e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:06/June-2022 Impact Factor- 6.752 www.irjmets.com

INNOVATIVE CONGESTION CONTROL SYSTEM FOR AMBULANCE USING RF

Kopparapu Sai Lahari[*1], Nimbur Ramya Sri[*2], Ige Naveen[*3], P. Subrahmanyam[*4]

[*1,2,3]Student, Electronics And Communication Engineering, ACE Engineering College, Hyderabad, Telangana, India.

[*4]Professor, Department Of Electronics And Communication Engineering, ACE Engineering College, Hyderabad, Telangana, India.

ABSTRACT

Congestion problem is a fact which contributed large impact on the transport system in the country. This causes many problems especially when there are emergency cases at traffic light junctions which are always busy with so many vehicles. A congestion control system is designed to solve these problems. This system was designed in such a way that it should be activated when it received a signal from an ambulance based on radio frequency (RF) transmission and used a microcontroller to change the sequence back to the normal sequence before the emergency mode was activated. This system will lessen accidents that often happen at traffic light intersections because other vehicles had to gather together and implementing wireless communication i.e. the radio frequency (RF) transmission in the traffic light control system for emergency vehicles like ambulances.

Keywords: Mobile Telnet, Radio Frequency, Microcontroller, Wireless Communication, NodeMCU.

I. INTRODUCTION

With increasing industrialization, urbanization and population, there has been a tremendous growth in traffic. With growing traffic there is rise in problems which include traffic jams, accidents, etc. One of the major effects of these traffic jams are faced by ambulances, fire-brigades and other emergency vehicles. Ambulance service is greatly affected because of traffic jams. Delays in reaching the hospital may lead to the loss of life of a patient. These things need a speedy response. Based on the traffic density at a particular intersection, the traffic light will cycle through red, yellow, and green at regular intervals to ensure a uniform traffic flow in all directions through the intersection. This paper describes the solution to the problem of ambulance getting stuck in a traffic jam and can be addressed by ensuring that the way through which ambulance is travelling is cleared. This can be done by alerting the nearest traffic light control room whenever an ambulance is approaching. The paper also proposes a health monitoring system in which vital health parameters of the patient in ambulance are monitored and transferred to the hospital before the patient reaches the hospital. For controlling the traffic an android application is created which can be used by both, the ambulance and the control room. The application can be viewed as a platform for the ambulance and control room to view the traffic conditions in the desired area. Whenever the ambulance driver notices a high density of traffic, on the app, on the route to the hospital, he can alert the traffic control room by sending a request signal. The control room can control the traffic signals on the route of the ambulance based on the ambulance's destination and the traffic conditions on the route.

II. LITERATURE REVIEW

IOT based intelligent traffic management system is divided into three types those are traffic monitoring, pedestrian crossing, emergency clearance. Traffic monitoring is one of the major factors in intelligent traffic system. It deals with vehicle to vehicle communication and vehicle to the various infrastructure communications for enhancing the availability of roadways those will needs major financial budget from the government to construct and maintenance. An IOT based intelligent traffic congestion control system for road crossing is to reduce the urban areas road congestions. The main work of the traffic management module the set of the traffic signal timings based on the traffic destiny measured during to the traffic destiny monitoring module Pedestrian crossing: One of the major considerations on the intelligent system is efficient pedestrian crossing monitoring in order to decrease hectic traffic issues. There are some of the several researchers to

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:06/June-2022 Impact Factor- 6.752 www.irjmets.com

come forward to implement the efficient pedestrian crossing management using IOT support An pedestrian safe smart crossing system based on IOT with object tracking for safe pedestrian crossing over roads based on IOT with object tracking for the safe pedestrian crossing over roads.

III. METHODOLOGY

The following two systems are combined in this paper - Traffic Control and Health Monitoring. Both traffic controlling and health monitoring systems will work simultaneously. Patient's health parameters are monitored and at the same time driver of the ambulance can request the control room to manipulate the traffic signals. The ambulance first sends a request to the control room for traffic control. The request consists of the current location of the ambulance accessed using GPS and the location of the desired hospital is sent by the ambulance driver. This request is now sent to the AWS server. The server consists of all the requests of various ambulances that request for traffic control.

