iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** III **Month of publication:** March 2019

DOI: http://doi.org/10.22214/ijraset.2019.3432

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue III, Mar 2019- Available at www.ijraset.com

Traffic Free Corridor for Smart Ambulance

Omprakash B[1] , Aishwarya B[2], Akshay T.S[3], Dilip J[4]
[1,2,3,4]*Atria Institute of Technology, Anandnagar, Bengaluru -560024*

Abstract: Traffic congestion is a major problem in all major cities all over the world. Conventional system has many limitations. In our project, we worked with three major goals, that is to a) provide variable time slot as per traffic density b)provide traffic corridor for ambulance c)provide shortest path to the nearest hospital. Through this paper we have attempted to revamp these standards. In our system we used RFID and Microcontrollers to sense and transmit status of traffic. The system is controlled by Microcontroller 8051. Traffic corridor can be established by the receivers installed at the ambulance section. All the sensors is interfaced to the microcontroller. The microcontroller chip supervise every sensor and either change the time slot or turn the signal green.

Keywords: RFID tags, AV Warning System, microcontrollers 8051,GPS/GPRS modem .

I. INTRODUCTION

According to the previous news and research it's known that the death rate of people due to traffic jams has increased. The ambulance reach hospital late due to increase in traffic which is again a big disadvantage for a smart city. Human life is affected due to delay in the arrival of ambulance. The ambulance is not able to reach the hospital in the golden hour. It gets stuck in the traffic signals. It would be of great use to the patient if the traffic signals in the path of the ambulance are ON. There must be a system by which the ambulance would reach the accident spot and then hospital as soon as possible to carry out health services. The existing systems are post-accident detection systems. It has lack of intelligence. It fails to track the rear-end collision and pre-damage status. It depends on the way of monitoring people to be manual. It requires a lot of manual work to save human life which results in time delay and because of that first aid cannot be provided to the patient on time. This leads to loss of human life.

Here, in this paper, we have described a design for controlling the traffic signals automatically so that the ambulance shall be able to cross all the traffic junctions without any time delay. The fast and hindrance free movement of emergency vehicles is a big challenge everywhere, especially in India this field is still untouched. Recently we have seen the formation of green corridor for vital organ transportation in Bengaluru but that require a huge man power and normal traffic suffered heavily. What we are going to do is to improve the problems faced by emergency vehicle on the road by traffic management. When the ambulance reaches the traffic junction, the encoder converts the serial data into parallel data when it passes from the transmitter to the receiver. If the signal is red, it comes to green automatically. The decoder in the receiver section converts the parallel data into serial data when it is sent back. This helps the ambulance to cross the traffic junction as soon as possible. The prioritized traffic switching is done priority wise, i.e. if two ambulances are coming at the same time, the ambulance which will arrive first at the traffic junction will be given the priority to cross the traffic junction before the next ambulance arrives [5]. In this way, using wireless technologies, the information is transferred and the traffic signals are controlled so that the ambulance would be able to reach the hospital on time

II. RELATED WORK

The Significant work has been done by the help of which a design for automatically controlling the traffic signals has been described.An automated mobile system for road safety services is described. It provides support to emergency service vehicles (EV) for accomplishing the mission faster. It is more reliable. The system must be based on standards, fully automated, flexible, intelligent and low cost. The availability of more pervasive and newer communication networks such as Zig Bee, WiMAX and mesh networks is more reliable. The objective of the system is to fulfill the needs of an error free and efficient emergency system. In case of an accident, it can accurately and quickly find the ambulance and send it to the accident spot without the requirement of manual work. It is made to reduce human errors, wrong data or treatment the emergency rescue system reliability on highway and intelligent ambulance have been described. To make sure, that the ambulance would arrive at the location of the accident on time and would reach to hospital as soon as possible to provide health services to the patient, the emergency rescue system started.

