Traffic Controlling and Health Monitoring System in Ambulance

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Abstract: **In today's world, traffic jams during rush hours is one of the major concerns. During rush hours, emergency vehicles like Ambulances, get stuck in jams. Due to this, these emergency vehicles are not able to reach their destinations in time, resulting into a loss of human lives. We have developed a system which is used to provide clearance to any emergency Ambulance vehicle by turning all the red lights to green on the path of the emergency vehicle. This cause the traffic jam at the traffic junctions which in turn causes delay to ambulance and it costs lots of life. In order to overcome this problem, we present a smart ambulance and a controlled traffic system. This system also concentrates on live video monitoring and parameters checking which will be helpful in saving one's life.**

Keywords: **Radio frequency identification, networking**

1. Introduction

In today's world, traffic jams during rush hours is one of the major concerns. During rush hours, emergency vehicles like Ambulances, get stuck in jams. Due to this, these emergency vehicles are not able to reach their destinations in time, resulting into a loss of human lives. We have developed a system which is used to provide clearance to any emergency Ambulance vehicle by turning all the red lights to green on the path of the emergency vehicle. This cause the traffic jam at the traffic junctions which in turn causes delay to ambulance and it costs lots of life. In order to overcome this problem, we present a smart ambulance and a controlled traffic system. This system also concentrates on live video monitoring and parameters checking which will be helpful in saving one's life.

Traffic jams is one of the crucial issues due to which ambulance services get affected on large amount.20% of emergency patient deaths blamed on traffic jam delay. According to surveys 95% of heart attacks can be treated, if the ambulance reaches the place at current time without getting stuck in traffic. Every second heart attack patient in India takes more than 400 minutes to reach a hospital, which is almost 13 times more than the ideal window of 30 minutes, government data shows. A two-year data from the ongoing Management of Acute Coronary Event (MACE) Registry of the Indian Council of Medical Research (ICMR) shows at some places it even takes 900 minutes as a lot of time is wasted in transportation. Beyond 180 minutes, the heart muscles suffer irreversible damage due to lack of blood supply. So this paper sums up that

how important ambulances can be in saving someone's life. This system facilitates the ambulance in finding the best route and also emphasizes in clearing up if any traffic jam at the ambulance's root by sending prior information to the signal. This system also enables patients monitoring system. The proposed smart ambulance vehicle system can track its location so that we can provide wireless signal to the emergency vehicle. Conventional technologies use image processing systems to identify the emergency vehicle. But these systems have a drawback during bad weather conditions. Due to wind, rain, fog, etc., the image received by the camera is distorted by noise and it becomes difficult for the system to identify the desired vehicle. Thus, we have built our system using wifi transponders and receiver. The advantage of wifi is that it is a cost-effective system which will provide uninterrupted communication in our network even in bad weather conditions.

In recent times, wireless sensors and sensor networks have become a great interest to research, scientific and technological community. Though sensor networks have been in place for more than a few decades now, the wireless domain has opened up a whole new application space of sensors. Wireless sensors and sensor networks are different from traditional wireless networks as well computer networks and, therefore, pose more challenges to solve such as limited energy, restricted life time, etc. An RFID tag is used to control and monitor traffic from the ambulance. In case of emergency, the RFID tag must be activated which will then be detected using RFID reader present at the junction. These readers will continuously send signals to the junction until the traffic is cleared. As soon as the ambulance cross the reader will stop sending signals and the traffic system will turn back to normal. This device can also measure and check the patient's health parameters such as heart eat rate and temperature using heart rate sensor and a temperature sensor. The readings are further verified using a client server module for which a Wi-Fi module is also included. A large population and large amount of vehicles there is also a big trouble of car accidents or road accidents, and with these overcrowded roads there is a problem of delay in first aid service. To overcome this delay in first aid service steps are taken such a way it includes automatic traffic light controlling system such that the ambulance can achieve a freeway in order to provide the first aid to patient as fast as possible. Here we

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also have a patient monitoring system.

In health monitoring system, the patient's vital health parameters such as heart rate and body temperature is measured. These parameters are sent to a PC in ambulance via serial communication and this data will be sent to the hospital server. In traffic control system an RF transmitter on the ambulance will communicate with the RF receiver mounted on the signal post. An algorithm is used to control and monitor. The traffic signals automatically based on the key pressed by the driver from keyboard in the ambulance. The information reading the current as well as future location of ambulance is sent from the ambulance itself. This information is used to optimally control the traffic.

