

Intelligent Ambulance System

Ms.Shaikh Parvin B.¹ Ms.Shaikh Dilshad I.² Ms.Shinde Shital R.³ Prof.Karambelkar V.S⁴

^{1,2,3,4}Department of Electronic and Telecommunication Engineering
^{1,2,3,4}Bharati Vidyapeeth's college of engineering for women Pune,India

Abstract— Traffic congestion and tidal flow management were recognized as major problems in modern areas, which have caused much uncomfortable for ambulance. Moreover, road accident in the city have been nonstop and to bar the loss of life due to the accidents is even more crucial. To implement this, we introduce a scheme called Intelligent Ambulance System. The main theme behind this scheme is to provide a smooth flow for the ambulance to reach the hospitals in time as well as exact position of ambulance and patient health condition provide to doctor time to time. This scheme is fully automated, thus it controls the traffic lights helping to reach hospital in time and gives data related to patient health helping to ready to operate patient.

Key words: Arm controller lpc2129, Pic controller pic16f877 GSM, GPs module, Biometric sensor(TRCT1000, LM35)

I. INTRODUCTION

There is loss of life due to the delay in the arrival of ambulance to the hospital in the golden hour. This delay is mainly caused by the waiting of the ambulance in the traffic signals. Because of the delay to reach hospital in time there increases risk to save patient. In critical condition one sec-sec is more important for the patients life. Immediate medical attention to critically ill patients followed by transportation to well-equipped medical facility within the golden hour save many lives.

The system monitoring ambulance location using GPRS module and gives contineously updated information to the hospital in personal computer because of that the hospital staff already know how much time taken by ambulance to reach hospital because of that hospital can prepare their staff for treatment of coming patient.

The system also include biomedical sensor to monitor heart bit and temperature of patient and this data is pass through GSM(SMS). Monitoring system in coordinating with the medical personnel of that hospital. Hence there is need for communication between the staff of the ambulance and the monitoring system. The doctor needs to understand the physical and physiological condition of the patient so that the right decision regarding administration drugs.

Monitoring system is base units include the location of the ambulance. The usage separate GSM/GPRS modems, would be required. Hence this system effectively developed that can helpful to acquire physiological data of patient and ambulance location data from a GPS receiver through a mobile smart location.

The system automatically controlling the traffic signals and reduce delay so that the ambulance would able to cross the traffic junctions without waiting .every traffic signal will have a controlling the RF transmitter and RF receiver.

II. PROBLEM STATEMENT

Now a days different physiological data acquisition and transmission system using cellular network and radio communication links, location monitoring system and video

transmission system are also commercially available. System uniquely require transmission of data pertaining to status of patient's heart bit rate, temperature of patient and ambulance location information. System also require control traffic signals to reach in time to the hospitals.

The aim of system is to design intelligent ambulance system based traffic controlling and ambulance monitoring with patient health care system.it includes Traffic controlling system , ambulance system and monitoring system,,

The ambulance system and traffic controlling system has built with ARM7 microcontroller based module. The system can monitor location of ambulance from hospital using GPRS module and send data through GSM. With use of biomedical sensor it is possible to send heart bit rate and temperature of patient to monitoring system during travelling through SMS. data will display on pc at monitoring system. On PC, location of ambulance and status of heart bit rate and temperature of patient displays. After receiving SMS, hospital can prepare their staff for proper treatment of coming patient.

The traffic controlling unit is also built with ARM7 microcontroller based module. The traffic unit control the traffic signals using GPRS module so that the ambulance would able to cross the traffic junctions without waiting .

III. METHODOLOGY

A. Hardware:

Fig 3.1. shows system architecture of proposed system. Ambulance system and monitoring system can monitor location of ambulance. It also includes health care system for monitoring temperature and heart bit rate of patient. Monitoring system has pc uses to display location of ambulance and health care parameters.

Traffic controlling system controls the traffic signal and give path for ambulance so that ambulance pass the traffic junction without waiting.

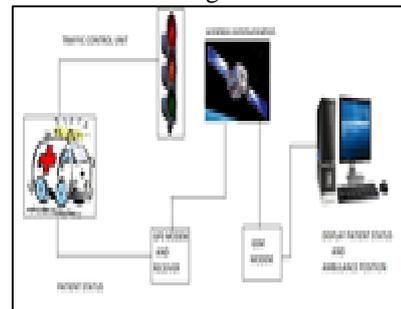


Fig. 3.1: System Architecture

B. Ambulance System:

Fig. 3.2 shows block diagram of proposed Ambulance System. It consists of biomedical sensors, GPS receivers, and GSM modem. The health statuses of patient obtain using a body temp sensor as well as heart rate sensor. This sensor will measure the body temperature and the heart rate of patient and will be stored in microcontroller memory.

