IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

IOT Based Automatic Traffic Light Control and Monitor System For Emergency Vehicles

Mrs K.Uma[1],B. Maneesha [2], P. Sudheerkumar reddy [3],CH. Byula [4], SK.Shafi[5],

[1]Assistant Professor, Dept:ECE , PBR VITS, Kavali,Andhra Pradesh-524201
[2,3,4,5] UG Students Dept. Of ECE, VEC, Kavali, Andhra Pradesh-524201 India

Abstract : The main objective of this project is to provide the way for emergency vehicles like ambulance in traffic areas. This project was developed to reduce the accidents and to avoid the vehicle traffic in the roads. In the proposed system, RFID tags are used to sense the traffic signal and to provide the way for emergency vehicle. We placed the RFID tag on the vehicles. This system is very useful for the emergency vehicles. Because when the accident happened in route1 and destination hospital is in route7,then the message with source and destination from the vehicle is transmitted to the Nodemcu using IOT. Nodemcu indicates Arduino to clear that route for emergency vehicle.All other routes are blocked which means that other routes in that junction becomes red and other junctions operate in auto mode.when the vehicle crosses the junction and destination is in next junction then the route connecting next junction turns green and RFID scanner is used to detect whether the vehicle has crossed junction or not.By using this system,save the people who need medical treatment urgently.This system will automatically resumes to the old configuration if the emergency vehicle crossed the traffic signal.

Index Terms -Traffic Congestion, Emergency Vehicle, Intelligent Traffic Management.

I.INTRODUCTION:

An Embedded system is a special-purpose system in which the computer is completely encapsulated by or dedicated to the device or system it controls. Unlike a general-purpose computer, such as a personal computer, an embedded system performs one or a few predefined tasks, usually with very specific requirements. Since the system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product.Personal digital assistants (PDAs) or handheld computers are generally considered embedded devices because of the nature of their hardware design, even though they are more expandable in software terms. With the introduction of the OQO Model 2 with the Windows XP operating system and ports such as a USB port both features usually belong to "general purpose computers". Physically, embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. In terms of complexity embedded systems can range from very simple with a single microcontroller chip,to very complex with multiple units, peripherals and networks mounted inside a large chassis or enclosure Avionics, such as inertial guidance systems, flight control hardware/software and other integrated systems in aircraft and missiles.

•Cellular telephones and telephone switches.
•Engine controllers and anti lock brake controllers for automobiles
•Home automation products, such as thermostats, air conditioners, sprinklers, and security monitoring systems
•Handheld calculators
•Handheld computers
•Household appliances, including microwave ovens, washing machines, television sets, DVD players and recorders
•Medical equipment
•Personal digital assistant
•Video game consoles
•Computer peripherals such as routers and printers.
•Industrial controllers for remote machine operation.

II.EXISTING SYSTEM:

The main function of traffic light control is to control the flow of traffic. The normal form of traffic light is comprises of simple three colour for traffic signal which are red means stop, yellow means ready to stop and green means move. This general traffic light control system cannot give prioritize and recognize the emergency vehicle and normal car. [1]As an example, the delay of the ambulance to reach at the hospital because of the traffic congestion may cause danger to patient's life. On another side, the normal form of the traffic management is requires traffic police on the road to control the traffic congestion. [2]The police traffic will control the flow of traffic during traffic congestion occurred by gives the signal to the road's user whether to drive or stop. The police traffic can recognize and give priority for the emergency vehicles by giving way to the emergency vehicles.

