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Ambulance Path Clearance System With Health Monitoring Using Internet of Things

Aishwarya Sateesh[1], Ankitha K S[1], Navyashree K N[1], Rakshitha B C[1] and G N Keshava Murthy[2]

[1]Department of Electronics and Instrumentation, Siddaganga Institute of Technology. Tumkur 572103. E-mail: Isi18ei004@sit.ac.in / Isi18ei010@sit.ac.in / Isi18ei033@sit.ac.in / Isi18ei041@sit.ac.in
[2]Assistant Professor M.E., Ph.D, Department of Electronics and Instrumentation, Siddaganga Institute of Technology. Tumkur 572103. E-mail: gnk@sit.ac.in

Abstract

Countless people's lives are jeopardized in India's crowded metropolitan metropolises due to ambulances stuck in traffic. Most of the time, commuters are unable to move in these traffic jams to make way for approaching ambulances which has become one of the most pressing issues in India. The main reason in the back of that is growing population which ends up in multiplied number of cars, due to which emergency provider like ambulance gets affected. This paper proposes a solution to make such offerings effortlessly available to those in need. It includes a software application referred to as Ambulance service through which the user can book the ambulance with one faucet and track the ambulance by using Google map on his device, we also use microcontroller-based hardware module to provide an easy flow for ambulance to attain the preferred destination This is achieved by using imposing RF technology which might automatically control the visitors alerts within the course of ambulance accordingly minimizing the time required to reach the destination. Besides this, a portable health monitoring device will be placed in the ambulance which will measure patient's body temperature, blood pressure which will be displayed in the hospital's webpage.

Keywords: *RF Technology, Internet of Things, Ambulance, Health Monitoring, Webpage.*

1.0 Introduction

Emergency Vehicles (EV) such as Ambulance, Fire Engine play a very important role in reducing situations from being risky. Also, it should reach the destination at earliest. Traffic congestion is the main reason for the emergency vehicle being procastinated in arriving to their definitive goal. We have examined various methods for this assumption, under extremely high density traffic and no method was feasible for managing the signal as long on condition of Ambulance.

The aim concerning to this work was to develop a controller that helps automobiles for obtaining green pass without delay in the signal while travelling. In spite of, security being ensured, recently various accidents are visualized to have occured at cross roads.

This has stressed the reality that the emergency automobiles are to be given higher priority at road intersections in addition to crisis.

Minimal delay is very much essential for automobiles in arriving the location, as exstinaces are at stake. The path driven by EV endure be clear of traffic because their pausing is shortened. Though, various methods are present, they are confronted accompanying application issues. Certain structures have restricted traffic range, while few are not healthy

in the atmosphere environments and likely to break. The key aim concerning this work is to decide the form for pre-emption in addition to developments of algorithm for lowering moment of travel for EVs. The fact is to help to choose the nearest route for emergency automobiles to reach their goal. Traffic poles at the crossroads are the obstacles met by Ambulance. To resolve these issues. several algorithms are entailed for the broadcast of facts about congestions at intersections. Once these facts are known, Traffic signal will turn on green and Automobiles will reach their definitive destination in the minimal time. The projected work will base a transmission. linking the Ambulance, Hospital, User and the Traffic Signal to guarantee that the emergency vehicle retaliation period is slightest.

2.0 Literature Survey

In [1] the advance traffic solidity detection and signal automation uses Internet of Things. This technique consists of Infrared sensors that track the traffic density of a particular site. The IR sensors are located in specific areas on both sides, so they can detect density on both sides at the same time. This records the value and saves it on the microprocessor. Sound sensors are used to detect noise pollution in a particular region, which helps identify emergencies based on set edge values. Therefore, when the sound crosses the edge boundary, it automatically detects an emergency and automatically changes the signal accordingly.

In [2], the abstraction of rescuing the patient's life in an emergency situation was proposed. The model will identify the traffic signal, increasing the likelihood that the road will be traversed before the ambulance arrives. Therefore, it helps reduce the complexity of time and provide faster ambulance services. Using Google Map Server API to detect the distance between an automobile and a traffic pole.

The main intention of the system proposed in [3] is to control influx systematically and support the safe movement of emergency automobiles. The system comprises an Radio Frequency Identification reader that reads Radio Frequency signals from moving vehicles in traffic. Arduino processes these signals before making the necessary choice for structured control. The Radio Frequency signal is captured by an RFID reader at a specified distance from the traffic pole. The detected signal is sent to Arduino. Emergency automobiles are identified when a specific range of RF signals are detected. When an emergency vehicle crosses the route, the traffic server will notify Arduino at the intersection. Arduino then matches this received information with the RF signal obtained from reader will check if the vehicle is in an emergency. After confirmation, turning on the green traffic light will release the lane for emergency vehicle.

