

# *IOT- Based Traffic Signal Control For Ambulance*

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## **Report**

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### *AGENDA*

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- Introduction
- Requirement
- Flow Diagram
- Abstract
- Architecture
- Working Module
- Result
- Conclusion

## Requirements

- The main objective of the project is to detect the sound of the ambulance and send the signal to the sensor near the traffic pole to change the signal to green.
- Once the ambulance crosses the traffic pole, the signal comes back to the normal form.
- This process can be carried out in two lanes as well as four lanes cross roads.

## *Features*

- The main view of this project is to save life.
- There are cases where a patient dies while travelling in a ambulance, where it takes a very long time to reach a hospital.
- The main cause of this is due to lots of traffic signals, around our cities

## ABSTRACT

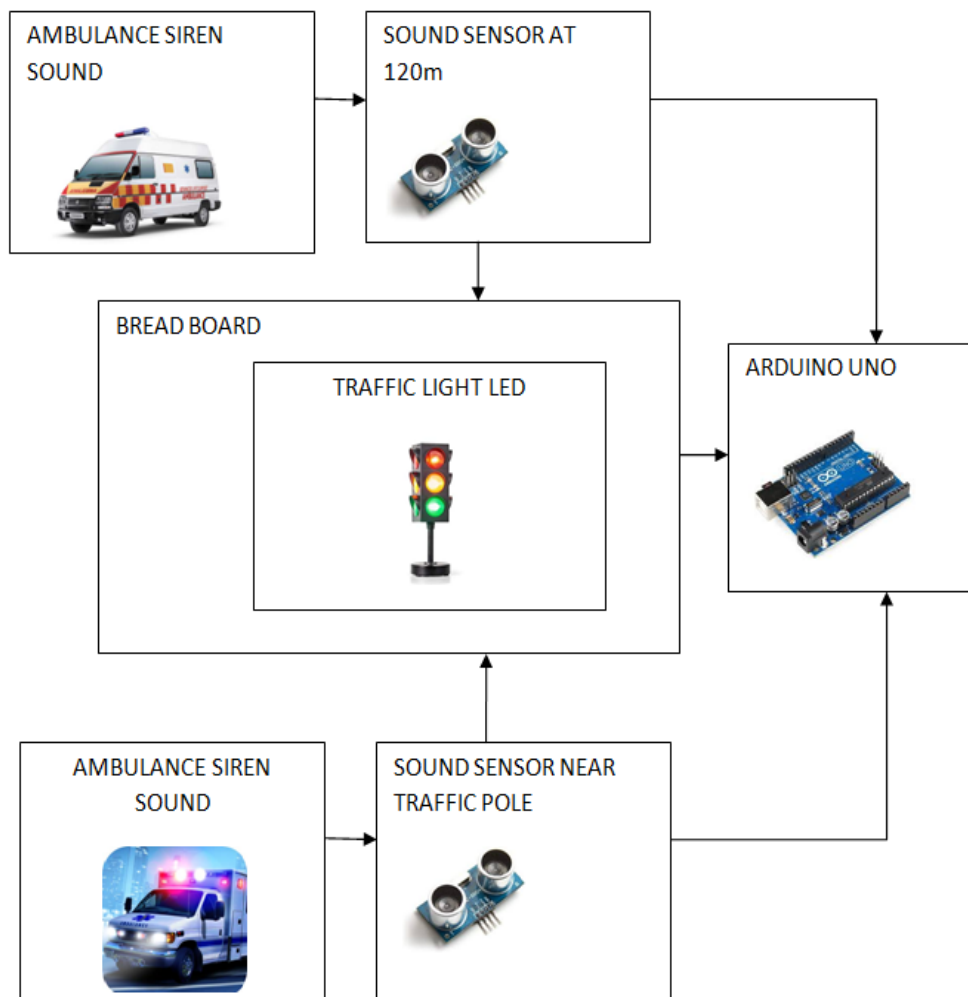
Increase in traffic in the city makes emergency vehicles, like ambulance, to take more time to reach the destination. The current, time-based traffic management system is not suitable and also not flexible for present day traffic. To solve this problem, we bring users a sound detector with automatic recording of various vehicle sounds and distinguishing the presence of ambulance in a particular area.