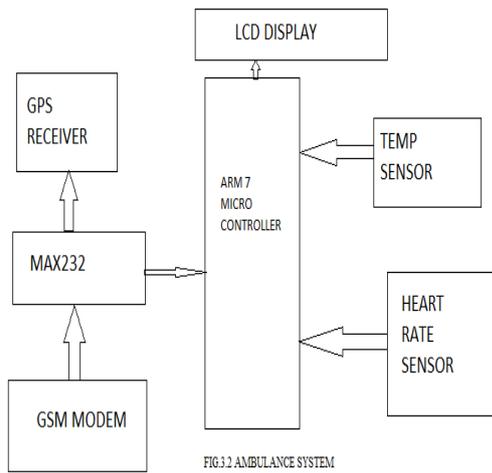


Fig. 3.2: Ambulance System

1) Heartbit Measurement Sensor(TCRT1000):

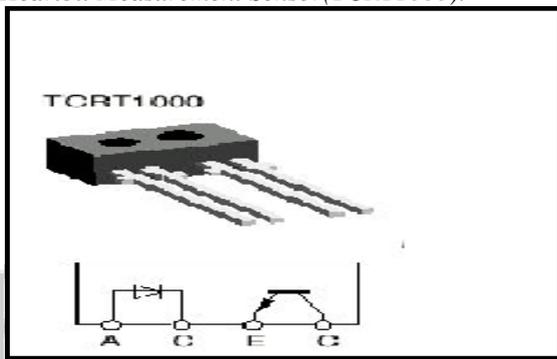


Fig. 3.2.1: Heartbit Measurement

TCRT1000 reflective optical sensor for photo plethysmography. The use of TCRT100 simplifies the build process of the sensor part of the System as both the infrared light emitter diode and the detector are arranged side by side in a leaded package, thus blocking the surrounding ambient light, which could otherwise affect the sensor performance.

2) Temperature Measurement:

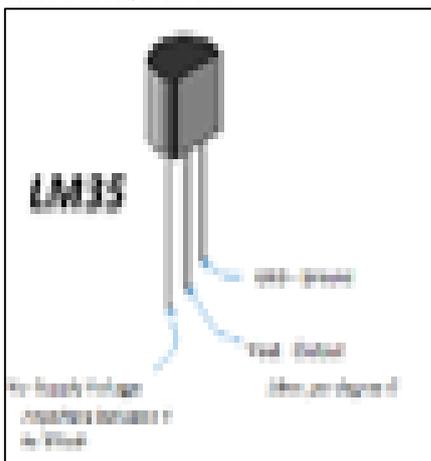


Fig. 3.2.2: Temperature Measurement

The main purpose is to measure temperature change with the range that is limited within a minimum temperature of about - 25°C to a maximum of about 200°C. LM35 temperature sensor converts temperature to electricity by using substances of various physical properties with temperature variation of the sensor. The output voltage of LM35 temperature sensor has a linear relationship with the Celsius temperature. The voltage output is:

$$V_{out_LM35} = 10\text{mV}/^{\circ}\text{C} \times T\ ^{\circ}\text{C} \text{ -----(1)}$$

Where,

V_{out} = output voltage of LM35

$T\ ^{\circ}\text{C}$ = Celsius Temperature

C. Monitoring System

Fig.3.3 shows the monitoring system. It includes microcontroller ARM7. On Personal computer shows the detail of patient like heart beat rate, temperature and Ambulance position.

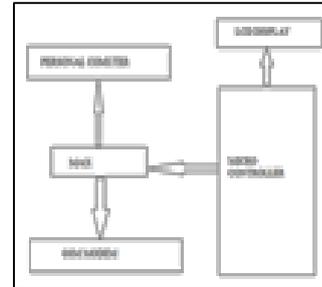


Fig. 3.3: Monitoring System

D. Traffic Control System:

Fig.3.4 shows the traffic control system. It includes PIC controller, LCD display. Traffic controls by using PIC controller so that ambulance would able to cross junction with out waiting. Because of this, there will be less delay in reaching ambulance hospital in time.

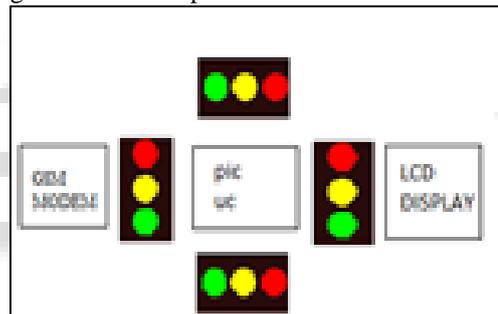


Fig. 3.4: Traffic Control System

IV. FLOW OF SYSTEM

- 1) Start
- 2) Ambulance will take patient
- 3) GPS and GSM module is on
- 4) Scan the nearest hospital
- 5) Ambulance send signal to traffic control(pole) by GPS
- 6) Traffic control clear the path for ambulance
- 7) Simultaneously by using biomedical sensor measure health parameter
- 8) Information about health parameter of patient send to doctor by using gsm module
- 9) At doctor monitor system display information of patient health condition as well as exact position of ambulance and how much time take to reach hospital

V. CONCLUSION

- 1) The system can help to save a few critical minutes of response times by monitoring location of ambulance from hospital.
- 2) This system also includes biomedical sensor which gives heart bit rate, temperature of patient during travelling in ambulance through SMS.
- 3) This system control the traffic signal so that ambulance can pass traffic junction without waiting.
- 4) With this system , there will be less delay in reaching ambulance hospital in time

VI. RESULT

- 1) By using intelligent ambulance system as we providing information about the conditions of patient before reaching the hospital that's why doctor require less time for checking the patient
- 2) Thus we can efficiently control the traffic with better accuracy and lesser human error.
- 3) Application of this system can reduce the traffic congestion and provide a time efficient path for emergency vehicles
- 4) Traffic can be control for every possible situations by giving a predefined set of input data to the processor

VII. FUTURE SCOPE

- 1) This system with further improved and advanced options will help reducing death rates further more.
- 2) The traffic can be controlled and managed well when used in conjunction with traffic police department when ambulance will send signals/information when dispatched from hospital or patient's location to the police department about ambulance routes.

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