[4] provides users with a noise detector that automatically records the noise of various vehicles and detects the sound of sirens to detect the presence of an ambulance in a particular path. The recorded ambulance siren is refined by Internet of Things and sent to the traffic mast to improve congestion clearance. This is done by placing sensors near each path and traffic pole to indicate that the ambulance has crossed the lane.

[5] give out a system which is put-into practice by using an RFID reader to seize RFID tags placed on emergency vehicles. As the emergency vehicle approaches the traffic zone, the Radio Frequency Identification reader at the intersection will recognize the Radio Frequency Identification tag. Only when the code between RFID READER and B. RFID TAG is compared will the arrival of the emergency vehicle be recognized and this information will be passed to the control room by the microcontroller (ARDUINO UNO). In this way, the traffic signal changes from red to green light.

[6] Proposes a system that prize the concepts of loT to manage traffic on local and centralized servers. The system proposed for the Indian urban environment is the first important time when video data is collected. It is then split into frames, binary translation and denoising are followed by blob detection, and finally the count is estimated using the proposed vehicle counting method.

[7]presents an intelligent traffic control system for the smooth passage of contingency vehicles. All vehicles are equipped with a special RFID tag that makes it insoluble to remove. Use the NSK EDK125TTL RFID reader and PIC16F877A system-on-chip to read RFID tags attached to the vehicle. It counts the number of vehicles that pass through a particular pass during a particular period of time. It also determines network congestion, that is, the duration of the green light for that path. If the RFID tag reading belongs to a stolen vehicle, the message will be sent to the police control centre via GSM SIM300. Also, as the ambulance approaches the intersection, it will instruct the traffic controller at the intersection to turn on the green light. The prototype was tested in a wireless communications lab with a variety of input combinations and experimental results were found as expected.

[8] puts forth solution make a to contingency vehicle quiet easily available to those in need of such services. There exists an mobile application HPVB (High Priority Vehicle Booking) that allows users to make reservations with Tap Track the ambulance with your device's GPS. It also uses a microcontroller-based hardware module to ensure smooth operation for the ambulance to reach its destination. This is achieved by application of Radio Frequency Identification technology that automatically controls the traffic lights in the path of the ambulance, minimizing the time to reach the destination.

3.0 Proposed Methodology

In this work, a system is proposed where technologies like Internet of Things and Cloud are used to surveil the status of emergency automobiles locations and route selection. A Mobile application is used as the User Interface to reserve an Ambulance which lists nearby hospitals using Google Map APIs, the best and shortest route from the place on incident to the ambulance driver is indicated.

The system comprises four units which are explained below:

Ambulance Unit

The Ambulance Unit which acts like transmitter is installed to Ambulance or emergency vehicle. As soon as it approaches the signal, green light is obtained any delay. With the Google Map APIs implemented in the Mobile Application the location of nearest Hospital can be tracked by the automobile driver.