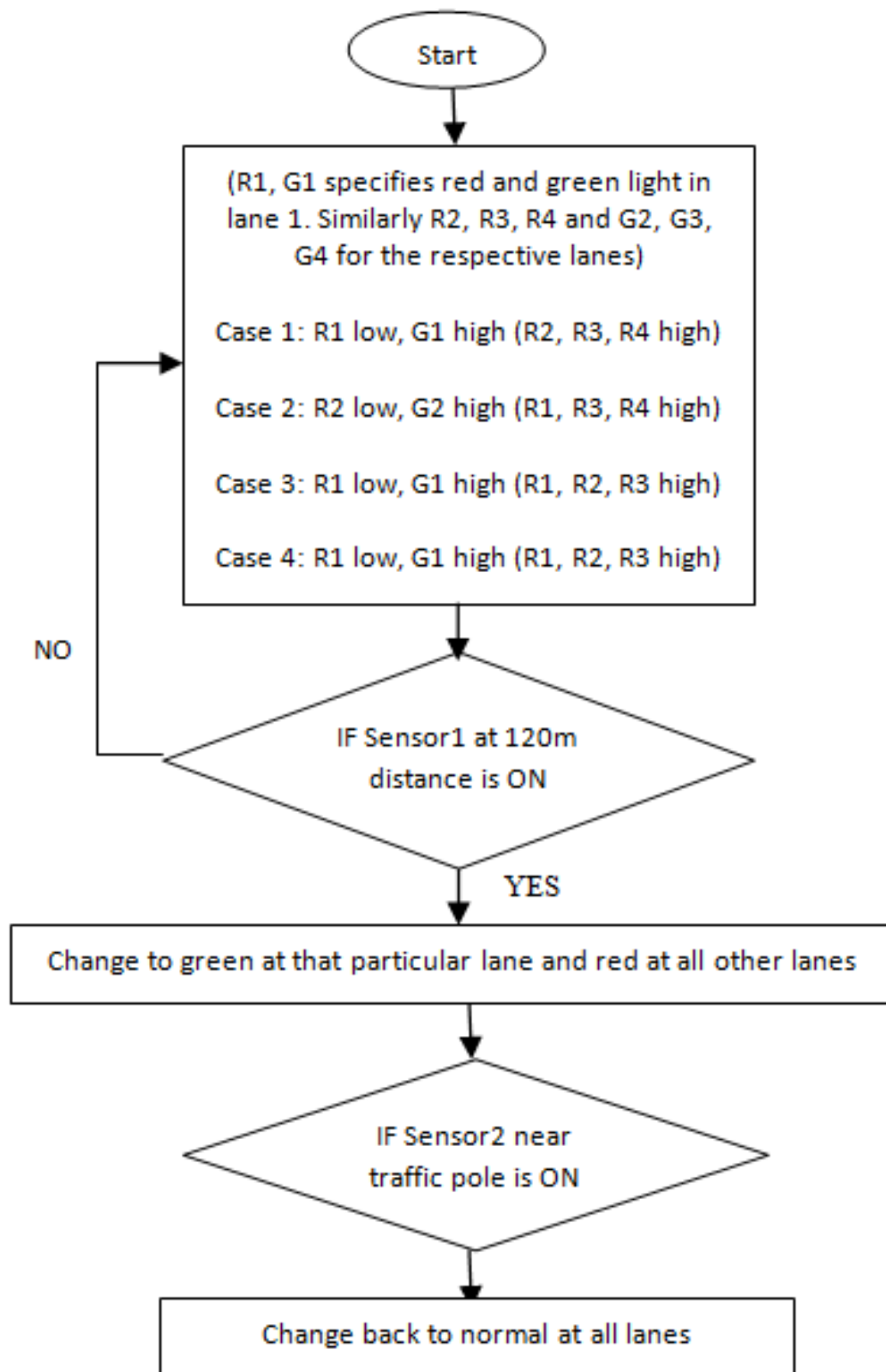
# INTRODUCTION

This system works on the sensors in Internet of Things IOT. Using the sound detector technique in IOT, the presence of ambulance at a particular place can be detected and signal is sent to change the traffic light, thus enabling the ambulance to reach the destination on time. The project is based on ambulance sound detection and traffic clearance by changing the traffic light using IOT.

- IOT is the collection of smart things which transmit and receive data in a much-secured manner.
- Sensors are functionally simple devices that convert physical variables into electrical signals.
- Traffic is generally organized in many domains with marked lanes, junctions, intersections, traffic signals, or signs.
- The main problem is to regulate the movements at an intersection.
- When properly timed and maintained, a traffic signal increases the traffic handling capacity of an intersection.
- Sirens are integrated into a warning system such that it is linked with other warning media.
- Ambulance is mainly used to transport patients between hospitals.
- Due to the traffic, often traffic jams occur on roads as a result the emergency vehicles like ambulance and fire engines get stuck in traffic. Emergency service should be provided perfectly at the needed time.

