

# Traffic Management System for Emergency Vehicles and Life Saving Activities using IOT

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**Abstract**-Delay in providing Emergency Medical Services (EMS) is the cause of the high mortality rate in road traffic accidents in countries like India. There is delay involved in each and every stage of the process, right from reporting an accident to dispatching an ambulance, till the patient is safely handed over to the casualty. Minimizing this delay can help save lives. To minimize such delays it is important to introduce smart system for control of traffic congestion at traffic signals. A system is autonomic if it can monitor changes by itself, analyze, plan actions according to it and execute them automatically in order to become a reliable system. The present work focuses on a real life case study of traffic light management system, plays an important role in our daily lives. In most places, “especially in developing countries” the traffic light system is time bounded, which sometimes does not allow an ambulance carrying a patient to pass through traffic light; red light. Hence there should be a smart traffic light signal system which can overcome with such problems, allow the ambulance to pass through traffic signal whether it's red or green. This can be done using a wireless sensor network and Internet of Things.

**Keywords**- RFID, IoT, EMS

## I. INTRODUCTION

The next generation of connected world is Internet of Things (IoT) which connects devices, sensors, appliances, vehicles and other things. The aim of IoT is to extend the benefits of Internet with remote control ability, data sharing, constant connectivity and so on. Internet of Things (IoT) is an ecosystem of connected physical objects that are accessible through the internet. The Internet of things (IoT) is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to connect and exchange data The IoT allows

objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. IoT has shown a lot of advancement in various fields including healthcare, transportation, home automation, environment management, agriculture etc. The human intervention is decreasing day by day and the concept of an “Internet of living things” has been proposed to make every human related field automated and making systems much smarter. The regular trouble witnessed

by every individual is the increasing traffic and increase in delay to reach desired destinations. There are so many people who fall prey to numbers of problems due to the increase in traffic regularly. The congestion leads to increase in risk on lives of people if any emergency vehicle is stuck in traffic. The emergency vehicles more often face problems due to regular traffic, thus finding a solution to control the congestion and reducing the risk to lives of people is an important concept and a solution for the same is the need of an hour and can be achieved with the help of IoT.

## II. PROBLEM STATEMENT

The increasing traffic has led to a lot of traffic congestion on roads today and Emergency Vehicles fall victim to this traffic every now and then. The vehicles are unable to reach their destination on time thus causing an increasing risk towards the activities they perform. Thus it is important to find out a way that can be helpful for these emergency vehicles to deal with traffic congestion.

## III. LITERATURE SURVEY

1] The first paper uses the concept of autonomic computing or a self computing system wherein the system can monitor environmental changes by itself and plan actions accordingly. The actions planned are executed automatically which provide highly reliable and low cost maintenance to the users. The signals present on every road are time bound and if any emergency vehicle arrives it has to face delay. The proposed approach is based on utilization of sensors situated on the corner of each individual road at notable distance. The sensors analyses the density of the vehicle and also the sound of the siren of the ambulance with the sound recognition system. The

sensors form a WSN(Wireless Sensor Network) and change the signals automatically interrupting the time bound signals. But if any sensors gets failed the entire system will be disturbed.

2]The proposed system aims to reduce emergency vehicles such as ambulances, police and fire fighters cars etc., response time by means of certain actions which may involve either changing driving policies (e.g. speed limits, lane usage permissions etc.) or altering the state of objects in the road network (i.e. traffic lights and vehicles).The actions carried out depend on the urgency of the vehicle and the traffic congestions on the road. A fuzzy logic controller is used in this approach, the purpose of using a fuzzy logic based system is its ability to provide a representative output for a set of imprecise inputs, in addition to its flexibility and design easiness. Fuzzy logic is applied to determine the most appropriate (accurate) evaluation of the congestion level (i.e., Negligible, Low, Medium, High and Critical) and accordingly reduce the congestions.