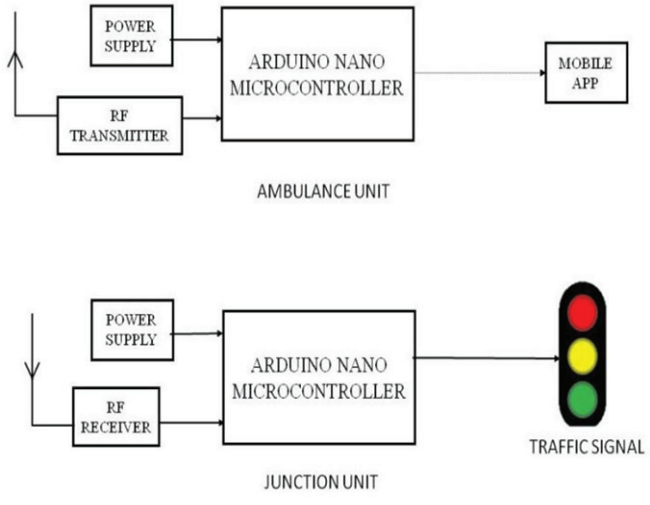

Figure 1: Block diagram of Ambulance Unit and Traffic Unit

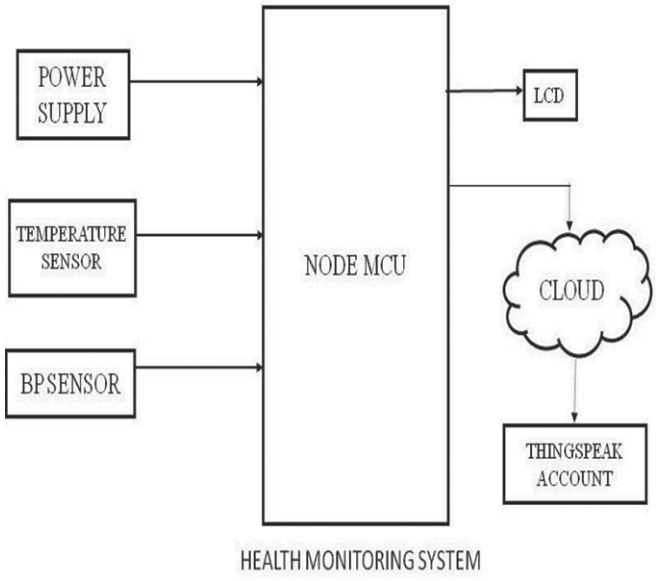

Figure 2: Block Diagram of Health Monitoring System

Junction Unit

The Junction acts like receiver, is integrated with a buzzer that indicates the path is free to move without any congestion. These unit is to be postioned at the intersections. As soon as the Ambulance approaches the the traffic intersection the green light is turned ON with a Siren beep.

Health Monitoring Unit

A portable Health monitoring device will be placed in the ambulance which will measure patient's body Temperature, Blood Pressure which will be displayed in the hospital's webpage.

Mobile Application

The user put in for an ambulance and is done through the Mobile application. The Ambulance Driver get details of the location of emergency through the map interface and the route details are provided. The hospital unit is alerted so that they can provide medical preference to the patient at the earliest by checking the basic health parameters which are provided in the webpage.

At the moment, when ambulance assistance is required, user or patient can directly use the application to call up the ambulance, The application supports to enter the bare miminal details to book the ambulance.

Application server will preferably selects the Ambulance which can reach the victim's location by considering current traffic scenario. The patient's

health parameters are monitored suitably and the relevant information are also shared with the hospital servers to prepare themselves for the oncoming critical cases. Google Map are used for direction.

4.0 Tests and Results

This segment discusses the flow of the work with the photograph of the results that were obtained.

In Fig.4, the vehicle or ambulance includes RF 435 MHZ Module, Arduino nano microcontroller. The RF transmitter transmits the radio signals to RF receiver. It is installed in the emergency vehicle.

As delineated in Fig.5, the traffic signal controller consists of the RF 435 MHZ Receiver and Transmitter, Arduino nano microcontroller. The Arduino Nano microcontroller is a open source development board which is utilized for electronics and coding. The RF receiver is a used to receive radio signals. No matter when the emergency vehicle reaches the traffic unit within 20 to 30 meters, the traffic light turn out to be green until the vehicle passes the signal.

Fig.6, demonstrates the health monitoring system put up in ambulance unit. It displays the blood pressure and temperature of the patient on liquid crystal display and same will be uploaded to webpage for further use.