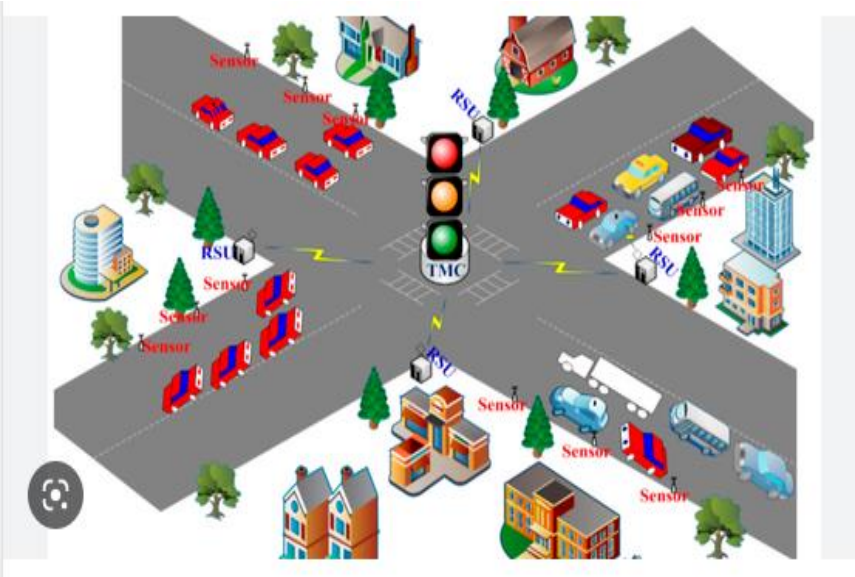

Fig2.1:Existing system

III.PROPOSED SYSTEM:

We propose here a mechanism, recently numerous researches on traffic signal control for ambulance are being carried out such that we have developed [3]an intelligent traffic signal control using Radio Frequency Identification (RFID) and cloud system. The system uses an android application that connects both the traffic signal station and ambulance using cloud network. [4]In, the researcher designed an Internet of Things (IoT) system for the ambulance to send patient information to the hospital and control the traffic light using Nodemcu system. They used Arduino and Blynk mobile application as well in the system designed. The project used application installed in the ambulance to find the location of the ambulance unit and IoT transceiver to operate. Most of the systems proposed were outstanding and cover bigger application ranges but far from being a low cost solution since it involved more than one technology.

3.1:BLOCK DIAGRAM

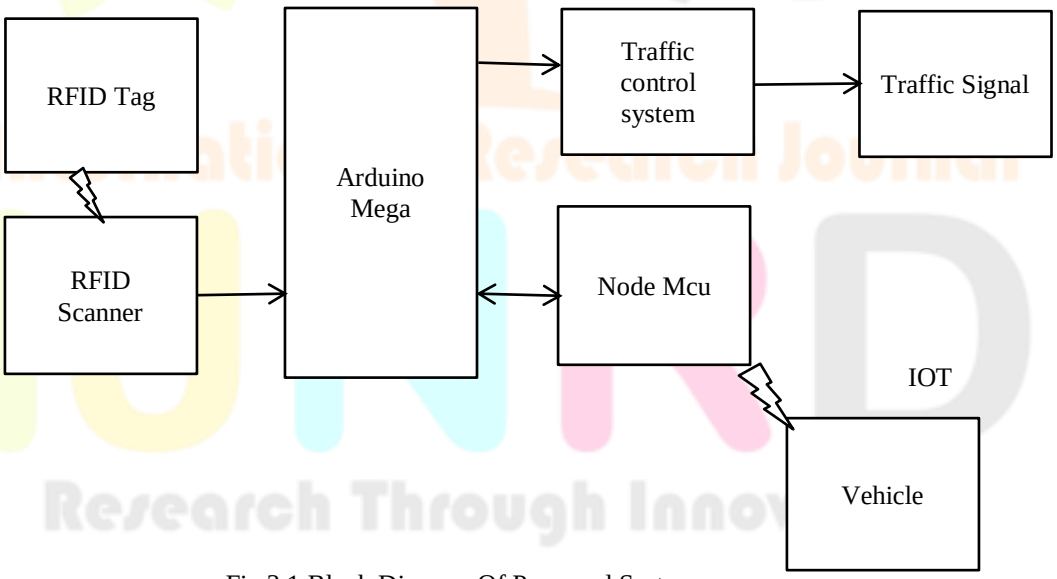

Fig 3.1:Block Diagram Of Proposed System

3.2:ADVANTAGES:

1. Lot of time is saved at signals due to automatic analysis of congestion.
2. Automatic signal changes for Emergency vehicles.

