AUTOMATIC AMBULANCE RESCUE SYSTEM BY CONTROLLING TRAFFIC LIGHTS

[1]B.Venkatesh, [2]V.Mohitha, [3]M. Naga Malleswararao, [4]K. Durga Prasad,
[5]CH. Naveen Kumar
[1234]U G Scholars, [5]Assistant Professor
[1]Electronics and Communication Engineering
[1]Godavari Institute of Engineering&Technology, Rajahmundry, Andhra Pradesh

Abstract: In normal conditions, there is a huge traffic in urban areas and that too in peak hours. If any accident occurs at that time, there is a great difficulty to the ambulance to reach the accident spot and also to take the victim to the hospital. This is because of the heavy traffic in that areas, and to control it according to the ambulance path, the traffic lights should be controlled with some specific timing in order to give the ambulance a free path without waiting. This timing should not effect the other vehicles for a longer time. The timing should be given in that manner with proper congestion of traffic. So that the ambulance can reach the hospital in minimal time without any lag, which will help in saving the lives to some maximum extent.

Index Terms- RFID, Atmega, Arduino Uno, Traffic Lights

1. INTRODUCTION

Generally for detection of vehicles different techniques are used. In this project, we use Radio Frequency Identification (RFID) for the detection of the ambulances for easy identification. The RFID sensors will be limited to some specific range only. So we use a wide range of these sensors in order in order to detect the vehicles (Ambulance). The controlling of traffic signals is adjusted by the RF nodes and sensors which are arranged in different paths of the roadways. The RF nodes are controlled by the RF control unit. The ambulance is fixed with some RF tags, whenever an ambulance starts from the accident spot, an instant message is sent to the RF control unit that the ambulance is in ON state. When the ambulance crosses any of the RF sensors, it sends a message to the control unit that the ambulance is passed the particular place. Then the control unit adjusts the nearest traffic signal junction with specific timing in order to show a clear path to the ambulance. The different RF sensors are independent of each other, in order to maintain a disciplined flow of traffic, so that the traffic vehicles cannot be disturbed. This independent process is taken into account because, if a specific timing is given to all the traffic signals once the ambulance is started from its location, then the timer will be started irrespective of the ambulance detection, so independent detection of ambulance by using RFID sensors will provide a updated information of the ambulance and also it passes a clear information to the control unit. So that the control unit will control the traffic signals according to the time that the ambulance crosses the RF sensors. This method is of great use to the modern traffic conditions for a smooth flow of traffic.

2. WORKING

The proposed project mainly consists of two sections for the easy flow of traffic. They are

2.1 RFID SECTION:

The RFID section is mainly used for sending the moving information of the ambulance along the road path. It mainly consists of two parts, they are tags and readers. The tags are attached to the ambulance and the readers are arranged along the different paths of the roadways. The RFID detection doesn't need a line of sight communication. So it is easy for the ambulance to travel in different routes depending on the traffic. The RFID frequencies ranges from 125 KHz to 2.45 GHz. So we use it in different ways depending on the conditions. Each frequency has its own advantages and disadvantages. The reader consists of a antenna which will send the signals to the tags, when the tags detects that particular signals it will sends an electric signal to the reader, so in that way the detection process takes place. The RFID tags will be divided into active tags and passive tags. Active tags are the tags to which we have to give the power supply. Passive tags are the tags with indefinite life expectancies. When the ambulance with RFID tags is detected by the readers, then it sends information to the control unit and hence from there the controlling of traffic lights is formed.

