SMART AMBULANCE WITH PATIENT MONITORING SYSTEM

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Abstract: Emergency medical response in India is lagging behind other countries. This is partially because of lack of technology implementation at ground zero. To address the issue, we are introducing smart ambulance system. It would take India to competitive position in emergency services around the globe. In this system, we will be using RF technology for traffic light control for Ambulances. And patient monitoring will be done with temperature monitoring, heart beat monitoring, respiration monitoring parameters. If any parameters are varied the information will be sent to the hospital using GSM technology.

Index Terms - **Global System for Mobile (GSM), Wearable Sensors, Health Monitoring**

I. INTRODUCTION

Safety is a necessary part of man's life. Due to the accident cases reported daily on the major roads in all parts of the developed and developing countries, more attention is needed for research in the designing an efficient car driving aiding system. It is expected that if such a device is designed and incorporated into our cars as a road safety device, it will reduce the incidence of accidents on our roads and various premises, with subsequent reduction in loss of life and property.

The Automation for Vehicles is the current trend, the project presented here is one such idea in automating the movements of important vehicle like Ambulance & Fire Fighting Vehicle etc., here the idea is to ease the movement of Ambulance by detecting its proximity to the traffic light, if the traffic light is Red, then automatically it will be turned to Green [6]. In the ambulance any parameters of the patient are varied means, respective information will be sent to hospital using GSM technology [5]

II. LITERATURE SURVEY

Kasim M. Al-Aubidy et al. [1] proposed a monitoring system. The main objective of this research was to design and realization of real-time monitoring and alarming system for patient health, this was done especially for patients suffering from diseases during their normal life. The proposed system had an embedded microcontroller connected to a set of medical sensors and a Bluetooth module. Each patient is considered as a node in a wireless sensor network and connected to a central node installed at the medical center through an internet connection. The embedded microcontroller checks if the patient health status is going well or not by analyzing the scanned medical signals. If the analysis results are abnormal, the embedded unit uses the patient's phone to transmit these signals directly to the medical center. In this case, the doctor will send medical advice to the patient to save his/her life.

Deepesh K Rathore et al. [2] proposed a wireless system which enabled real-time health monitoring of multiple patients. The proposed system monitors the heart rate and other vital signs of the body. The heart rate was measured through a Photoplethysmo graph. A transmitting module was attached which continuously transmited the encoded serial data using Zigbee module. A receiver unit was placed in doctor's room, which receives and decodes the data and continuously displays it on a User interface which is visible on Personal computer. Thus doctor can observe and monitor many patients at the same time. System also continuously monitors the patients data and in case of any irregularities are found in the condition of a patient, the alarm system connected to the system gives an audio-visual warning signal that the patient of a particular room needs immediate attention. In case, the doctor is not in his chamber, the GSM modem connected to the system also sends a message to all the doctors of that unit giving the room number of the patient who needs immediate care.

Malik Tubaishat et al. [3] proposed a system which uses wireless sensor network to decrease vehicles average trip waiting time on the road. They studied the performance of using one sensor and two sensors and designed corresponding controllers. In the case of one sensor we developed two models; a non-occupancy detection and an occupancy detection. Non-occupancy detection detects passing vehicles only whereas, Occupancy detection detects vehicles that pass the sensor or stop at it. In both methods, changing of the sensor location relative to the traffic light's location was done. Then they used two sensors to calculate number of vehicles waiting or approaching a traffic light. In analysing the simulation, they found that the distance between the two sensors does not affect the performance of our design. Hence, placing both the sensors close to each other's produce the best performance in terms of quality of the data and reduce energy consumption which leads to extending the life time of the WSN.

B.Vijayalakshmi et al. [4] proposed a system with Wireless Sensor Networks (WSN) is a significant technology that has a considerable attraction in many areas, particularly in health sector. In this paper a scheme that is Wireless Sensor based Mesh Networks, which is an integration of the above two technologies has been used for monitoring the patients status as follows: The patient's temperature, heart beat and pressure is monitored automatically using a bio-medical kit that is connected with the patient. A LCD is provided with the kit that is used to notify the nurse about the patient's health status. The information is then sent to a mesh node through Zigbee technology. The mesh node is generally a PC that helps the duty doctor to monitor all the wards that are

present in the hospital. This ensures that the patient's health status is monitored even in the absence of the nurse. From the mesh node, a SMS is sent to specified doctors through GSM connection. With the help of the information got through SMS, the doctors can be able to attend the patient very quickly. Since the monitoring is done automatically there is no need for any person to look after the patient.

