm. This system makes sure that more lives are saved. It is easier for detecting ambulance and low cost. The difficulty is if the ambulance is stuck after a distance of more than 300 metres then it would be very difficult to detect the ambulance.

## VIII. FUTURE ENHANCEMENT

This system can be implemented to all other emergency vehicles in future like fire engine, police, cars etc., in future. We can share the patient information to the hospital in an easy way. The patient information can be shared to the hospital so that they get ready with the required medicines or infrastructure to treat that patient. Traffic signal timer can be controlled dependent on number of vehicles present in front of the ambulance.

## IX. REFERENCES

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