The main components used in this section are:

1) RFID tags
2) RFID readers

2.2 TRAFFIC UNIT:

The traffic unit mainly comprises of the behavior of the traffic signals. The working of the traffic signals is mainly controlled by this unit. For the indication of traffic lights, here we use LED's. The LED's represents the green and red colors for controlling traffic. The functioning of this traffic lights is done by program code which is written in embedded c language. The code is stored in Arduino UNO microcontroller or Arduino Nano microcontroller. The code that is used to control the traffic lights is to be uploaded into the Arduino UNO microcontroller, and the controlling of traffic lights is done by the Atmega 8 microcontroller. These two microcontrollers will be helpful in uploading and running the code and used to the functioning of traffic lights. An LCD module is placed to indicate the information about the ambulance. The traffic lights will function in two ways. Traffic lights before ambulance is detected and after it is detected. These two ways will vary depending on the timing conditions. So the timing of traffic lights are set in order to obtain a free path flow for the ambulance to reach the hospital.
This section comprises of:

1) Arduino Uno or Nano Microcontroller
2) Atmega 8 Microcontroller
3) LCD Module

3. METHODOLOGY

This method starts with the detection of the RFID induced ambulance by the RFID readers. Once the ambulance is detected, it will send a message to the control system that the ambulance is detected. From there, the RFID control system controls the traffic signals according to the route followed by the ambulance. The timing should be in the state that the timing adjusted for the ambulance to reach the hospital in minimal time should not affect the timing of other vehicles in traffic. After the ambulance crosses the signal junction then it will be set to its normal timing in minimum time. This process continues to all junctions in the way that the ambulance passes throughout the traffic.