III. HARDWARE REQUIREMENT

©IJRASET: All Rights are Reserved

RFID
ZIGBEE for wireless connection with the vehicles
Microcontroller
A.V warning systems

IV. SOFTWARE REQUIREMENTS

Atmel studio for embedded programming.
GPS and google maps for finding shortest path
Proteus for simulation

V. SYSTEM MODEL

We should create a design for automatically controlling traffic signals so that ambulance would be able to cross all traffic junctions without waiting. In order to do so we divide the solution to our problem into 2 sections, A) Vehicle Section & Ambulance Section B)Signal Section .In vehicle section, vibration sensors are placed which monitors the speed and if it is over speed, alert will be produced and automatically speed will be reduced .The display unit in ambulance section is used for driver's reference. It will show them the names and distances of the nearest hospitals so that ambulance can reach the hospital as soon as possible. The signal section receives the signal from ambulance section and signal comes to green automatically. It helps ambulance to reach hospital without any traffic problem.

A. Vehicle Section & Ambulance Section

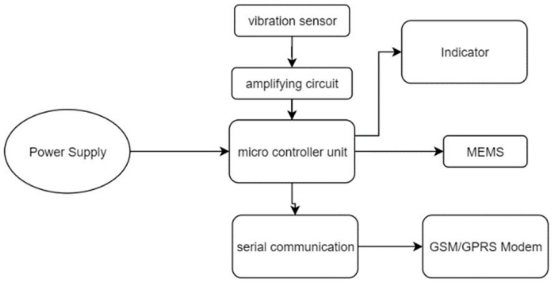


Fig 1 Vehicle Section

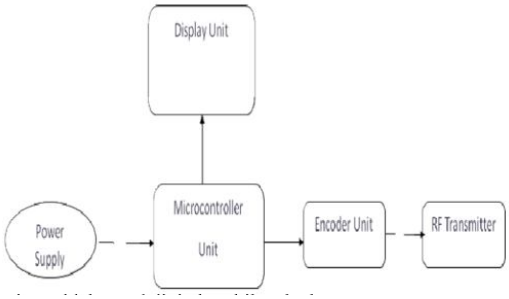


Fig 2 Ambulance Section

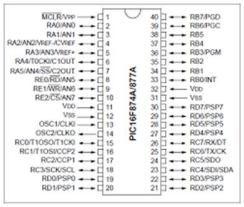
In this Section, all the equipments are connected to the microcontroller.

1) *ZigBee Module CC2500:* The CC2500 is a RF module and has transreceiver, which provides a very easy way to use RF communication at 2.4 GHz. All CC2500 is equipped with the microcontroller (PIC 16F877A), which contains Unique

©IJRASET: All Rights are Reserved

Identification Number (UIN). This UIN is based on the registration number of the vehicle. One of the most important features is serial communication without any extra hardware and no extra coding. Hence, it is a transreceiver as it provides communication in both directions, but only one direction. The microcontroller and CC2500 always communicate with the microcontroller via serial communication. Rx pin of CC2500 is connected to Tx (RC6) of microcontroller and Tx pin of CXC2500 is connected to Rx pin of microcontroller (RC7). Other two pins are used to energize transreceiver. It is used to transmit and receive the data at 9600 baud rate. Figure 4.1.a shows the image of transreceiver. Here, we uses CC2500 ZigBee module and it has transmission range of 20 meters.