3.3:APPLICATIONS:

1.Can be used in all ambulances.
2.Can be used for VIP cars.
3.Traffic management and control.
4.Used for road safety control.

5.Defense vehicle in emergency cases.
6.Fire extinguishing vehicle.
7.Police van in emergency cases.

IV.COMPONENTS DESCRIPTION:

4.1:HARDWARE COMPONENTS REQUIRED:

4.1.1:ARDUINO MEGA 2560:

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 Analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the micro controller; simply connect it to a computer with a USB cable or power it with a AC to DC adapter or battery to get started. The Mega is compatible with most shields designed for the ArduinoDuemilanove or Diecimila.

Fig 4.1.1:ARDUINO MEGA 2560 BOARD

4.1.2:NODEMCU:

The NodeMCU (***N***ode Micro Controller ***U***nit) is an open-source software and hardware development environment built around an inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains the crucial elements of a computer: CPU, RAM, networking (WiFi), and even a modern operating system and SDK. That makes it an excellent choice for Internet of Things (IoT) projects of all kinds.

Fig 4.1.2:NODEMCU

4.1.3:RFID TAG:

An RFID tag contains a chip for storing information about physical object and an antenna to receive and transmit a signal. [5]A RFID tag can usually store 1KB of data but it is enough for storing the name, credit card number, unique identification number, birth date and some more information.

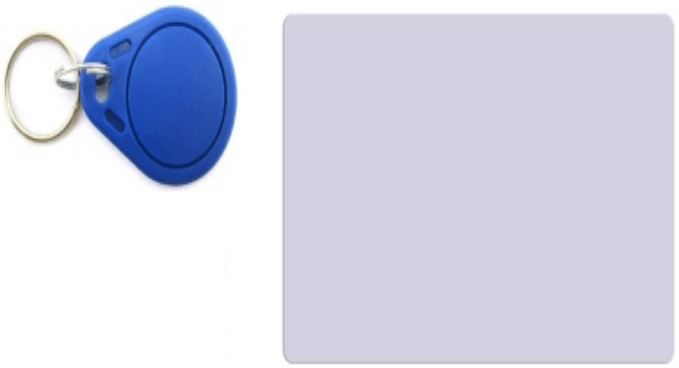

Fig 4.1.3:RFID Tag

4.1.4: RFID READER:

The RFID reader performs two functions: Transmit and receive. So you can also say it a transceiver. The RFID reader contains an antenna, radio frequency module and a control unit.

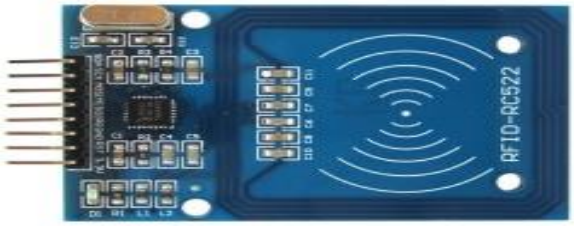

Fig 4.1.4:RFID Reader

4.1.5:LIGHT EMITTING DIODE (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. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

Fig 4.1.5:LED

4.2:SOFTWARE REQUIRED:

4.2.1:ARDUINO IDE SOFTWARE:

The Arduino integrated development environment (IDE) is a cross platform application (for Windows, macOS, Linux) that is written in the programming language Java. It originated from the IDE for the languages *Processing* and *Wiring*. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple *one-click* mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus. The source code for the IDE is released under the GNU General Public License, version.

4.2.2:EMBEDDED C:

EMBEDDED C Programming is the soul of the processor functioning inside each and every embedded system we come across in our daily life,such as mobile phone,washing machine and digital camera. Each processor is associated with embedded software. The first and foremost thing is the embedded software that decides functioning of the embedded system. Embedded C language is most frequently used to program the micro controller.