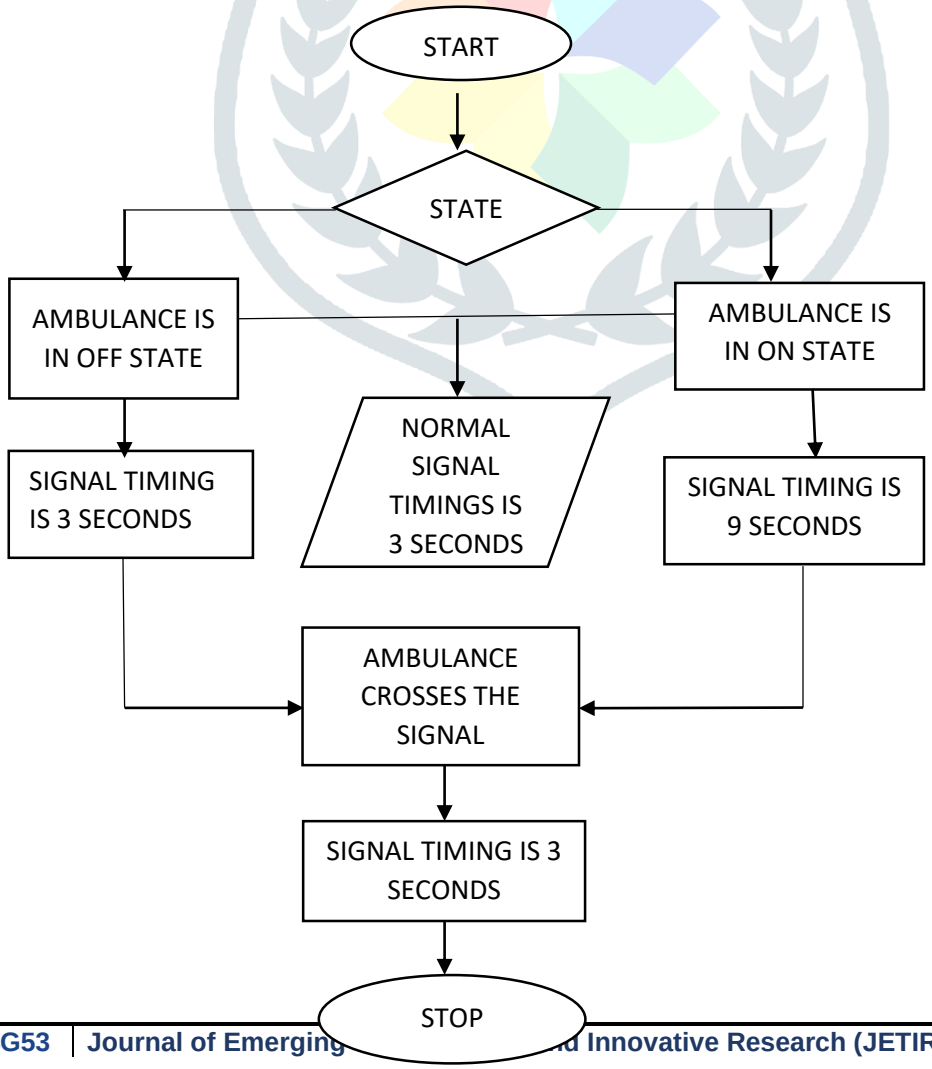

Fig 1: Flowchart of working model

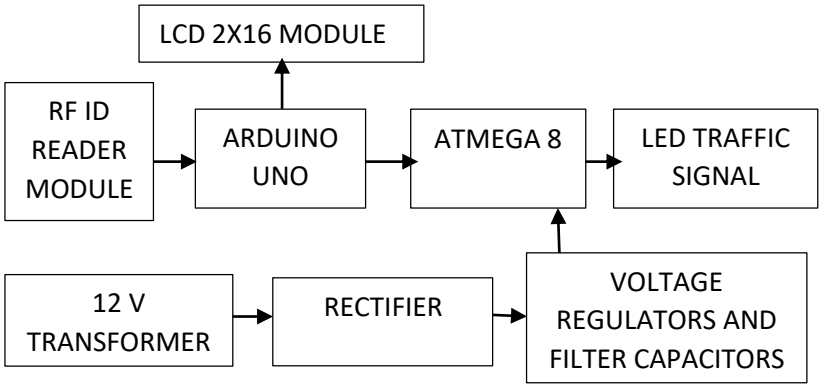

Fig 2: Block Diagram

4. RESULTS

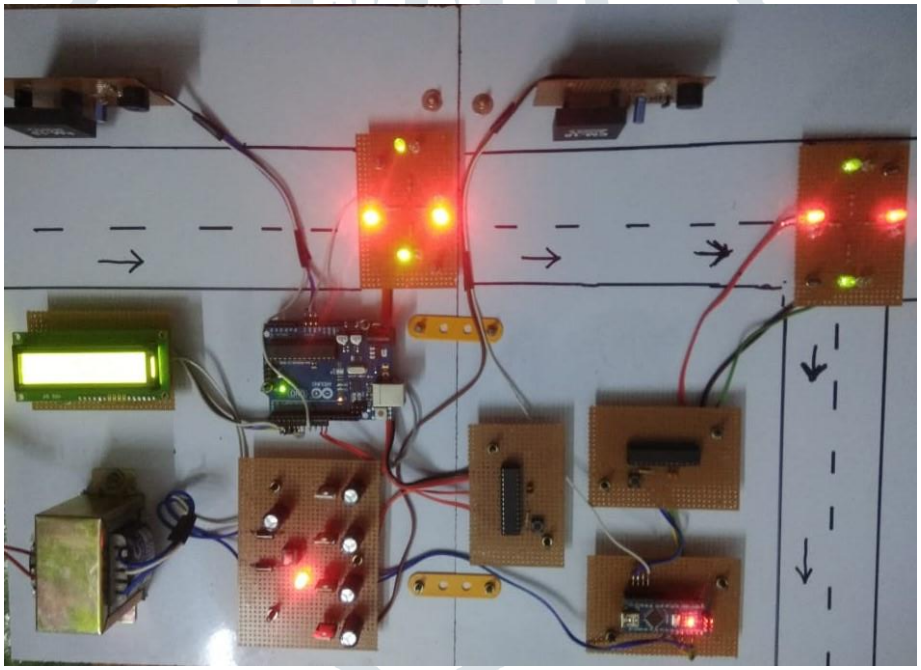

Fig 3: Output Model

The project kit consists of two junctions which we proposed a prototype model for the ambulance to reach the nearest hospital. The RFID readers will be placed at a limited space from the traffic junctions. In real life situations, the RFID readers will be set at a distance of two kilometers from the signal junction. So, we observe a free flow of traffic along all the roadways. When the ambulance crosses the RFID reader, the timing will be set to 9 seconds that means in real life scenarios it will be 90 seconds. The normal timing of traffic signals is 3 seconds on the kit, which will be 30 seconds in life scenarios. After the ambulance crosses the junction, the signal timing will again be set to 3 seconds. This is because we give a maximum time for the ambulance to cross the junction without any trouble. This proposed model will help the vehicles to follow the traffic with minimal congestion.

