



## Smart Traffic Management System

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### ABSTRACT

Traffic congestion is a major problem in many cities of India along with other countries. Failure of signals, poor law enforcement and traffic management has led to traffic congestion. One of the major problems with Indian cities is that the existing infrastructure cannot be expanded more, and thus the only option available is better management of the traffic. Traffic congestion has a negative impact on economy, the environment and the overall quality of life. Bottlenecks will be detected early and hence early preventive measures can be taken thus saving time and money of the driver.

Keywords: RFID, Ambulance, Arduino, IoT, Smart, Traffic Signal, Cloud

### 1. Introduction

Road traffic congestion becomes a major issue for highly crowded metropolitan cities like, Chennai. Ambulance service is one of the major services which gets affected by traffic jams. To smoothen the ambulance movement this paper has come up with the solution of "Intelligent automatic traffic control for ambulance". The proposed system creates a android app that connects both the ambulance and the traffic signal station using cloud network. This system makes uses RFID (radio frequency identification) technology to implement the Intelligent traffic signal control. The basic idea behind the proposed system is, if the Ambulance halts on the way due to a traffic signal, RFID installed at the traffic signal tracks the RFID tagged ambulance and sends the data to the cloud. After the acknowledgment for the user through the mobile app, the particular signal is made Green for some time and after the ambulance passes by, it regains its original flow of sequence of signalling. If, this scheme is fully automated, it finds the ambulance spot, controls the traffic lights. This system controls the traffic lights and save the time in emergency periods. Thus, it acts as a life saver project.

The main responsibility of the Smart Traffic Management System (STMS) is to help the emergency vehicles to reach its destination without losing time because of traffic signals. Thus, our proposed methodology will clear the traffic by identifying the ambulance and work accordingly.

### 2. Literature Survey

Manav Kandhari and Svetlin Antonov "Smart Traffic Control System For Ambulance" [1] provides user an easy way of booking the parking slots through an application. To avoid the problem of traffic conjunction in commercial areas that unnecessarily consumes time, this paper provides the easy reservation system for parking. In this application the user can view various parking slots and check for the availability of slots. Whenever a user books a particular slot it will be marked red and all the available slots will be green. Booking can be done through credit card/net banking. This application also provides an additional feature of canceling the booked slot within 20 minutes from the time of booking.

Asmaa Shaalan Abdul Munem, Dr. Muayad Sadik Croock "Smart Traffic Light Control System for Emergency Ambulance" [2] In emergency system, the transfer of patients to the hospital should be in fast and save manner to increase the rescue and survival rates. Thus, the ambulances take the short and safe way to the emergency department at a hospital. To satisfy this, this paper tackles the problem of road jamming by controlling the underlying traffic lights and selecting the optimal path depending on crowd sensor readings. The proposed system includes two main parts; data center and ambulance. The data center collects the information regarding the location of patients and hospital as well as the current location of an ambulance and crowd sensor

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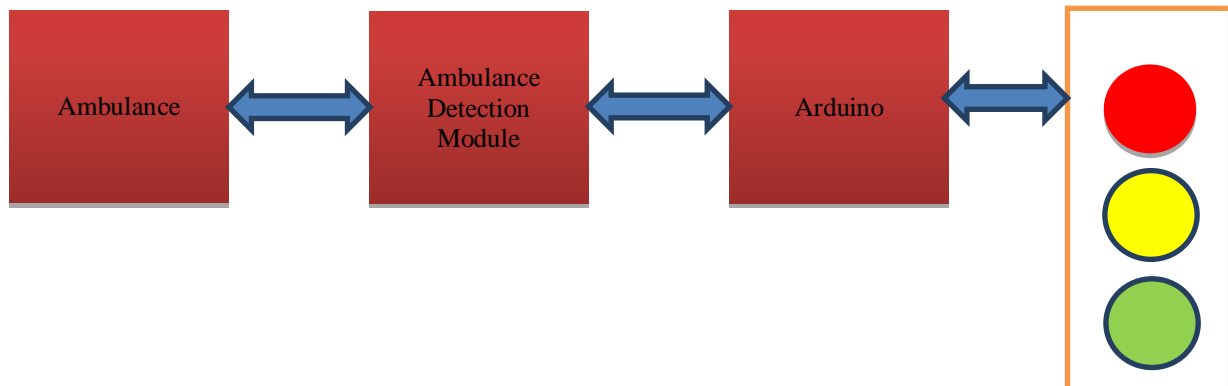
readings fixed on the roads. This is to implement the proposed algorithm that guides the ambulance to the optimal path in which the patient can be delivered to the emergency department safely and shortly. Moreover, this algorithm sends signals to the considered traffic light to be green in front of ambulance arriving. In the ambulance side, the location has been sent to the data center using Arduino, Global Position System (GPS) shield and Global System Mobile (GSM) shields fixed on the ambulance. In addition, the ambulance is provided with navigation screen to guide the driver using the best path. All the traffic data and locations of patients and ambulances are stored in a database at the server of datacenter for more reporting and actions. Different software has been used, such as PHP, SQL server, C#, Arduino and Google maps. The obtained results satisfy the expected objectives of the proposed system.