4.2.3:BLYNK APP:

Blynk is an Internet of Things Platform aimed to simplify building mobile and web applications for the Internet of Things. Easily connect 400+ hardware models like Arduino, ESP8266, ESP32, Raspberry Pi and similar MCUs and drag-n-drop IOT mobile apps for iOS and Android in 5 minutes.

Fig 4.2.3:BLYNK APP

V:RESULT AND DISCUSSION:

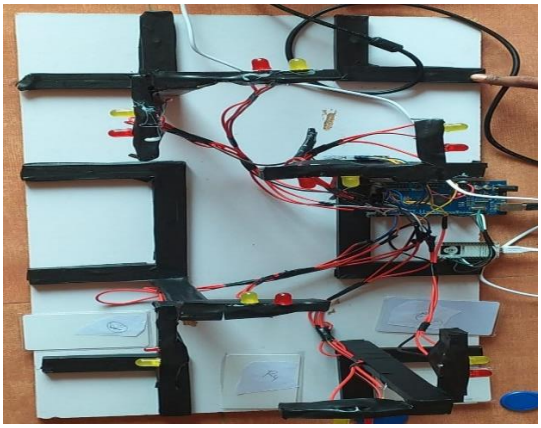

Fig 5.1:Working model of proposed system

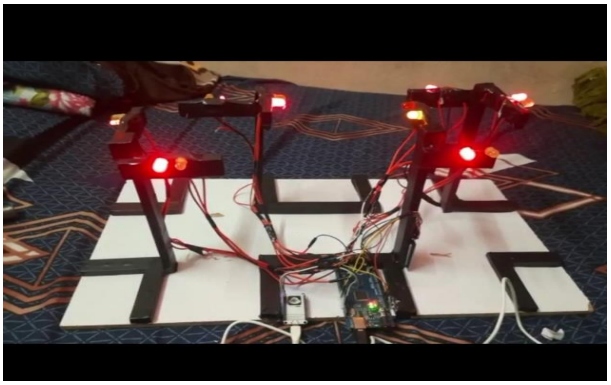

Fig 5.2:When we power on the system,it will works in Automatic traffic mode

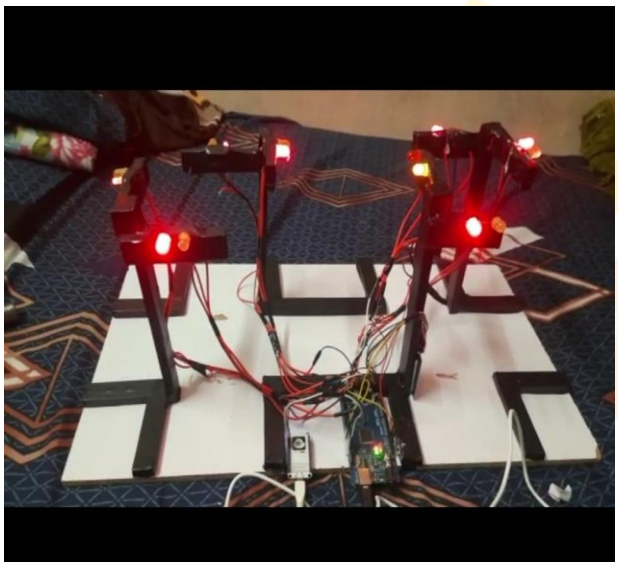

Fig 5.3:In automatic mode for every 10seconds LED position changes (R-G & G-R)

