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WIRELESS EMERGENCY TRAFFIC MANAGEMENT SYSTEM WITH REAL TIME MONITORING USING IOT

SEEMA BHANUDAS SASE[1], Mrs. WARSHA KANDLIKAR[2]

[1]M-tech in Electronics Design and Technology, National Institute of Electronics and Information Technology, Aurangabad, Maharashtra
[2] Scientist 'c', National Institute of Electronics and Information Technology, Aurangabad, Maharashtra

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Abstract - *With a large population and large amount of vehicles ,there is also a big trouble of car accidents or road and with these overcrowded roads there is a problem of delay in first aid service .To overcome this delay in the first aid service this paper describes a solution which includes accident detection unit. In order to provide the first aid to patient as fast as possible. Here we also have a patient's health monitoring system .In that, the patient's vital health parameter such as heart rate and body temperature are measured .These parameter 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 ambulance will communicate with RF receiver mounted on signal post. An algorithm is used to control the traffic signals automatically based on key pressed by the driver from keypad in the ambulance. In future, this system can be improved by controlling the real traffic situation, in fact improving present traffic light system technology.*

Key Words: microcontroller PIC 16F887A,Wi-Fi module, LED driver module, accident detection unit, health monitoring unit.

1. INTRODUCTION

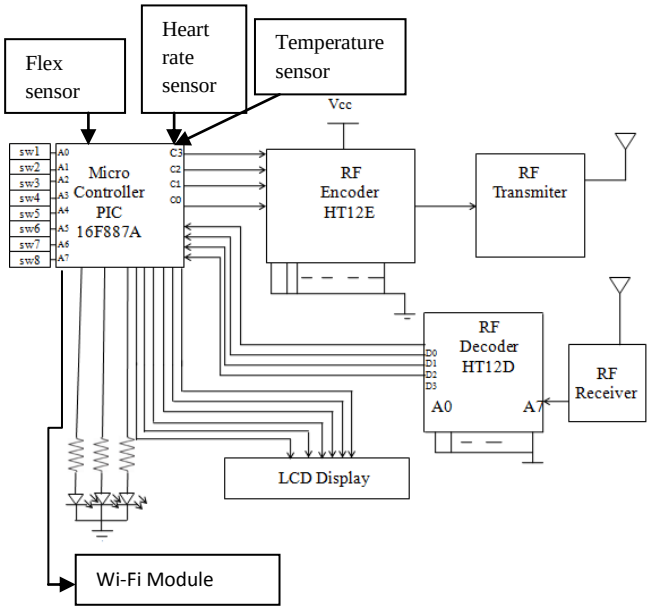
Today's world is developing at a very high speed. Everyday a new technology is discovered. However at the same time everyone is facing many problems in these smart cities. Some of these problems are health issues as well as high traffic jams in big cities.[1] Some of these problems are health issues as well as high traffic jams in big cities. This is very serious problem even in case of road accident .One even doesn't care to call the emergency unit.[3] On road due to high traffic people are unable to provide the freeway to the emergency unit which also becomes one of the factors of late first aid to the patient due to which one can die on the way to hospital.[2] So to overcome their negative factors and to provide the first aid to the victim these paper describes the working of accident detection and immediately alerting the emergency ambulance unit about the accident with the location coordinates, receiving such coordinates the ambulance unit or so called emergency unit respond immediately and leaves for the accident location .[4] Now while moving toward location or while taking patient to the hospital there may or may not occur some traffic. So in order to free or release the traffic the ambulance controls the traffic light itself such that the traffic light converts in a manner so that it could receive the freeway to hospital.[5] Ambulance also have some extra features such as while in the way to hospital before providing the first aid to the patient one can detect the patient health status like monitoring the heart rate and body temperature. So that the patient can get the correct first aid treatment and can save his life.[5][6]

2. PROPOSED SYSTEM DESIGN

BLOCK DIAGRAM OF TRANSMITTER SECTION:

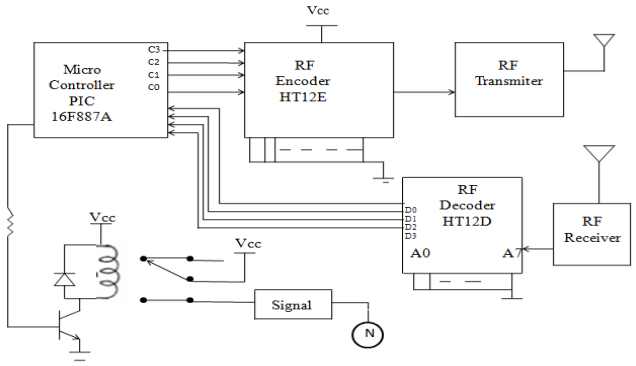
Transmitter section consists of 4*4 keypad, a microcontroller-16F877A, RF encoder and decoder, RF transmitter and receiver. Parallel output of microcontroller is given to the RF encoder which is encoded and converted into serial output as RF signal. Further this serial output is transmitted through the RF transmitter and antenna. Traffic