3] To manage traffic flow real time traffic density management using IOT is used in this approach. It helps in optimization of traffic switching; controls traffic flow and prevent congestions. These aspects are been made available on website to displays the traffic status, so that people will get early update and can avoid traffic jam and have alternative path. At time of Emergency vehicle can get early access to reach their destination. In this approach, the number of vehicles will be tracked in Active Lane, according to the density of vehicle, threshold will is set. The traffic density is classified according to HIGH, LOW and MEDIUM. Thus the approach provides runtime status of traffic using IoT but is not efficient.

4]In this paper, comprehensive solution is used for both accident detection and ambulance management. The

in-vehicle accident detection module reports an accident, the main server automatically dispatches the nearest ambulance to the accident spot. The android application used by the ambulance driver assists the driver to reach the location quickly and safely. Automation of accident detection and ambulance dispatch, along with providing

guidance to the ambulance driver, is achieved here. This approach focuses on sending the ambulance quickly to the accident location and reduce the delay and save lives. The problem of delay minimization, right from the detection of an accident till the victim is safely handed over to the casualty.

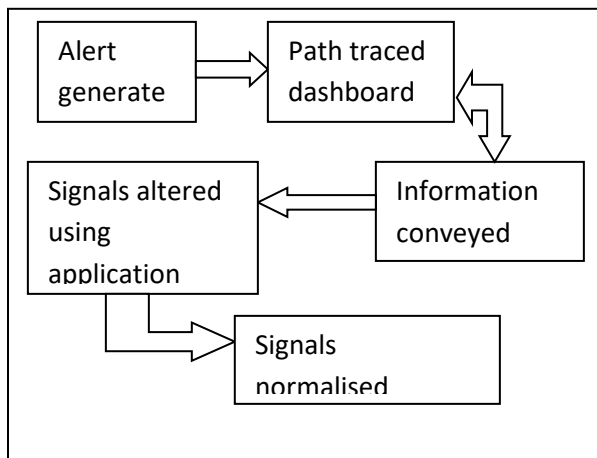


Figure 1 Traffic Management System

#### IV. PROPOSED WORK

The above proposed system is designed for emergency vehicles which have to face delay due to uninvited traffic congestions. In the above system an emergency vehicle will generate an alert with the help of an android application and the alert will be captured on the dashboard. Further with the help of GPS sensor attached on the emergency vehicle the entire source to destination path for the emergency vehicle will be traced. The data collected by the GPS sensor will be stored on cloud and the respective path using the available data will be traced with help of google maps on dashboard. Once the path is traced the dashboard controller will convey the message to every traffic police present on the signal on the path of the emergency vehicle. The police will receive a message while the emergency vehicle will be present at a shorter distance from the signal. The traffic police will alter the signal with the help of an android application. The signals

when altered will help the emergency vehicle to pass the signal at its earliest and also reduce the delay caused due to congestions at signals. Once the emergency vehicle passes the signals, the signals will be normalised back with the help of an application.

#### Hardware And Software Specification

The system has following hardware requirements:

- **Development board ESP8322** :It is use to perform hardware operation like signal controlling and it is wifi supportable chipset.
- **GPS(neo-6m)**:It is use to trace the run time location of emergency vehicle .
- **RFID**: RFID tag and reader is use to keep record of registered emergency vehicles.

The System has following software requirements:

- **MIT tool kit:** It is use to create an application to control signals and also to used to create a application for emergency vehicle driver
- **Arduino IDE:** It is platform where we can program the hardware example microcontrollers, development board ESP8322.
- **ThingSpeak :**ThingSpeak is an application platform for IoT. It is cloud system where we can store the data.
- **Freeboard :** It is a free dashboard available to analyse runtime data.

## V. CONCLUSION

Hence, the prototype model will reduce the time delay caused for emergency vehicles in case of large traffic congestion. The RFID(Radio Frequency Identification) tag with the help of the reader will scan the validity of the emergency vehicle and allow the vehicle to pass through the signal. The historical data collected on cloud related to the emergency vehicle will be used for obtaining better paths for emergency vehicles to reach their emergency vehicles with least delay.

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