IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

WIRELESS TRAFFIC CONTROL WITH PATIENT MONITORING AMBULANCE

Patel Vishal N.*, **Patel Jigar J., Surati KomalV., Patelwala Shivangi R.**

Electrical Engineering, Gujarat Technical University, Surat, India.

ABSTRACT

The traffic congestion problems are the phenomenon which contributed huge impact to the transportation system. Ambulance service is always affected by traffic. So many important schedules get delayed due to these traffic jams. To solve this problem we have decided to make "A wireless traffic control system with patient monitoring ambulance". In this, we will collect the patient's health conditions with following parameters such as heart beat, body temperature, pressure etc. This parameters are collect, displayed on LCD and are send to authorized mobile phone using GSM module.

This system is also designed to operate the traffic light, when it receives signals from an emergency vehicle whose signal transmissions are based on radio frequency (RF). According to this project, when patient's parameters exceed the normal values then the sensor will detect the signal and sends it to PIC microcontroller. The microcontroller will send the alert message through the GSM to an authorized mobile number, which will help in providing better facilities to the patient.

Keywords: GSM, Radio frequency, PIC controller, LCD.

INTRODUCTION

This project is mainly divided into three parts. First is to control the traffic signal or to change the traffic light. Second is measured various health parameters of patients. And third is to send that information in hospital. Ambulance service is a service which gets widely affected because of traffic jams. If there is a delay in reaching of ambulance to hospital, a patient may lose his/her life. This is very serious problem in case of heart attack patients. A direct clot removal in heart attack patients becomes possible if the electrocardiogram is analyzed by a cardiologist. This system transmits the ECG at a regular time intervals to the hospital. The ambulance driver will change the traffic signals with help of remote .There are four lanes. Suppose ambulance is coming to the lane 1.So that ambulance driver will sent signal via remote. That signal will receives by a traffic light. If the light is red in colour it will automatically change in green colour. So that ambulance can easily passed away.
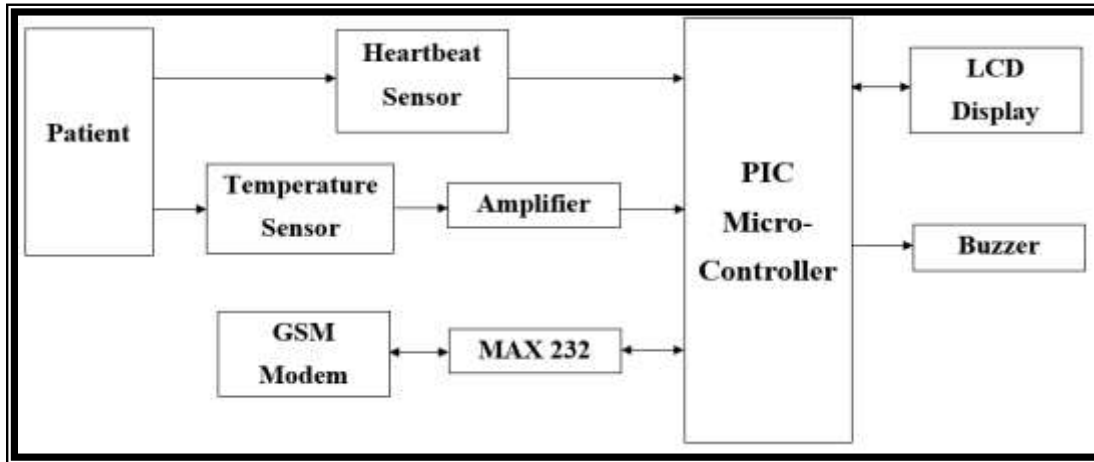
BLOCK DIAGRAM OF AMBULANCE UNIT