light is controlled with time delay according to the programming of the controller. LED's connected to controller indicates the status of signal. Path selected and travelled stations are displayed on LCD. The Wi-Fi module connected to the transmitter microcontroller in emergency vehicle will send the current position of the Emergency vehicle over internet so as to monitor real time position of it. Health monitoring parameters such as body temperature and heart rate of the patient in the ambulance are measured. This parameter is sent to a PC in ambulance via serial communication and this data will be sent to the hospital server. Flex sensor are used for accident detection.



BLOCK DIAGRAM OF RECEIVER SECTION

This section consists of RF decoder and receiver. RF receiver receives the data transmitted through a section of transmitter .RF decoder decodes it and gives to controller. Microcontroller processes the data and pass signal to a relay through a transistor. With the help of this relay we are controlling the signals. The status of traffic signal is also send to the RF encoder through the controller. RF encoder encodes the data and transmits it through RF transmitter. This radio frequency (RF) transmission system employs Amplitude Shift Keying (ASK) with transmitter/receiver (TX/Rx) pair operating at 434MHz. The transmitter module takes serial input and transmits these signals through RF. The transmitted signals are received by the receiver module placed away from the source of transmission.



Android App for real time patient monitoring

Accident detection unit:

Here once any accident takes place, the equipment built in the system means at transmitter itself detect the accident with the help of flex sensor. Flex sensor is fix at ambulance. on sensing the accident the system which is continuously receiving the GPS coordinates send the message alert to the concerned authority about accident.

Traffic Management:

On the way to the hospital ambulance may or may not stuck in traffic jams. Since we are living in society with massive population and with heavily crowded roads. So to overcome this traffic jams or to take the patient to hospital at early. This system helps a lot. Here ambulance itself informs the nearby traffic light about incoming of ambulance. Traffic light can control the traffic in such a way that the ambulance can get the freeway to reach the hospital.

3. Product Perspective

In our day to day life we see most of the times emergency vehicles get stuck in traffic signals, because of that sometimes someone has to suffer in terms of their lives, financial loss etc. neither the people stopping at signal can't break the rule nor they able to provide the path to emergency service though they are willing to. Also some times the driver of the Emergency service doesn't know the exact location of the destination who required the help, so our GPS system will guide him to reach exact destination. Also in Emergency services like ambulance, the patient health monitoring system was absent so the doctors present in hospital will first check the patient then start medication. During that time it may possible that patient will die due to late diagnosis. To implement smart traffic management system in which all emergency services will get free path to reach destination.

4.HARDWARE INTERFACES

4.1 BLOOD PRESSURE SENSOR

The Blood Pressure Sensor is a non-invasive sensor designed to measure human blood pressure. It measures systolic, diastolic and mean arterial pressure utilizing the oscillometric technique. Pulse rate is also reported. It is having intelligent automatic compression and decompression it is Easy to operate, switching button to start measuring.

4.2 TEMPERATURE SENSOR

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to 150°C temperature range. Lower cost is assured by trimming and calibration at the wafer level. The low-output impedance, linear output, and precise inherent calibration of the LM35 device makes interfacing to readout or control circuitry especially easy. The device is used with single power supplies, or with plus and minus supplies.