2. Related works

To There are lot varieties of health monitoring and wearable health care devices emerged these days, but installing it in the ambulance along with that of the traffic monitoring and controlling system has not yet been invented. Smart ambulance European procedure platform (SAEPP) has taken initiative only to minimize the risk of infection, reducing time at hospital admission. Currently the automatic traffic control system, includes the accident detecting and alerting tracking mechanism. Until now there is only facilities to detect patient's health parameters and no live video streaming is implemented. Few of these smart devices will play an important role in improving the quality of medical care, bringing convenience for patients and improving the management level of hospitals. However, due to the limitation of communication protocols, there exists non unified architecture that can connect all intelligent things in smart hospitals.

Some healthcare systems collect, in real time, both environmental conditions and patients' physiological parameters via an ultra-low-power Hybrid Sensing Network (HSN) composed of 6LoWPAN nodes integrating UHF RFID functionalities. Sensed data are delivered to a control centre where an advanced monitoring application makes them easily accessible by both local and remote users via a REST web service. The simple proof of concept implemented to validate the proposed SHS has highlighted a number of key capabilities and aspects of novelty which represent a significant step forward compared to the actual state of art.

To take care for the elderly person a smart band will be introduced which will monitor all the health issues such as pulse, blood pressure and mainly it will monitor the heart beats of the person. This smart band can be easily wearable on the wrist of our hand and it will be connected to smartphones all the time. The data collected from this band will be easily transferred with the help of provided application with the help of smartphones. Smart band will monitor the person 24X7 and will keep on sending the data. This large amount of data will be send to a centralized database, where large amount of data will get collected in a systematic way. All the process will take place automatically with the help of IoT i.e., Internet of Things. This

collected data will get filtered to check for any irregularities, this will be done by checking the readings collected from the smart band i.e. if the readings are below or above the average health limits then the person will be informed or prompted with the prescribed medicine by the doctor on their smartphone with the help of the application. There are times in which matter can get serious if a person is about to get a cardiac arrest. In those times our service will play a crucial role by prompting that person's family member which will be already provided by the smart band user through application to the database and an emergency ambulance service will get dispatched carrying all the emergency equipment. The dispatched ambulance will be aware of the location of the person with the help of smart band or the smartphone application. The user or the caretaker of that person will be able to track the location of the dispatched ambulance on their smartphones with the help of Global Positioning System (GPS) and Google maps APIs on this application.

The most precious time in these kinds of emergencies is when the patient enters the ambulance to the point of reaching the hospital and to get hospital staffs to get ready for the emergency case. To deal with these kinds of situations our project will provide live readings of the patient to the hospital so that hospital staff can get ready for treating the casualty. It is said that treatment given while taking patient from source place till hospital is most crucial in case of any heart related problem and emergency. Thus, Hospital administrative person can guide which actions should be taken until patient it reaches hospital. This will make emergency medical facility more responsive and time saving.

3. Proposed system

A large population and large amount of vehicles there is also a big trouble of car accidents or road accidents, and with these overcrowded roads there is a problem of delay in first aid service. To overcome this delay in first aid service steps are taken such a way it includes automatic traffic light controlling system such that the ambulance can achieve a freeway in order to provide the first aid to patient as fast as possible. Here we also have a patient monitoring system. In health monitoring system, the patient's vital health parameters such as heart rate and body temperature is measured. These parameters are sent to a PC in ambulance via serial communication and this data will be sent to the hospital server. In traffic control system an RF transmitter on the ambulance will communicate with the RF receiver mounted on the signal post. An algorithm is used to control and monitor. The traffic signals automatically based on the key pressed by the driver from keyboard in the ambulance. The information reading the current as well as future location of ambulance is sent from the ambulance itself. This information is used to optimally control the traffic.

The LM35 is one kind of commonly used temperature sensor that can be used to measure temperature with an electrical o/p comparative to the temperature (in °C). It can measure

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temperature more correctly compare with a thermistor. This sensor generates a high output voltage than thermocouples and may not need that the output voltage is amplified. The LM35 has an output voltage that is proportional to the Celsius temperature. The scale factor is .01V/°C. The front of the sensor is the pretty side with the Heart logo. This is the side that makes contact with the skin. On the front you see a small round hole, which is where the LED shines through from the back, and there is also a little square just under the LED. The square is an ambient light sensor, exactly like the one used in cell phones, tablets, and laptops, to adjust the screen brightness in different light conditions.
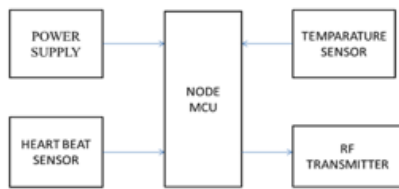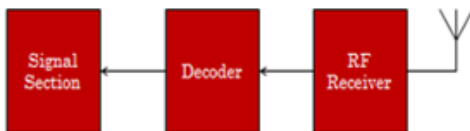