Fig 1: Block Diagram of Ambulance of Unit

In this unit using the different sensor such as the temperature sensor, the heart beat sensor, pressure measuring device we will measure the health parameters of the patient being carried in the ambulance. This measured and recorded data will be then sending to the PIC microcontroller and this data will be displayed on the LCD with the patient name as well. While measuring this data if the parameters goes beyond range than buzzer will give a bell and indicating the situation. After being measured this parameters will be send to the authorized person in the hospital so that necessary precautions can be taken in advance and preparations can be made before patients is brought to hospital. so that treatment can be started earlier.
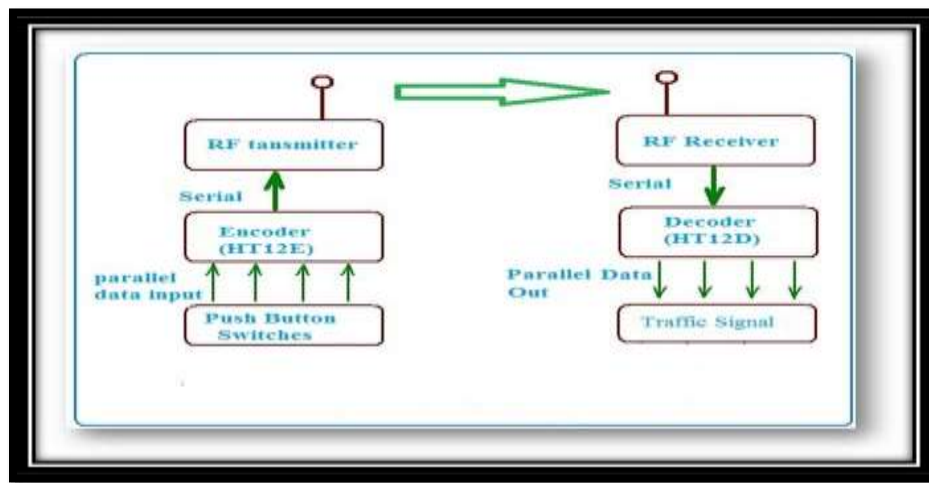
BLOCK DIAGRAM OF TRAFFIC UNIT

Fig 2 block diagram of traffic unit

In this unit traffic signals present on the roads at different places where traffic merge are going to be controlled with help to trans receiver. Here one transmitter will be present from which the signal light will be controlled with help of RF receiver present on the signal poles.

BLOCK DIAGRAM OF HOSPITAL UNIT

One of the receiver units is hospital unit. This unit includes GSM trans-receiver and computer with software installed. In this setup, GSM is used as source of information to hospital from ambulance. GSM is duplex unit and capable of transferring data as well as voice. Parameters of patient measured in ambulance are received by GSM

receiver with delay of 5 sec. These parameters should be displayed on screen, so GSM has accompanied with computer having program which is compatible for storing and displaying received data in appropriate form which is very user friendly. After every 5sec interval, data get updated and displayed on monitor. According to displayed data, appropriate action required can be suggested via message or call
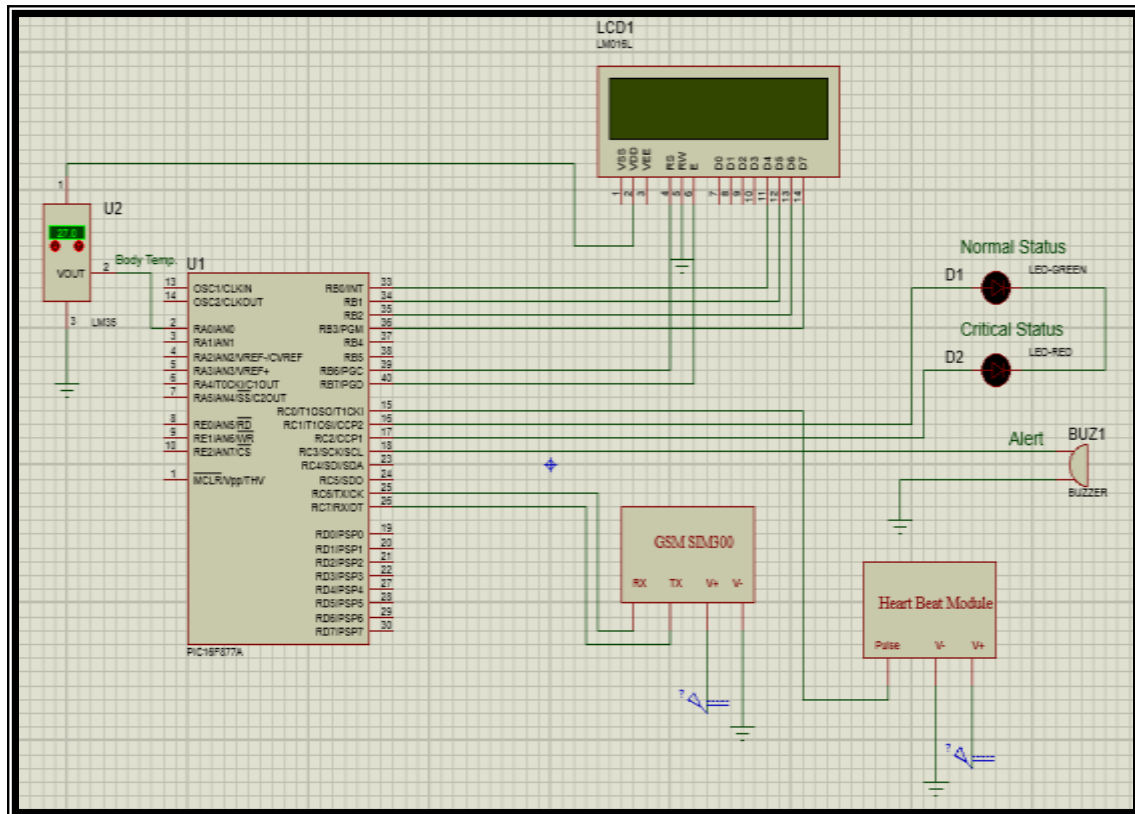
CIRCUIT DIAGRAM