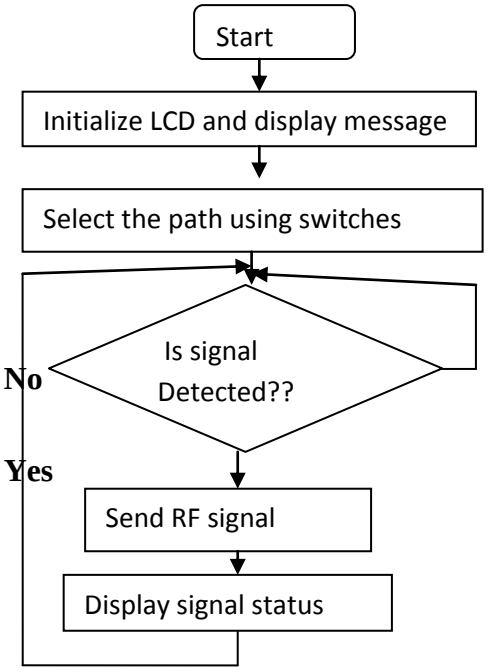
4.3 WIFI MODULE

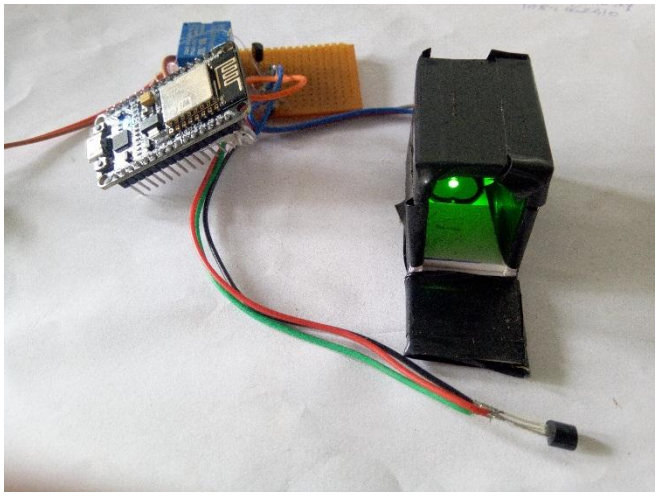
4.4 This is ultra-low cost module that is easy to use and reliable based on ESP8266 cheapest to be used along with a microcontroller that configures and communicates through AT commands

- 400 Meters Working Distance in Open Area (100 Meters Indoors)
- On Board 2.4 GHz PCB Antenna
- Metal Shielding

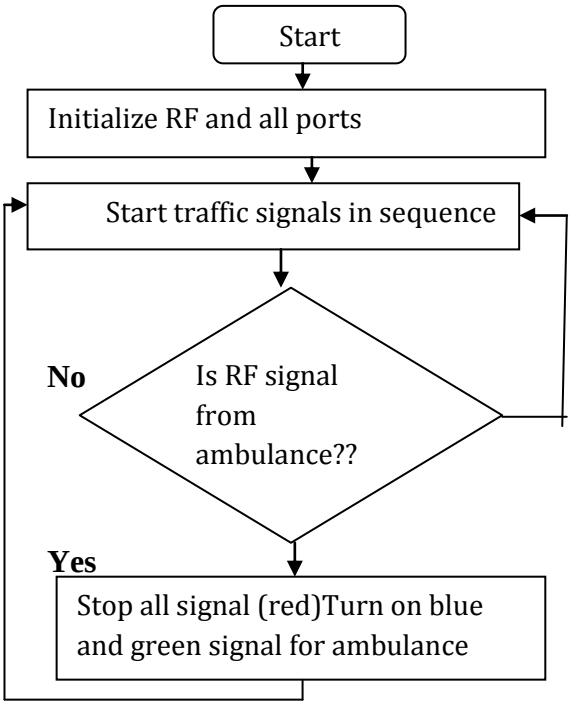
FLOW CHART

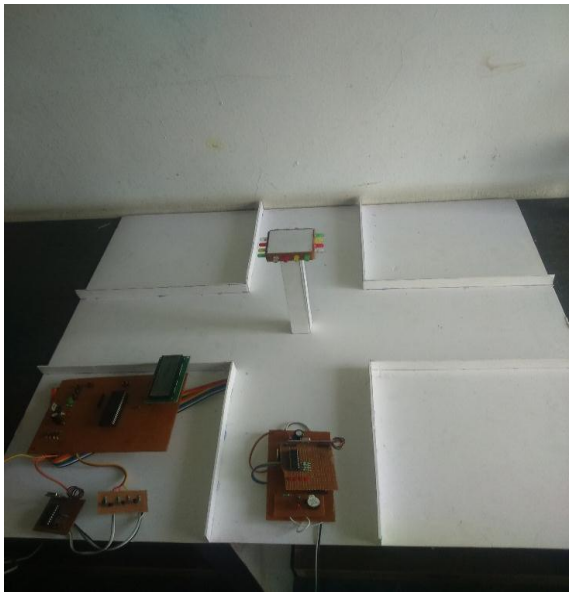
Ambulance section





Traffic signal section





5. CONCLUSIONS

This paper, a system is described which will continuously monitor the patient's health parameters and simultaneously will control the traffic signal. Ambulance service is one of the crucial services that get delayed very often. Also sometimes on-sight doctors are not available. So patient does not get medical attention immediately. This paper describes two systems viz. patient health monitoring system and intelligent traffic control system. In health monitoring system, the patient's vital health parameters such as ECG, Heart Rate and Body Temperature are monitored. This information is sent to the hospital for analysis. In traffic control part, RF transmitter on the ambulance will communicate with the RF receiver mounted on the signal post. An algorithm is designed to control the traffic signals automatically based on the key pressed by the driver from keyboard in the ambulance. The traffic control algorithm considers the current & destination location of the ambulance to control the traffic lights. 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.

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