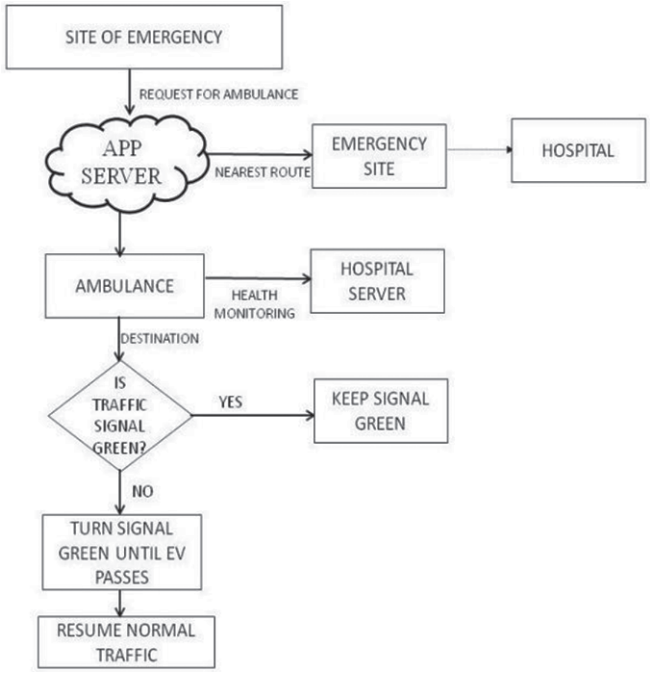

Figure 3: Flowchart of the proposed methodology

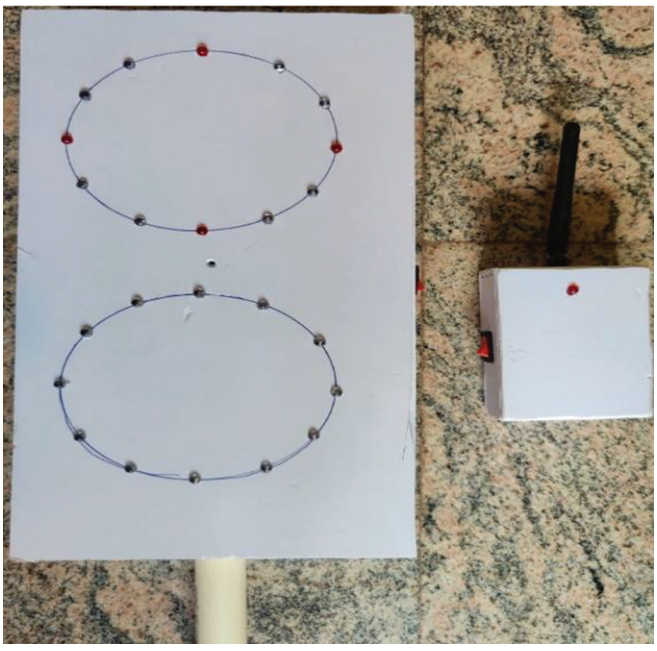

Figure 4: RF Transmitter and Receiver

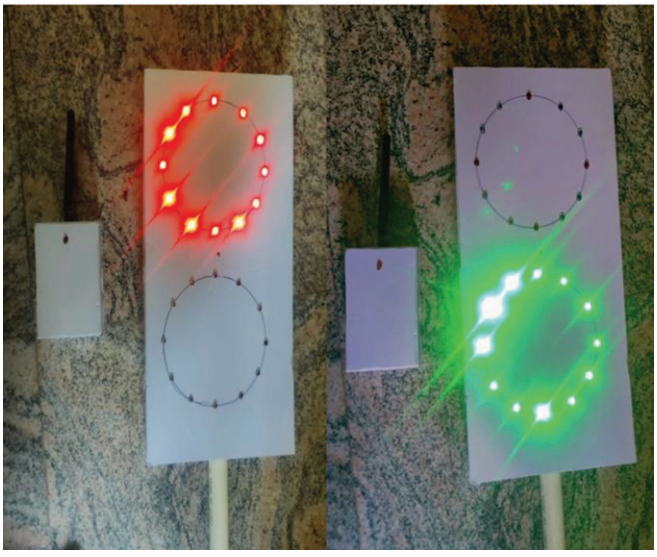

Figure 5: Status of RF Transmitter and Receiver

Fig.7, depicts the cover screen of the mobile application in which we can select for driver or user according to our need. Once we select for driver or user button, the application is pulled for login credentials of driver or user.

Fig.8, shows the user and driver interface to book the ambulance. User at patient end can we have developed a comprehensive far and enter minimal situation details to order ambulance. These details are