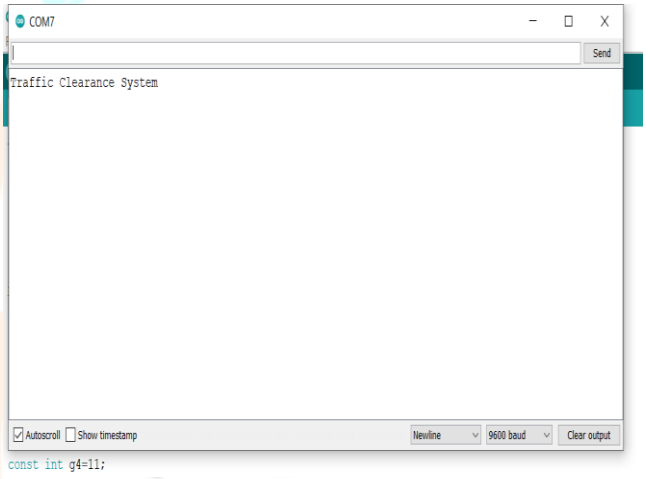

Fig 5.4:Open serial monitor in ARDUINO IDE Software

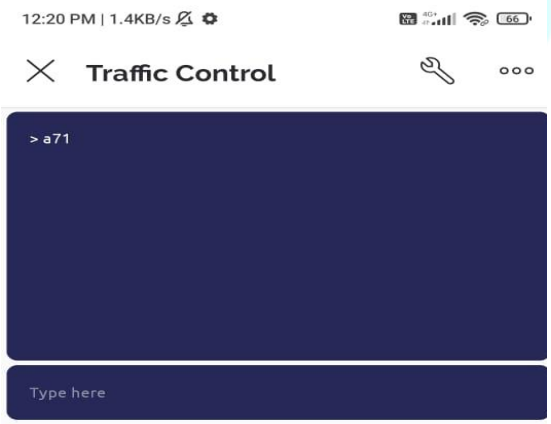

Fig 5.5:Blynk app

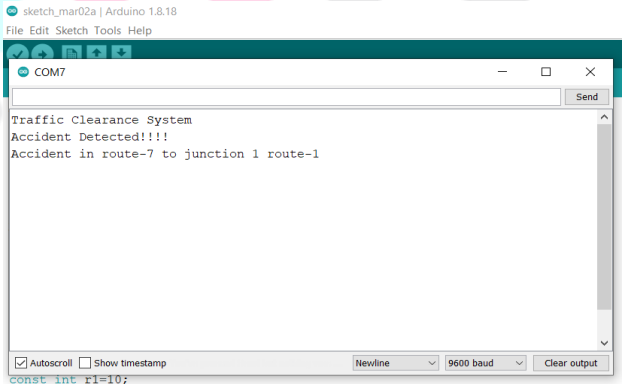

Fig 5.6:Arduino IDE Software

Fig 5.7:After connecting blynk app result

Fig 5.8:Ambulance while crossing junction3 blynk app result

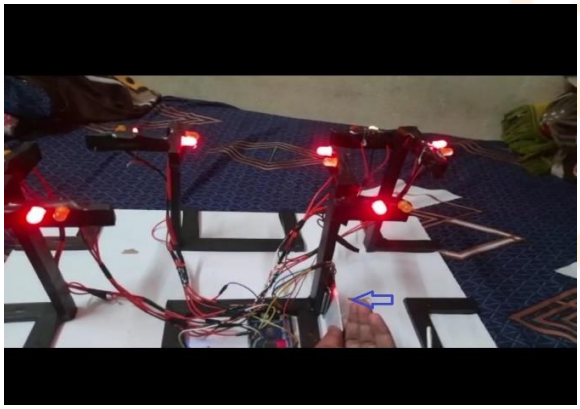

Fig 5.9 Ambulence crossing junction 1

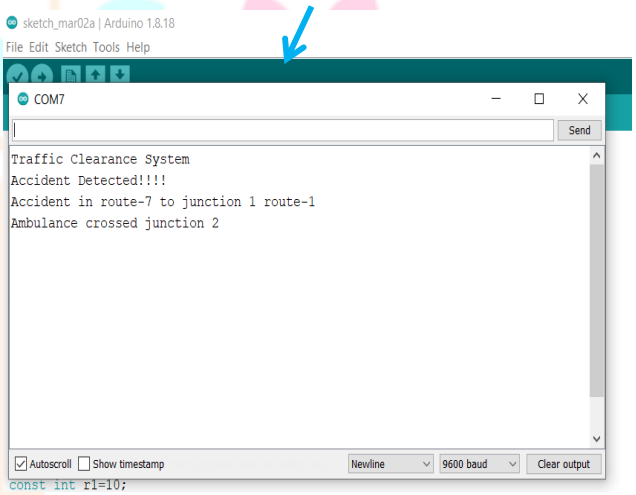

Fig 5.10: Ambulance After crossing the junction2 message will displayed on serial monitor in aurduion IDE software

