

ADVANCED AMBULANCE RESCUE SYSTEM USING PRIORITIZED TRAFFIC SWITCHING

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Abstract - India is one among the huge populated country in the world. Due to increase in population, vast transportation is taking place across the country. The facts says that during 2014 in India the total number of accidents are 4.97 lakh (annual) the Deaths are 1,42,485 (i.e., one death in every 3.7 minutes). The recent study states that 90 percent of the accident deaths are occurring while taking victims to the hospital. The main idea behind this scheme is ambulance can reach smoothly to hospital in time, by mechanically controlling traffic lights in path. The ambulance is controlled by control unit which gives the shortest path for reaching hospital and controls traffic lights. The sensor senses the spot and the nearest ambulance reaches the accident spot. The traffic lights in the path of the ambulance are controlled. The ambulance is guided to hospital by server through shortest route. The vehicle unit installed in vehicle senses the accident and sends the location of the accident to the main server in the ambulance section. The main server finds the ambulance, nearest to the accident spot and also shortest path between ambulance, accident spot and nearest hospital.

Key Words: - Automatic Ambulance Rescue System (AARS), Vehicle Section, Ambulance Section, Signal Section, Global System for Mobile Communications (GSM), Global Positioning System (GPS), Microcontroller

1. INTRODUCTION

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 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. In Pre-collision system, one or more systems may not activate due to sensing and tracking limitations. The actual field performance may be less effective. Limitations in the algorithms and sensors may cause difficulty in real world applications. Moreover, it may use more complex algorithms to determine collision risk. There will be different effectiveness for different algorithms.

The traffic signals on the path of the ambulance are controlled. 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. 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 without time delay. The server keeps a database for each node for easy access.

Hence, each node will have a unique id for addressing the data. The ambulance is guided to the hospital by the server through the shortest route. The sensor installed in the vehicle senses the accident and Global Positioning System (GPS) tracks the location of the accident. Through GSM (Global System for Mobile Communications), it sends the location of the accident to the ambulance section. The buzzer produces sound when accident occurs. The central unit finds the ambulance, nearest to the accident spot and also the shortest path between the location of the accident, ambulance and the nearest hospital. Here, wireless technologies are used for information transferring.

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. 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.

2. RELATED WORK

The ambulance is guided to the hospital by the server through the shortest route.[1] The sensor installed in the vehicle senses the accident and Global Positioning System (GPS) tracks the location of the accident. Through GSM (Global System for Mobile Communications), it sends the location of the accident to the ambulance section. The buzzer produces sound when accident occurs.

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The applications of powerful portable devices for human activities are described. An automated mobile system for road safety services is described. [3]

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.

The solution to traffic congestion problem and an advanced algorithm have been described to find the shortest path in car navigation system.[4] It is difficult for many drivers to find an efficient route. These systems can perform the task of determining the best path to the destination.

The emergency rescue system reliability on highway and intelligent ambulance have been described. [5] 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.

3. BLOCK DIAGRAM

The design of the project has been divided in three major sections. The three sections are the traffic signal section, vehicle section and ambulance section.

3.1 Vehicle Section

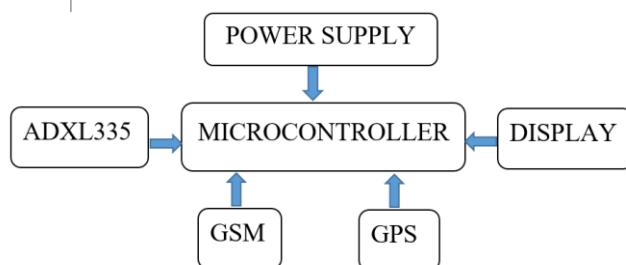


Fig1.block diagram of vehicle section

In Vehicle Section, all the equipments are connected to microcontroller .the ADXL sensor installed in the vehicle unit senses the accident and GPS tracks the location of the accident. Through GSM, it sends the location of the accident to the ambulance section.

3.2. Ambulance Section

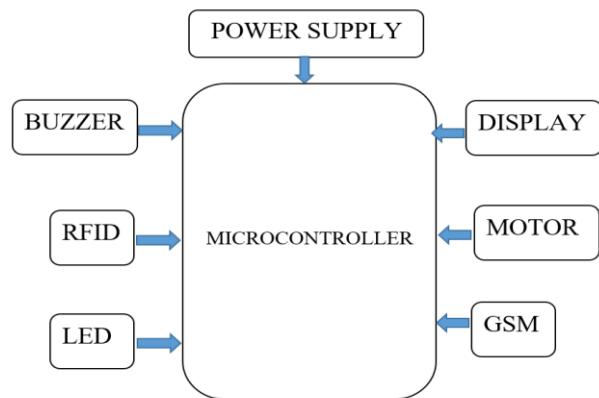


Fig. 2: Block Diagram for Ambulance Section

In Ambulance Section, we used PIC microcontroller. The display unit in ambulance section is used for driver's reference. It will display the location of the accident vehicle.as soon as the ambulance takes off to reach the accident spot the buzzer siren gets on along with the led.