Now, the server sends all the data of all ambulances that have requested for traffic control to the Control room. The control room side of the application now displays the requests of all ambulances. The ambulances are displayed in order of their distances. The control room operator can now choose which ambulance it chooses to navigate by selecting it. Now a map is displayed which shows the current location of the ambulance as well as the location of the hospital. The route between the ambulance and the hospital and the live data of traffic is displayed on the map.

Here, green represents less traffic, orange represents moderate traffic and red indicates high traffic. An option is also displayed which enables navigation on google maps. The shortest route between the ambulance and hospital is displayed as well as the traffic at various junctions. With the help of this data, the control room can control the traffic signals at various junctions

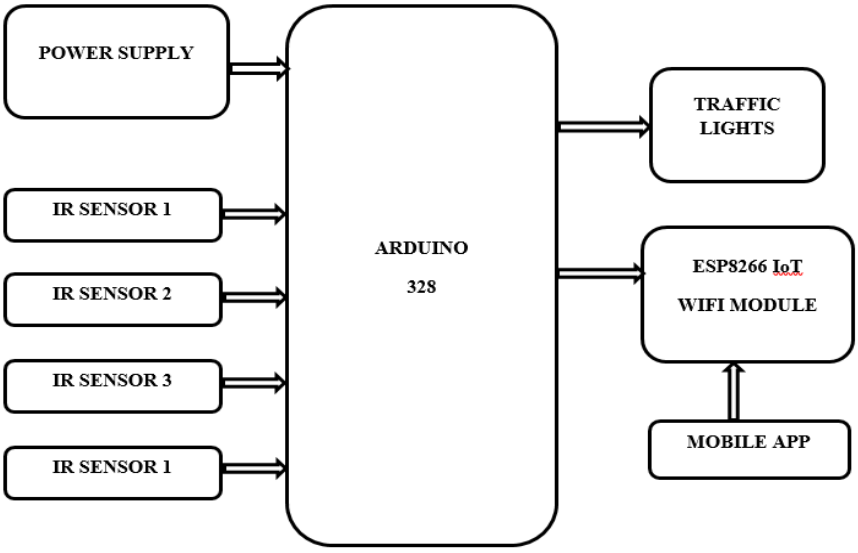


Figure 1: Block Diagram Of Traffic Light System With Integrated Module

IV. THE HARDWARE

ARDUINO UNO

The ATmega328 on the Arduino Uno comes preprogrammed with a bootloader that allows you to upload new code to it without the use of an external hardware programmer. Arduino board can be powered by using the USB cable from your computer. All you need to do is connect the USB cable to the USB connection. The Arduino UNO board has six analog input pins A0 through A5. These pins can read the signal from an analog sensor like the humidity sensor or temperature sensor and convert it into a digital value that can be read by the microprocessor.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:06/June-2022 Impact Factor- 6.752 www.irjmets.com

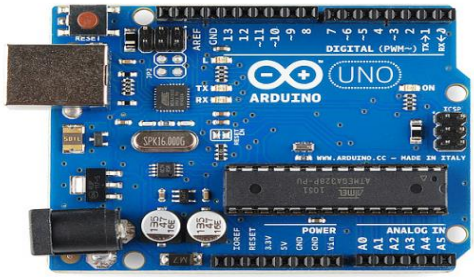


Figure 2: ARDUINO UNO

IoT MODULE (ESP8266)

The best way to develop quickly an IoT application with less Integrated circuits to add is to choose this circuit "ESP8266. The module is mainly based on ESP8266 that is a low-cost Wi-Fi microchip incorporating both a full TCP/IP stack and microcontroller capability. The ESP8266 is a complex device, which combines some features of the ordinary Arduino board with the possibility of connecting to the internet. NodeMCU V3 is an open-source firmware and development kit that plays a vital role in designing an IoT product using a few script lines.