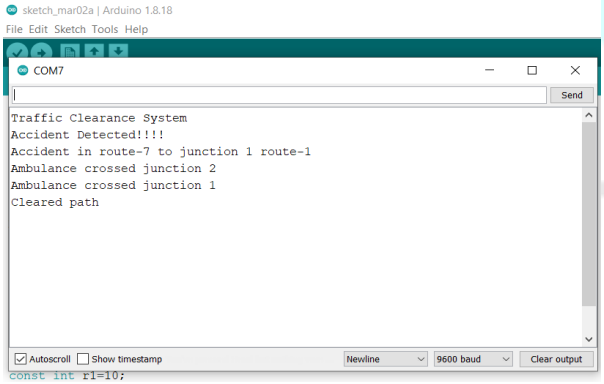

Fig 5.11:After crossing junction1&reaching destination

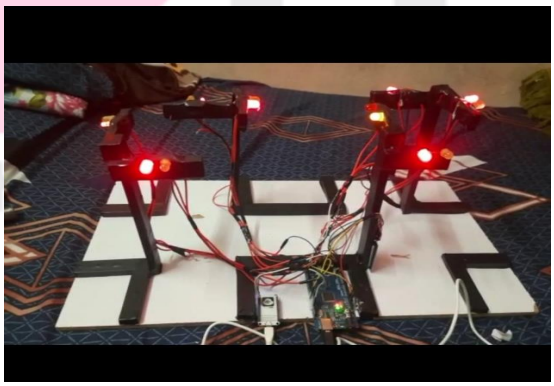

Fig 5.12:After cleared path

VI.CONCLUSION

In this project, we have successfully designed and analysed an AUTOMATIC PATHWAY CLEARANCE FOR EMERGENCY VEHICLE by implementing 2 junctions which indicates the real time operation of multiple junctions. Arduino Mega is used as the micro controller and the system can be operated automatically during emergency cases. [6]In future, the GPS

of vehicles can be used to operate the traffic lights when any accident or any emergency happened. Different micro controllers could also be introduced to save programming processing time in the future.

REFERENCES

1. R.S.B.Vanjale, SayaleeDeshmukh. "IOT based Traffic Signal control for reducing time delay of an Emergency Vehicle using GPS", April 6-8, 2016, India. Issue 5page, IEEE ISBN:978-1-5090-0396-9/16/$31.00 ©2016 IEEE.
2. Puneet Kumar Aggarwal, Prashanth nigam, Vineeth shrivastava. "Self Controlled Traffic Management Using Autonomic System", Issue page 3, ISBN:978-9-3805-4421-2/16/$31.00 ©2016 IEEE 2016.
3. B. Janani Saradha, G. Vijayshri, and T. Subha, "Intelligent Traffic Signal Control System for Ambulance using RFID and Cloud," IEEE Proceedings on Computing and Communications Technologies (ICCCT), pp. 90-96, 11 Jul 2017.
4. S. N. Sivaraj, K. Vigneshwaran, S. Vigneshwaran, and M. Vishnu Priyan, "IOT Ambulance with Automatic Traffic Light Control," SSRG International Journal of Industrial Engineering (ICRTECITA), pp. 12-18, Mar 2017.
5. S. Sharma, et al., "Traffic Light Priority Control for Emergency Vehicle Using RFID," International Journal of Innovation in Engineering and Technology (IJIET), vol/issue: 2(2), 2013.
6. R. Hedge, R. R. Sali, and M. S. Indira, "RFID and GPS based automatic lane clearance system for ambulance," Int. J. Adv. Elect. Electron. Eng., vol. 2, no. 3, pp. 102-107, 2013.