Varsha Srinivasan<sup>1</sup>, Yazhini Priyadarshini Rajesh<sup>1</sup>, S Yuvaraj<sup>2</sup> and M Manigandan<sup>2</sup> “Smart traffic control with ambulance detection”[3] The problem of urban traffic congestion is constantly spreading. The increase in traffic is due to the growing number of vehicles and the limited expansion of roads. We propose a system for reducing traffic congestion using image processing by detecting blobs and tracking them. The system will detect vehicles through images instead of using electronic sensors embedded in the pavement. We also plan to provide a suitable solution for emergency vehicles stuck in traffic to clear the route by using Bluetooth, thus assuring timely help to those in need.

Madhav Mishra, Seema Singh, Dr.Jayalekshmi .K.R, Dr. Taskeen Nadkar developed an advance alert mechanism for ambulance pass by scenarios . This research basically uses the existing technologies along with the concept called internet of things (IoT). The architecture used is server-client architecture. The client is a user using an android application.

### 3. Proposed Methodology

As we can see in daily traffic is the major problem for emergency vehicles. This situation is seen in most of metropolitan cities today. This project us developed to overcome this problem and manage the traffic lights on priority basic to the emergency vehicles.



### 4. Module Description:

#### 4.1. Ambulance Module:

This module is emergency vehicles has less with smart technology which can easily detecting by system. Android app is used by the ambulance driver, the limitation is that it will work only on android platforms or the app has to be developed for other platforms as well. This paper implements the system in which a Web application is used by the ambulance driver to request the traffic controller to make the signal green for the lane in which the ambulance is present. Since web can be accessed from any platform this system will be useful in emergency situations.

#### 4.2. Detecting Module:

A central server is used, which acts as the medium of communication between the traffic signal and the ambulance. The server will hold the information as to what request was made by the ambulance driver. This information is used by the traffic signal to switch the requested lane to be green. The API and authorization server is created in the Google cloud service platform.

#### 4.3. Arduino Module:

Arduino UNO board interfaced with ESP 8266 Wi-Fi module is used as a traffic signal. The Arduino module is programmed to fetch the data from the server. The traffic signal looks for an interrupt from the server, i.e. a request from the ambulance to turn a specific lane to green. If there is a request, then that lane is turned off till the ambulance leaves. Then the traffic signal resumes from where it left off.

## 5. Results And Discussions

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When the ambulance instructs a particular lane to use the app, the traffic light changes the lane to green and then sometimes reverts to its original sequence.

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## 6. Future Work

This model is developed to help the ambulance reach the hospital at the earliest possible time. Take into account different traffic scenarios and how this system will react to them. Secure communication between the ambulance application and the server, so that only authorized staff is permitted to do the same. Send the patient data to the hospital before reaching them so that the necessary steps can be taken.

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## 7. Conclusion

One of the major issues facing most countries in the world is death from ambulance delays. The document implemented the development of a new smart ambulance guidance system concept. During the emergency, the traffic light changes to green and allows the ambulance to cross the intersections. It can help the ambulance reach the hospital with less time consumption.

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