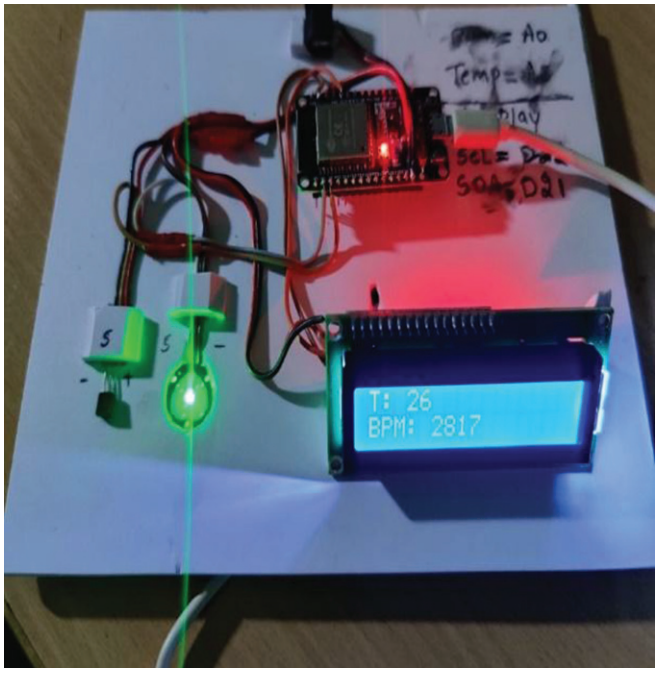

Figure 6: Health Monitoring System in the Ambulance

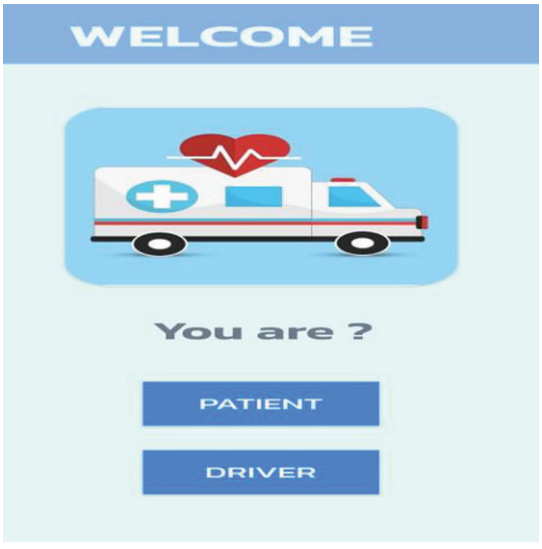

Figure 7: Chosing the actors in mobile application

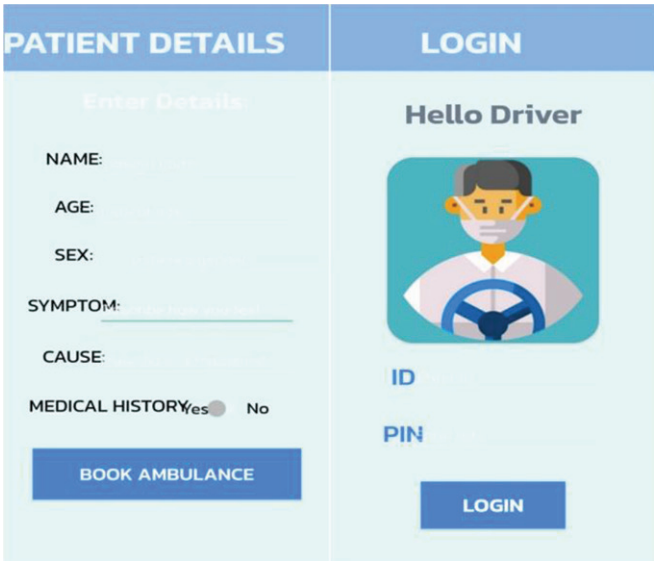

Figure 8: Login and Registration Interface

Figure 9: Google maps showing nearest route

required for better case management, i.e. the patient's age, gynic and incident particulars may be better measure of the severity and vulnerability of the patient case. Particular driver has its own login identification and password.

Fig.9, lay out the map and shortest distance to the site of emergency. Google map is popular and well-established navigation tool among the mortals. This is the reason for using Google map, and users are not needed to be comprehend with new interface. It supports our motivation to provide the application to all coven.

5.0 Conclusions

We have developed a comprehensive far and near recommendation to ensure a reduction in ambulance

emergency response times. This automated proposition offers a solution from the solicitation of an ambulance until the victim is taken to the hospital for medical intervention. The system imparts using Google map, and Internet of Things and thus executed on real time and provides an attainable and agreeable solution to the real-time matter of question in metropolitan citics. The presented solution has been tested by implementing validation in principle using the Arduino nano microcontroller and the idea is evaluated. The monitoring of the signals was very rapid and the concept can be carried out and analyzed in a factual domain. The program of works is to ease the faster movement of ambulances by reducing the bottlenecks on the desired routes. We anticipate reducing the overall travel time for ambulances in traffic. The program of this work is to help paramedic shuttles in times of distress, should be reached when this compact system is implemented in reality. Further, Image proceesing and Piezoelectric sensors can be implemented to detect the solidicity of the vehicles and make a way for the emergency automobiles.

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