3.3 .Traffic Signal Section

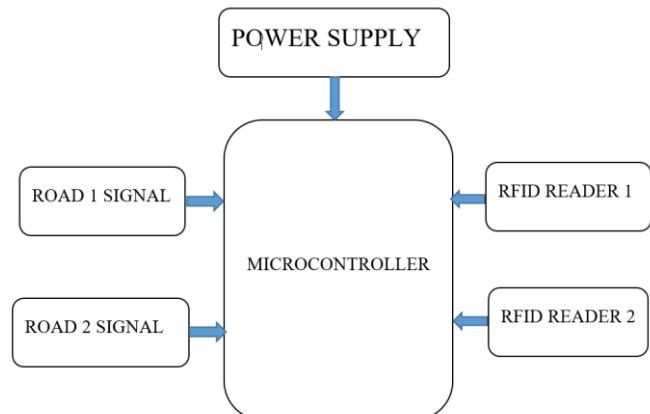


Fig3.block diagram of traffic signal section

The signal section receives the signal from ambulance section. As soon as the ambulance is detected by the traffic signal, the signal comes to green automatically and the other signals turn red. It helps ambulance to reach hospital without any traffic problem.

4. SOFTWARE ENVIRONMENT

The softwares used in the implementation of the proposed project work includes the softwares like Proteus, Eagle, MPLAB IDE.

Proteus design suit is a proprietary software tool suite used primarily for electronic design automation. The software is used mainly by electronic design engineers and technicians to create schematics and electronic prints for manufacturing

printed circuit boards. Eagle was used for PCB design, MPLAB for simulation and coding

5. HARDWARE ENVIRONMENT

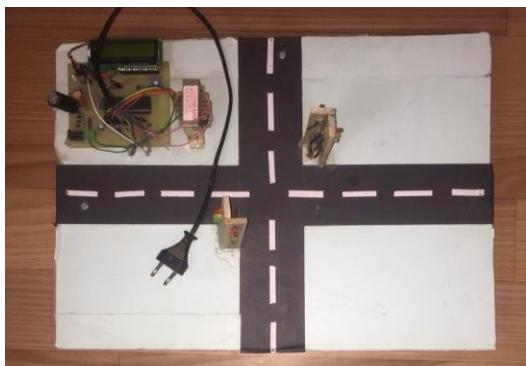


Fig.4. Hardware Set-up of traffic signal

The hardware setup of traffic signal is as shown in the figure above. It consists of a microcontroller connected with the power supply and display unit. An RFID reader is installed under the road. The RFID tag is installed in the ambulance.



Fig 5. Hardware Set-up of Ambulance section

The hardware setup of ambulance section is as shown in the above figure. It consists of microcontroller and GSM section along with an RFID tag. The LCD displays the coordinates of the accident spot.

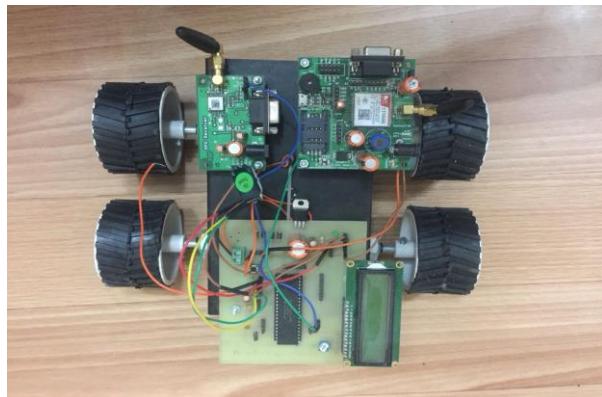


Fig 6. Hardware Set-up for Vehicle section

The hardware setup of vehicle section is as shown above. it consists of a microcontroller section, a GPS section and a GSM section. The ADXL sensor detects the accident, the GPS detects the exact location of the accident spot and sends it to the ambulance using GSM.

6. RESULT

The following results were obtained while performing the experiments. The accident was detected with the help of ADXL sensor. The location of the accident spot was detected using GPS and the details were send to the ambulance via GSM.

7. CONCLUSION

In this paper we have designed an automatic ambulance rescue system which enables the ambulance to reach the exact accident site within the minimum amount of time using prioritized traffic switching control method.

In our proposed system the ambulance is guided to the accident spot. The sensor installed in the vehicle senses the accident and GPS tracks the location of the accident. it send the location of the accident through GSM. Hence wireless technologies are used to transfer information.

8. REFERENCES

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