Fig 3 circuit diagram of the ambulance unit

As shown in the figure different components are connected to PIC controller. All components are discussed in detail below:

PIC Microcontroller
PIC microcontrollers (Programmable Interface Controllers) are electronic circuits that can be programmed to carry out a vast range of tasks. They can be programmed to be timers or to control a production line and much more. They are found in most electronic devices such as alarm systems, computer control systems, phones, in fact almost any electronic device.

GSM module
A GSM modem is a specialized type of modem which accepts a SIM card and operates over a subscription to a mobile operator like a mobile phone. GSM modem is wireless modem device that are designed for communication of a computer with the GSM network. It requires a SIM (Subscriber Identity Module) card like mobile phones to activate communication with the network. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM modem can perform the several operations, like
1.   Receive, send or delete SMS messages in a SIM.
2.   Read, add, search phonebook entries of the SIM.
3.   Make, Receive, or reject a voice call.

As shown in fig.1, the modem needs AT commands for interacting with controller, which are communicated through serial communication with use of MAX 232. These commands are sent by the controller. The modem sends back a result after it receives a command. Different AT commands supported by the modem can be sent by the controller to interact with the GSM cellular network.
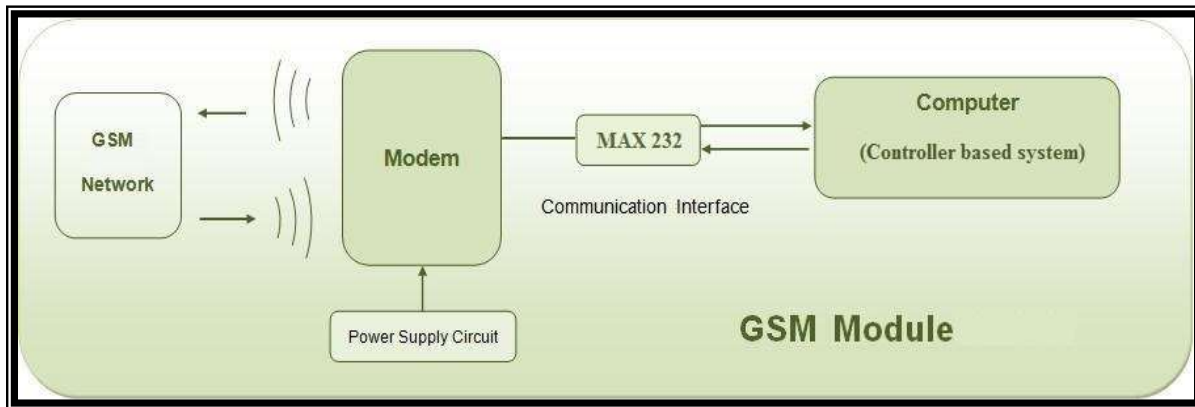

Fig.4 Block Diagram of GSM module

MAX 232

The MAX 232 is trans-receiver that includes a capacitive voltage generator to supply voltage from single 5V supply. Each receiver converts inputs to 5V levels. These receivers have a threshold of 1.3V, hysteresis of 0.5V and can accepts ±30V inputs. Outputs are protected against shorts to ground.

Heartbeat Sensor

The heart beat sensor is designed to give digital output of heart beat when a finger is placed on it. When the heartbeat detector is working, the top-most LED flashes with each heartbeat. This digital output can be connected to PIC controller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

Temperature Sensor (LM35)

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. 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.