a)ZigBee module CC2500



b)pin diagram of PIC16F877A

c)GSM/GPRS Modem

d)RFID Reader-125kHz-TTL

2) *Microcontroller (PIC16F877A) :* Peripheral Interface Control (PIC) 16F series has a lot of advantages as compared to other series. It executes each instruction in less than 200 nanoseconds. It has 40 pins and has 8K program memory and 368 byte data memory. It is easy to store and send UINs. At the junction, it is easy to store large number of emergency vehicles. Before switching to green, it should satisfy all the conditions. Simple interrupt option gives the advantage like jump from one loop to another loop. It is easy to switch any time. It consumes less power and operates by vehicle battery itself without any extra hardware. Figure 2.b shows the PIN Diagram of PIC16F877A.
3) *GSM Module SIM 300:* Here, a GSM modem is connected with the microcontroller. This allows the computer to use the GSM modem to communicate over the mobile network. These GSM modems are most frequently used to provide mobile Internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. GSM modem must support an “extended AT command set” for sending/receiving SMS messages. GSM modems are a cost effective solution for receiving SMS messages, because the sender is paying for the message delivery. SIM 300 is designed for global market and it is a tri-band GSM engine. It works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. SIM300 features GPRS multi-slot class 10/ class 8 (optional) and supports the GPRS coding schemes. This GSM modem is a highly flexible plug and play quad band GSM modem, interface to RS232, it supports features like voice, data, SMS, GPRS and integrated TCP/IP stack. It is controlled via AT commands (GSM 07.07,07.05 and enhanced AT commands). It uses AC – DC power adaptor with following ratings DC Voltage: 12V/1A.
4) *RFID Reader–125 kHz -TTL :* Radio Frequency Identification (RFID) is an IT system that transmits signals without the presence of physical gadgets in wireless communication. It is categorized under automatic identification technology, which is well established protocol. The working of an RFID system is very simple. The system utilizes tags that are attached to various components to be tracked. The tags store data and information concerning the details of the product of things to be traced. The reader reads the radio frequency and identifies the tags. The antenna provides the means for the integrated circuit to transmit its information to the reader. There are two types of RFID categories, active and passive tags. The tags that do not utilize power are referred to as passive and they are driven by an antenna that enables the tag to receive electromagnetic waves from a reader. On the contrary, active tags rely on power and they have inbuilt power sources that enable it to send

©IJRASET: All Rights are Reserved

and receive signals from RFID reader. RFID range depends on transmit power, receive sensitivity and efficiency, antenna, frequency, tag orientations, surroundings. Typically, the RFID range is from a few centimeters to over hundred meters. RFID reader uses frequency 125 KHz with a range of 10 cm.

B. Signal section

In Signal Section, the functions of the microcontroller section are same as in the ambulance section. Here, we used reader device, decoder unit and signal indicator. The reader device receives the data which the RF transmitter sends from the ambulance section.

Any device may act as a reader that can display text on a screen. A decoder is a device that performs the reverse operation of an encoder. To recover the original information, it undoes the encoding. Normally, the same method which is used to encode is reversed to decode.

It is a combinational circuit that converts binary information. Here, the decoder unit converts the parallel data into serial data and sends it to the microcontroller section. The received signal strength indicator (RSSI) measures the power present in a radio signal which is received. RSSI is a radio receiver technology metric, which is normally invisible to the user of the device which consists of receiver, but is directly known to users of wireless networking. The output of RSSI is a DC analog level.

The ambulance unit is the transmitter and each signal is the receiver. When the data is transmitted to the receiver, the signal comes to green automatically. The decoder converts the data from parallel to serial because the controller knows only serial language. In this way, this system helps the ambulance to reach the emergency site and then to hospital without time delay so that intensive care can be given to the patient in the golden hour and many lives can be saved.