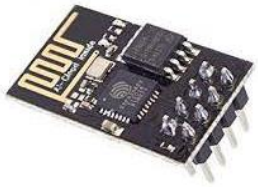


Figure 3: IoT MODULE

IR SENSORS

An infrared sensor (IR sensor) is a radiation-sensitive optoelectronic component with a spectral sensitivity in the infrared wavelength range 780 nm. IR sensors are now widely used in motion detectors. In this we are using sensors to detect the density of traffic.

Figure 4: IR Sensors

LED

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

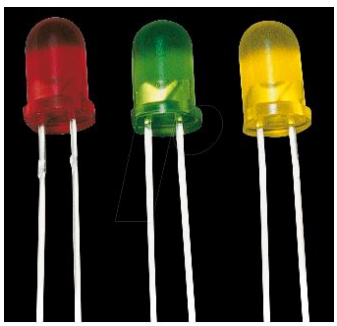


Figure 5: LED's

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:06/June-2022 Impact Factor- 6.752 www.irjmets.com

V. SOFTWARE

ARDUINO IDE SOFTWARE

It's free software that allows us to develop and upload code to Arduino devices. This software can be run on many operating systems or platforms such as windows, Linux, and Mac OS. C and C++ have supported programming languages. This software combines standard inventor tools into a single user interface for creating apps for several operating systems. It is very similar to C Language and it is based on a hardware programming language named processing. An Arduino IDE is required for uploading the sketch on the board.

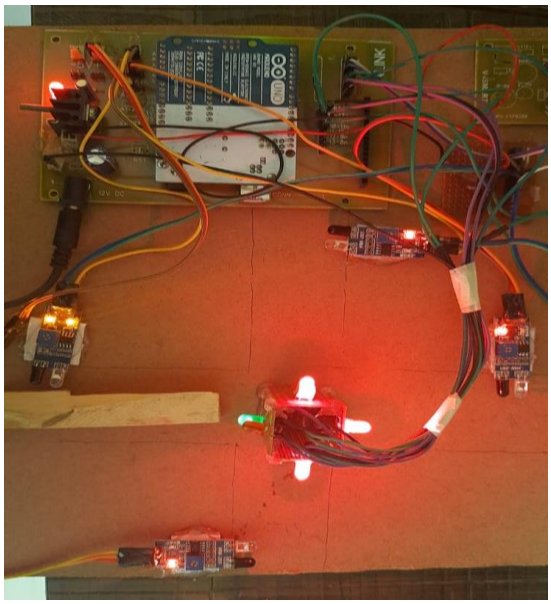
MOBILE TELNET

This is free Android Telnet app which is based on open source Putty Telnet as its backend library. Inspired by open source community and in the hope of extending usage of Putty Telnet on Android devices, the Mobile Telnet was created. It is a Mobile Application to send the assigned characters to the Wi-Fi module.

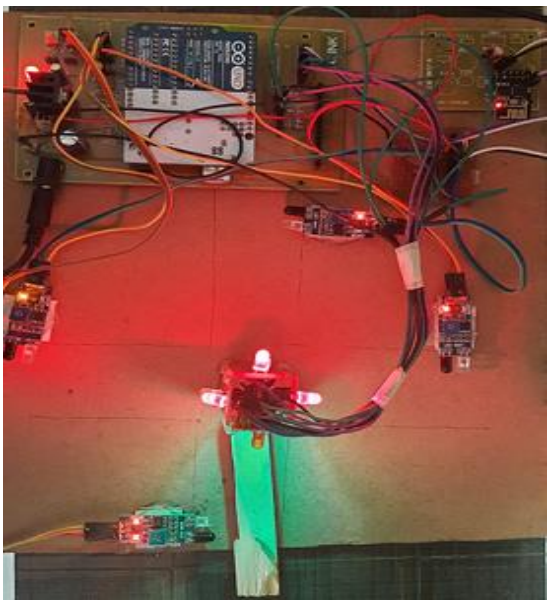
VI. RESULTS AND DISCUSSION

DEVICE:

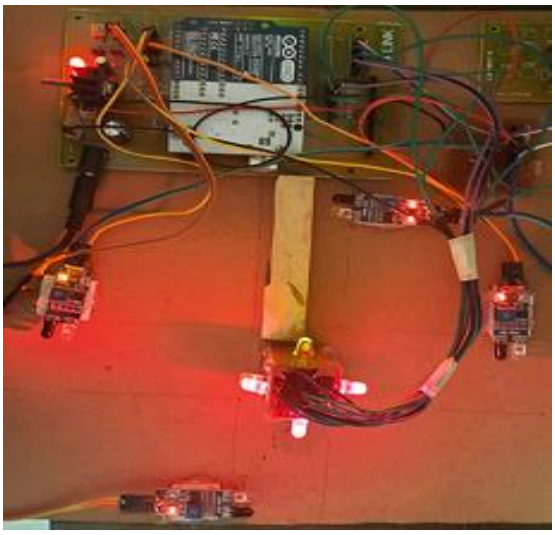
The pictures below are to represent the result of this work.



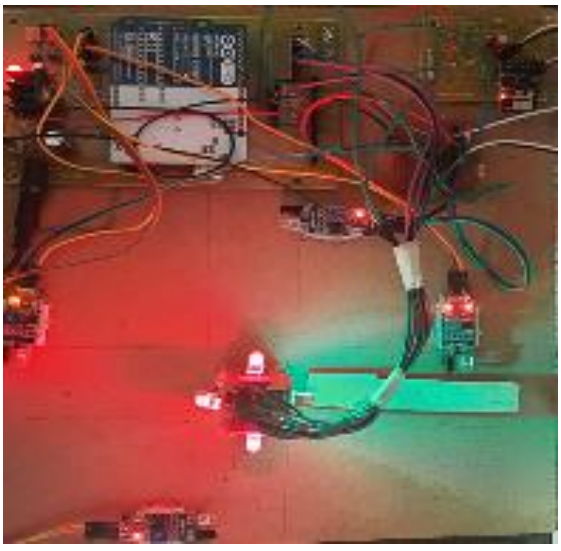
Road 1 Green Signal



Road 2 Green Signal



Road 3 Green Signal

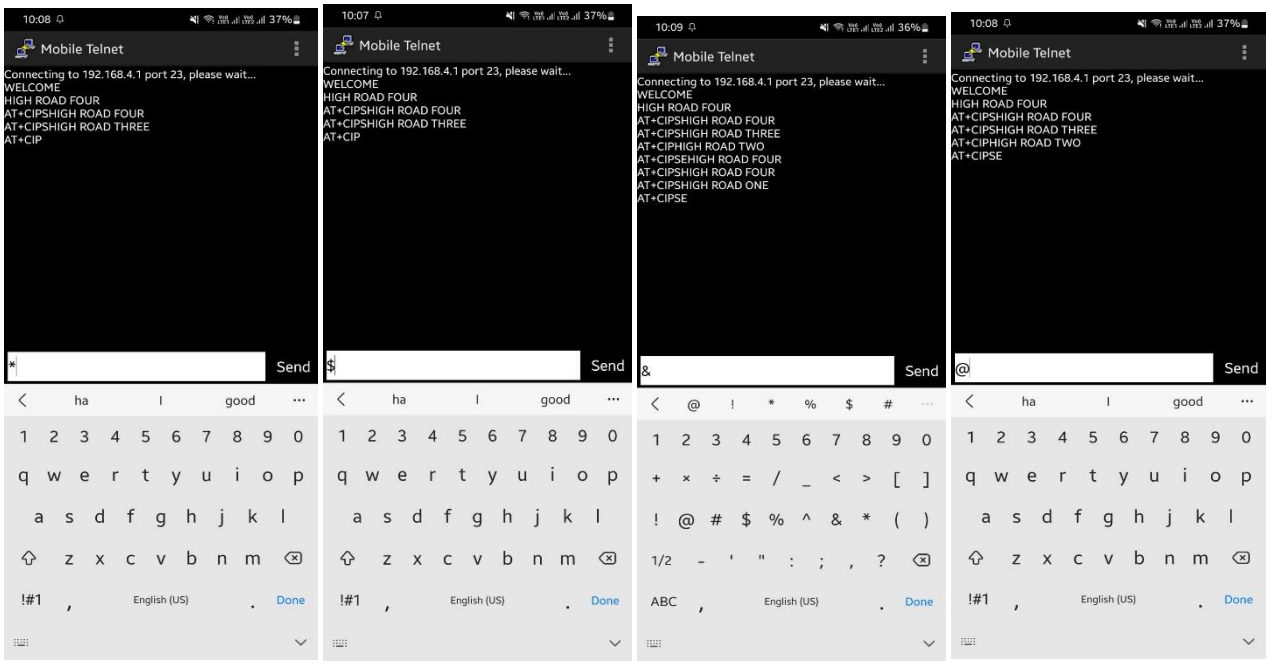


Road 4 Green Signal

Figure 6: Congestion Control System

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:06/June-2022 Impact Factor- 6.752 www.irjmets.com

ANDROID APPPLICATION:



Road 1 Code Road 2 Code Road 3 Code Road 4 Code

Figure 7: ANDROID APPLICATION (Mobile Telnet)

The pictures above are the screenshots of android application which is developed using ANDROID STUDIO. In the first picture all routes are in off state which means not even one device is activated. In the second picture the route named LOCATION is activated so it is denoted with green color, remaining all are in deactivate state so they all are in red color.

VII. CONCLUSION

The proposed Traffic Control for Smart Ambulance is based on monitoring of traffic conditions using Google maps API. Here, both the parties, the ambulance and the control room can view the traffic conditions on the application created. Using this application, the ambulance will be able to reach the hospital without encountering traffic on it's way with minimum delay. Also, the health monitoring system will ensure that the conditions of the patient will reach the doctor before the patient so that the doctor can take necessary actions using these prerequisites. This traffic controlling and health monitoring system may lead to save one precious life.

ACKNOWLEDGEMENTS