- The proposed method will be beneficial for the vehicles at emergency circumstances to pass through the traffic junctions without waiting so that they can reach their destination on time.
- This project is mainly based on interaction among ambulance, sound sensors, Arduino UNO and traffic signals.





## **ARCHITECTURE**

The architecture diagram shows various modules involved in the project design:

- This architecture diagram is a pictorial representation of our proposed system in which, two sound sensors, bread board and an Arduino UNO R3 kit is used. One sound sensor is placed at a distance of 120m from the traffic light and other placed near the traffic pole to sense the siren sound. Traffic light control is wired on the bread board.
- The sound sensor is used to predict the distance of the vehicles to and from it. In our system, one sound sensor is placed at a distance of 120 m from the traffic pole and the other is placed near the traffic pole. A sound sensor is used to detect the sound of an ambulance, which is transmitted to the traffic pole for light change. The traffic light control is wired on a bread board to make changes in the lights.
- All these components are connected together using an Arduino UNO kit, that is an open-source microcontroller board equipped with digital and analog input and output pins. The kit is programmable using Arduino IDE and can be powered using an USB cable or connecting it externally to a 9V battery.

## **WORKING MODULES**

### **INITIAL DETECTION OF AMBULANCE SOUND:**

When the ambulance passes by the lane and is at a distance of 120m, the sound sensor detects the ambulance by recognising its sound level which is 120dB.

### **TRANSMITTING SIGNAL:**

The detected sound is then transmitted by the sound sensor to the traffic controller which is located at the intersection. This in turn enables them to change the signal at correct time.

### **SWITCHING THE LIGHTS AT THE TIME OF AMBULANCE CROSSING:**

The traffic light at a particular lane in which the ambulance passes is changed to green and all other lanes are changed to red, thus allowing the uninterrupted passage of ambulance.

### **DETECTING AMBULANCE SOUND NEAR TRAFFIC POLE**

When the ambulance crosses the lane and reaches the traffic pole, the sound sensor detects the ambulance by recognising its frequency

### **DIRECTING SIGNAL AFTER THE AMBULANCE CROSSES:**

The detected sound is now transmitted by the sound sensor to the traffic controller again. This in turn enables them to change the signal. The traffic light at all the lanes meeting at the junction is changed back to normal form, thus allowing flow of vehicles in all the lanes

## **RESULTS**

- The aim of this design is to obtain a highly accurate model for recognising the ambulance by detecting the siren sound at all the lanes.
- This is deployed by making use of sound sensor at a distance of 120m and the other sensor near the traffic pole.
- The sound sensor detects the ambulance sound passing the lane at 120m distance. This detected sound is sent to the traffic controller.
- The traffic light at that particular lane is changed to green and all other lanes are changed to red using Arduino UNO.
- After the ambulance crosses the lane, the sensor placed near the traffic pole detects the ambulance sound, and concludes that the ambulance has passed and thus sends the has passed and thus sends the message to the traffic controller to change the traffic light back to normal at all the lanes.
- The efficiency of using the sound sensor over other method of traffic clearance such as Image processing, Android, GPS are analysed.
- The given analysis on traffic signal control for ambulance, travelling a distance of 50Km using GPS, image processing, android software and IOT shows that, the average time taken to



reach the destination using GPS is 30 minutes, image processing is 26 minutes, android software is 22 minutes and IOT is 20 minutes.

- Thus, IOT seems to be an efficient way to reduce the delay of ambulance.

## **CONCLUSION**

- As human life is very valuable, people should be conscious and follow the security measures.
- In this paper, we have presented an efficient traffic signal system by which, we will manage the ambulance to succeed in the destination by avoiding much traffic.
- Our system is meant to realize lower vehicular waiting time than the prevailing ones.
- The most contribution of our proposed system is that, it is often used to select the simplest possible options for changing the green light and control the traffic system, such that the waiting time is minimized. Moreover, the implementation cost is reduced, because it does not involve any complex hardware installation.
- The plan was developed to regulate two- or four-way traffic junction. Additionally, our plan can be extended to handle

various lanes and assigning priority to the ambulance if the ambulances are approaching at different lanes simultaneously.

- This IOT and sensor-based system was developed to provide automated environment and save human lives.