SIMULATION RESULTS
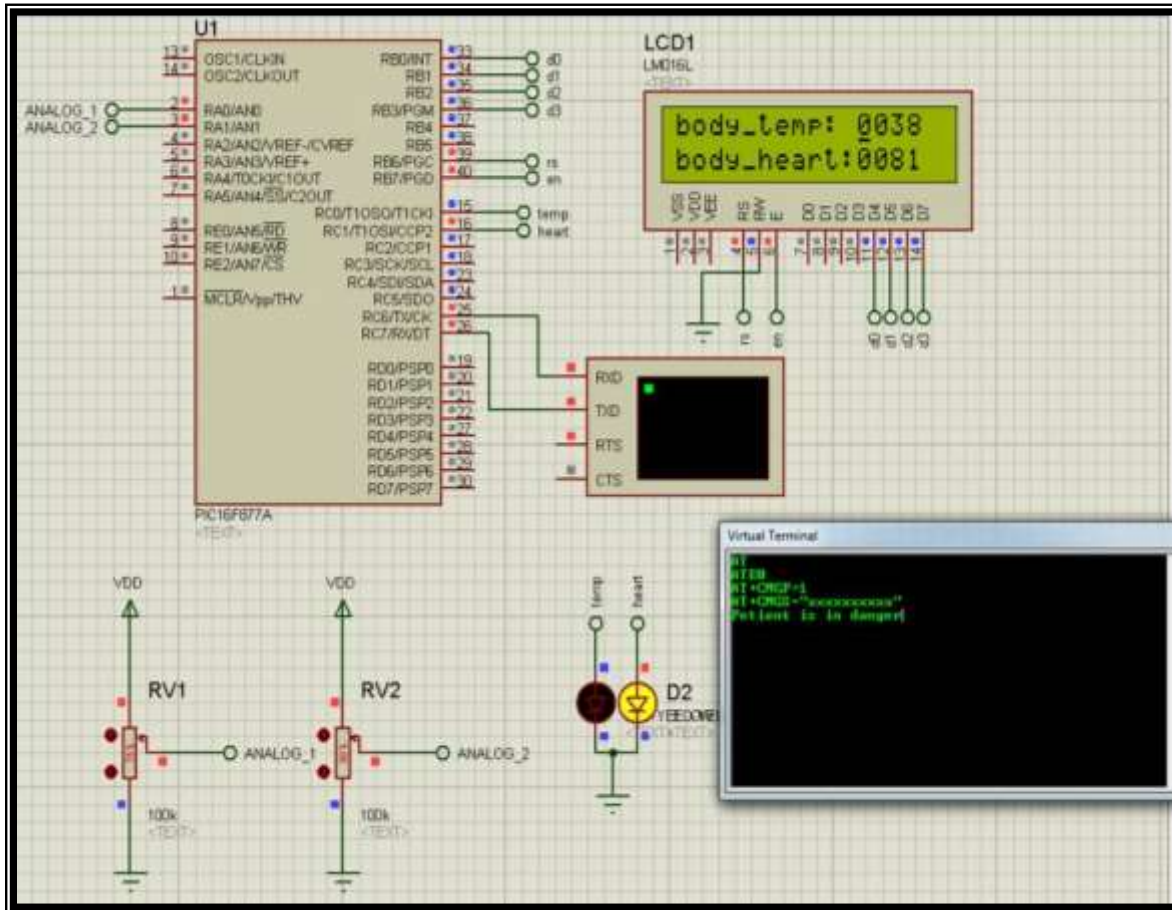
CONCLUSION

It is more accurate with no loss of time. But there may be a delay caused because of GSM messages since it is a queue based technique, which can be reduced by giving more priority to the messages communicated through the controller.

REFERENCES

[1] Suneesh S, Muhammad Mansur P K, Bibin Varghese, Norg Taku, "Intelligent traffi control and patient monitoring for efficient ambulance service", International journal of electrical and electronics research, Vol. 3, Issue 2, April - June 2015.

[2] Ankit Jha, Lalit Kanwar ,Mayur Salonki, Shyam Sundar Joshi, Smt. Sarita Chauhan, "An advance intelligent ambulance with online patient monitoring system", IPASJ International Journal of Electronics and Communication (IIJEC), Volume 3, Issue 4, April 2015.

[3] Prof. Dr. Deepak .B. Kadam, Prof. Vinay .S. Suryawanshi, "Patient Health Care & Ambulance Monitoring System using Controller & Wireless Technology",International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering, ISO 3297:2007 Certified, Vol. 4, September 2016.

[4] Dr. Shantanu K. Dixit, Ashwini A. Joshi, "Design and Implementation of GPS and GSM Based Intelligent Ambulance Monitoring with Patient Health Care", International Journal of Innovative Research & Development, Vol 3, Issue 9, September, 2014.

[5] Ch. Sandeep Kumar Subudhi and S. Sivanandam, "Intelligent Wireless Patient Monitoring and racking System", International Journal of Interdisciplinary and Multidisciplinary Studies, 2014, Vol 1.