We would like to thank our guide Mr. P. Subrahmanyam sir for his continuous support and guidance. Because of his guidance, we completed our project successfully. We are extremely grateful to Dr. P. Satish Kumar, Head of the Department of Electronics and Communication Engineering, Ace Engineering College for his support and encouragement.

VIII. REFERENCES

[1] K.Sangeetha, P.Archana, M.Ramya , P.Ramya, Automatic Ambulance Rescue With Intelligent Traffic Light System, IOSR Journal of Engineering (IOSRJEN), Issue 02 (February. 2014)

[2] Manav Kandhari, Svetlin Antonov, Smart Traffic Control System for Ambulance, September 2016

[3] Gargi Beri, Pankaj Ganjare, Amruta Gate, Ashwin Channawar, Vijay Gaikwad, Intelligent Ambulance with Traffic Control, International Journal of Electrical, Electronics and Computer Systems, Pune, February 2016

[4] Venkatesh H, Shrivatsa D Perur, Jagadish M C, An Approach to Make Way for Intelligent Ambulance Using IoT, International Journal of Electrical and Electronics Research, March 2015 [5] Takwa Tlilia,

Marwa Harzi, Saoussen Krichena, Swarm based approach for solving Ambulance routing problem, International Conference on Knowlegde based and Intelligent Information and Engineering Sytems.

[5] Saurabh Kapoor, Parul Gupta, Pooja Sharma, Prabhu Nath Singh, Intelligent Ambulance with Automatic Traffic Control, , International Research Journal of Engineering and Technology (IRJET), Apr -2017

[6] Priyanka Nalawade, Prajakta Waghere, Nisha Vanare, Prajakta Kalbhor, A. J. Jadhav,"Dynamic Traffic Control system Using Rfid Technology "IJARCCE,Vol.6, Issue.1, Jan2017.

[7] Ruihua Zhang, and Dongfeng Yuan, "A Health Monitoring System for Wireless Sensor Networks," in Proc. of 2ed IEEE Conference on Industrial Electronics and Applications (ICIEA), pp. 1648-1652, Harbin, China, May 2007.