Table 1: Timing of signals

STATE	TIMING IN SECONDS	TIMING IN SECONDS
	RED	GREEN
NORMAL STATE	3	3
WHEN AMBULANCE IS DETECTED	9	9
AFTER AMBULANCE CROSSES THE JUNCTION	3	3

5. APPLICATIONS

- RFID Based Attendance System
- Electronic based Attendance System
- Anti-Theft Systems
- Object Identification

6. CONCLUSION

The project "**AUTOMATIC AMBULANCE RESCUE SYSTEM BY CONTROLLING TRAFFIC LIGHTS"** has been successfully designed and tested. This paper presents a new advanced solution for controlling the traffic signals in favour of ambulances during the accidents. With this system the ambulance can be maneuvered from the accident spot to the hospital without time lag. The AARS can be proved to be effectual to control not only ambulance but also authoritative vehicles. The RFID detection plays a key role in controlling the traffic in this system.

7. REFERENCES

[1] K.athavan, (2012)'Automatic ambulance rescue system' journal of advanced technology & engineering research-may

[2] Ashraf Tahat, (2012)'Android-Based Universal Vehicle Diagnostic and Tracking System' IEEE 16th International Symposium

[3] Deok-Rae Kim 'Outdoor Visible Light Communication For Inter- Vehicle Communication Using Controller Area Network', 2012 IEEE

[4] Deepika Bhandari (2012)'A Novel Approach to Implement Green Wave system and Detection of Stolen Vehicles' 2012 IEEE

[5] G. Derekenaris ,(2000)'An Information System for the Effective Management of Ambulances', Department of Computer Engineering and Informatics-jan

[6] H.Dian-liang, (2009)'Reliability of Emergency Rescue System on Highway', Second International Conference on Intelligent Computation Technology and Automation

[7] Edward McCormack, (2012)'GPS Tracking Of Freight Vehicles to Identify and Classify Bottlenecks' 15th International IEEE Conference on Intelligent Transportation Systems

[8] S.Iyyappan, (2013)'Automatic Accident Detection and Ambulance Rescue with Intelligent Traffic Light System', International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

[9] Gustavo Marfia, (2013)'Safe Driving In La: Report from the Greatest Intervehicular Accident Detection' IEEE Transactions on Vehicular Technology February

[10] Nathir A, (2012)'Development of a low cost differential drive intelligent ground vehicle' IEEE Conference

[11] Nan Wu, Yunfeng Lou, (2012)'Automatic Driving System by Small Electric Vehicle for elderly person' -SICE Annual Conference

[12] V.Padmaja, (2012) 'Vehicle Accident Automatic Detection and Remote Alarm Device' International Journal of Reconfigurable and Embedded Systems (IJRES)

[13] S Prabakar, (2012)' an enhanced accident detection and victim status indicating system: prototype' IEEE

[14] Rashmi Hegde, (2013)'RFID and GPS based Automatic Lane Clearance System for Ambulance' International Journal of Advanced Electrical and Electronics Engineering, (IJAEEE)

[15] Seokheun Choi, (2010)'Microfluidic-based biosensors toward point-of-care detection of nucleic acids and proteins 'IEEE conference February

[16] Setsuo Tokoro Kazushi, (2011)'Pre-crash Sensor for Pre-crash Safety' JUNE 2011

[17] Saleh Alghamdi, (2013)'Safe Trajectory Estimation at a Pedestrian Crossing to Assist Visually Impaired People' IEEE-34th Annual International Conference of the IEEE EMBS

[18] Smitha Shekar B, (2012)'GPS Based Shortest Path for Ambulances using VANETs' International Conference on Wireless Networks (ICWN 2012).