VI. CONCLUSION

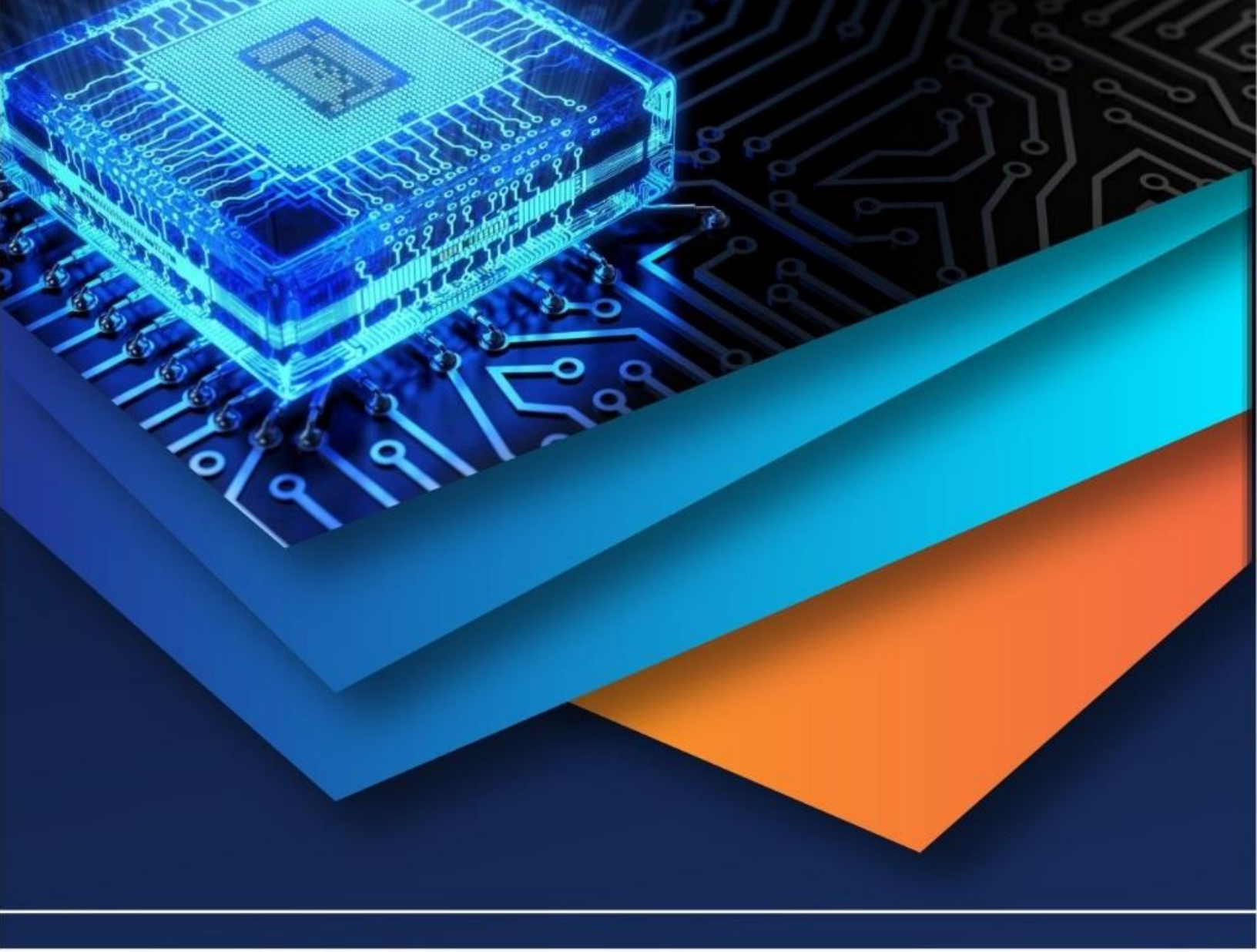
In this paper, we have described a design for automatically controlling the traffic signals so that the ambulance would be able to cross all the traffic junctions and reach hospital without time delay. Human life is affected due to delay in the arrival of ambulance. The ambulance is not able to reach the hospital in the golden hour. The existing system has many disadvantages. It depends on the way of monitoring

people to be manual which results in time delay and because of that health services cannot be provided to the patient on time which leads to loss of human life. In our proposed system, the ambulance is guided to the hospital, and also we have implemented it for 100mtrs radius to avoid traffic jams.

REFERENCES

[1] Xiaolin Lu, Develop Web GIS Based IntelligentTransportation Application Systems with Web Service Technology, Proceedings of International Conference on ITS Telecommunications, 2006.
[2] Kristofer D. Kusano and Hampton C. Gabler, Member, IEEE, “Safety Benefits of Forward Collision Warning, Brake Assist, and Autonomous Braking Systems in Rear-End Collisions”, 2011.
[3] Wang Wei, Fan Hanbo, Traffic Accident Automatic Detection and Remote Alarm Device.
[4] G. Derekenaris, J. Garofalakis, C. Makris, J. Prentzas, S. Sioutas, A. Tsakalidis, “An Information System for the Effective Management of Ambulances”, 2000.
[5] Zhaosheng Yang. Study on the schemes of traffic signal timing for Priority Vehicles Based on Navigation System, 2000.
[6] Maria Teresa Aviles, Roberto Becchini, “Missionsupport for emergency operators”, 2007.
[7] Samir El-Masri, Basema Saddik, “Mobile Emergency System and integration”, 2011.
[8] Sara Nazari, M. Reza Meybodi, M. Ali Salehigh, Sara taghipour, “An Advanced Algorithm for Finding Shortest Path in Car Navigation System”, Proceedings of 1st International Conference on Intelligent Network and Intelligent Systems, pages: 671-674, 2008.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)