Fig. 1. Health monitoring system

Fig. 2. Traffic monitoring system

The LED shines light into the fingertip or earlobe, or other capillary tissue, and sensor reads the light that bounces back. The back of the sensor is where the rest of the parts are mounted. We put them there so they would not get in the way of the of the sensor on the front. Even the LED we are using is a reverse mount LED. as a chip, the ESP8266 is also hard to access and use. You have to solder wires, with the appropriate analog voltage, to its PINs for the simplest tasks such as powering it on or sending a keystroke to the "computer" on the chip. While this level of integration is not a problem when the ESP8266 is used as an embedded controller chip in mass-produced electronics, it is a huge burden for hobbyists, hackers, or students who want to experiment with it in their own IoT projects. Borrowing a page from the successful playbooks of Arduino or a Raspberry Pi, the Node MCU project aims to simplify ESP8266 development. It has two key components. RFID installed at the traffic signal tracks the RFID tagged ambulance and sends the data to the cloud. After the acknowledgment for the user through the mobile app, the particular signal is made Green for some time and after the ambulance passes by, it regains its original flow of the sequence of signaling, if this scheme is fully automated, it finds the ambulance spot, controls the traffic lights. This system controls the traffic lights and saves the time during emergency times.

4. Experiments and results

The results can be displayed in the serial monitor and mobile screens by connecting to the Wi-Fi module. By connecting the IP address.

You have to solder wires, with the appropriate analog voltage, to its PINs for the simplest tasks such as powering it on or sending a keystroke to the "computer" on the chip. And, you have to program it in low-level machine instructions that can be interpreted by the chip hardware. While this level of integration is not a problem when the ESP8266 is used as an embedded controller chip in mass-produced electronics, it is a huge burden for hobbyists, hackers, or students who want to experiment with it in their own IoT projects.
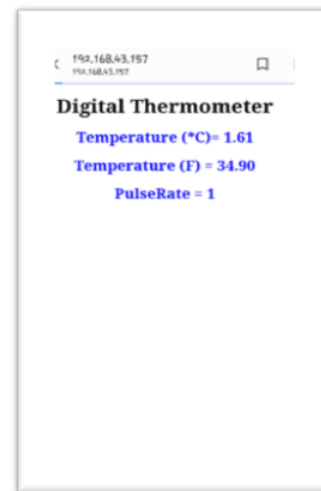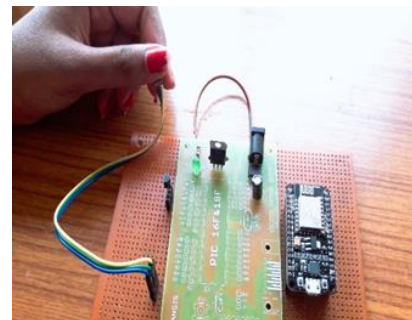

Fig. 3. Output screen

Fig. 4. Heart beat sensor

The Node MCU (Node Micro Controller Unit) as shown in Fig. 4 is an open source software and hardware development environment that is built around a very inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains all crucial elements of the modern computer: CPU, RAM, networking (Wi-Fi), and even a modern.

Radio Frequency, any frequency within the electromagnetic spectrum associated with radio wave propagation. When an RF current is supplied to an antenna, an electromagnetic field is created that then is able to propagate through space. Many wireless technologies are based on RF field propagation. Radio Frequency: The 10 kHz to 300 GHz frequency range that can

be used for wireless communication. Also used generally to refer to the radio signal generated by the system transmitter, or to energy present from other sources that may be picked up by a wireless receiver. Indoors, the range is approximately 200 foot, and will go through most walls. The TWS-434 transmitter accepts both linear and digital inputs can operate from 1.5 to 12 Volts-DC, and makes building a miniature hand-held RF transmitter very easy. The TWS-434 is approximately 1/3 the size of a standard postage stamp.
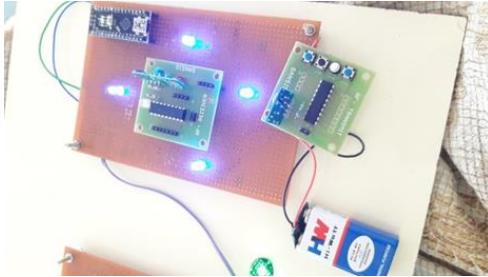

Fig. 5. Rf-id module

5. Conclusion

The system described which will continuously monitor the patient's health parameters and simultaneously will control the traffic signal in case is emergency is discovered. If the doctors do not have sufficient medical history of the patient, they may not be able to give proper treatment to the patient. This system tries to prevent just that. In health monitoring system, the patient's vital health parameters such as Heart Rate and Body Temperature are monitored. This information is sent to the hospital for analysis. Many traffic control systems propose an autonomous solution which does not consider the future path of the ambulance. This will help in optimization of the time taken by the ambulance to reach the hospital. Also, the monitoring of the patient will help the doctors to give him the necessary treatment for the time being. A network between consecutive signal posts may be established to control high intensity traffic.

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