Mohammad A. Al-Khedher [8] An integrated GPS-GSM system is proposed to track vehicles using Google Earth application. The remote module has a GPS mounted on the moving vehicle to identify its current position, and to be transferred by GSM with other parameters acquired by the automobile's data port as an SMS to a recipient station. The received GPS coordinates are filtered using a Kalman filter to enhance the accuracy of measured position. After data processing. Google Earth application is used to view the current location and status of each vehicle.
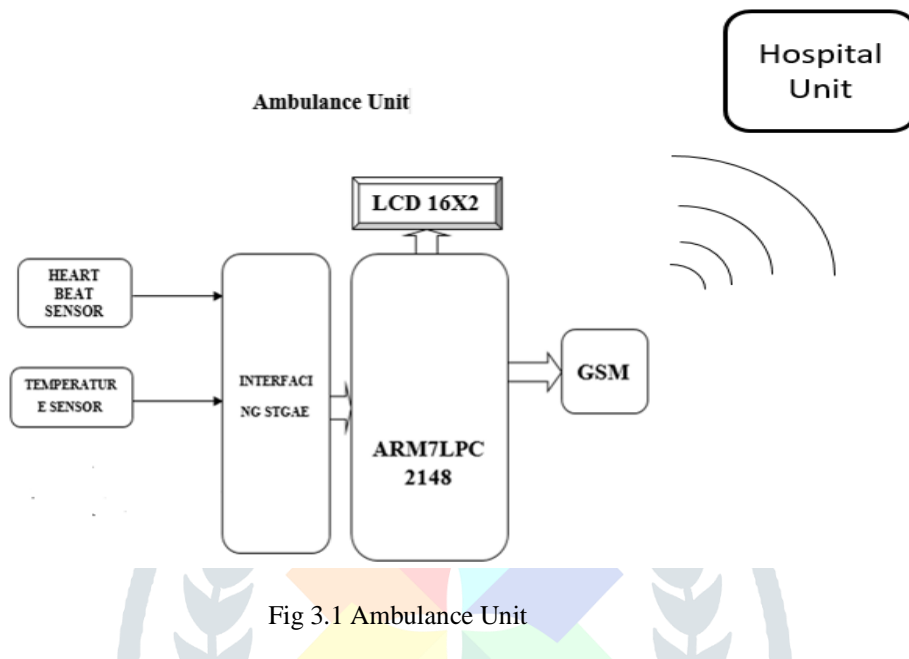
III.   BLOCK DIAGRAM

Fig 3.1 Ambulance Unit
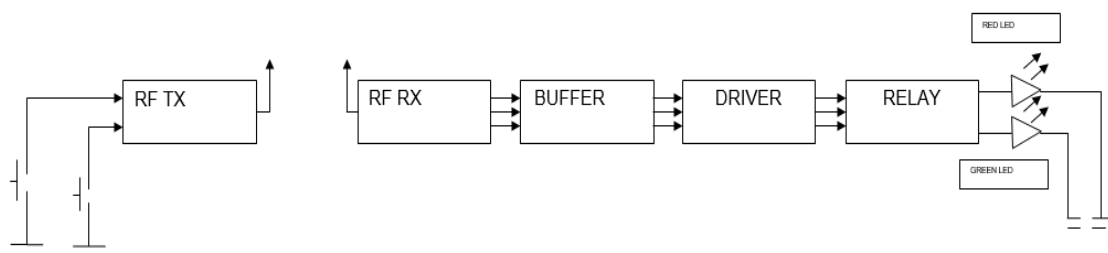
Traffic Control Unit:

Fig 3.2 Traffic Control Unit

IV.WORKING PRINCIPLE

This project is designed to monitor the patient's health with respect to temperature monitoring, heart beat monitoring, respiration monitoring and traffic control by ambulance for ease of move. Whenever the any variation occurs to the measured parameters then that will be detected with respective sensors. There are two units in the system one is Ambulance unknit and the other is Traffic control unit.

4.1 Ambulance Unit

In this unit we have measured the health parameters (Heartbeat, body temperature) of patient who is in ambulance and send this data to hospital unit using GSM module. This is done by using sensors. Here, we are using two sensors Heartbeat sensor for heart pulse measurement and LM35 sensor for body temperature measurement.

These sensors measure data in analog form and given to microcontroller, which converts analog signal to digital signal using inbuilt ADC. The scaling of collected data reading is set by programming codes in microcontroller then displayed on alphanumerical LCD display. In next step, we transmit same data to the hospital unit mobile using GSM module.

4.2 Traffic Control Unit

In traffic controlling system RF TX part is in Ambulance and RF RX part is in traffic signal. When ambulance moving from road the RF TX is in ambulance transmits RF continuously. That RF signal is received by RF RX in the traffic lights then time any red signal is in traffic signal changes to green.
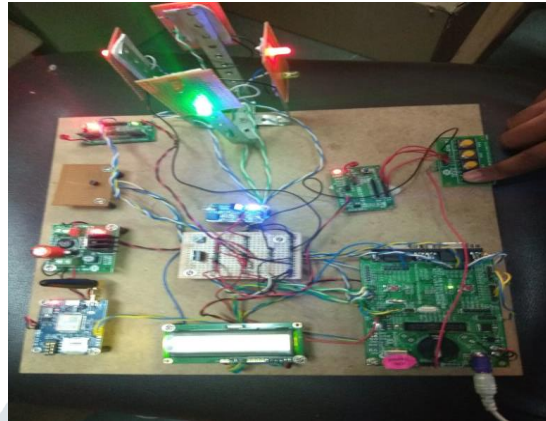

Fig 4.2 Overview of the project design

V.RESULTS DISCUSSIONS

When the ambulance gets struck in the signal and rider selects the switch and presses it the traffic light gets automatically turns into green for specified time interval and the GSM message is sent to the mobile that where the ambulance is detected. The change of traffic light from red to green in the prototype implementation is shown in Fig 5.1
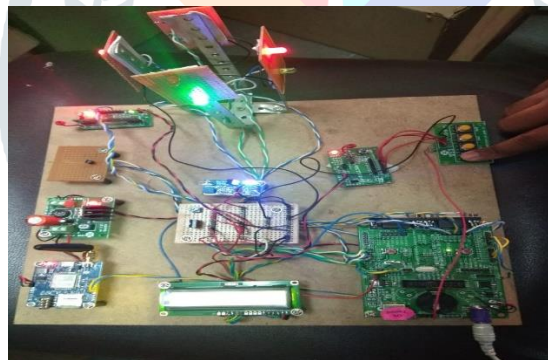

Fig 5.1 Traffic light turned green

Then in the ambulance itself the basic parameters of the patient like heart beat and temperature were measured and the patient's status was sent to the mobile, the screenshot for the same is shown in Fig 5.2.
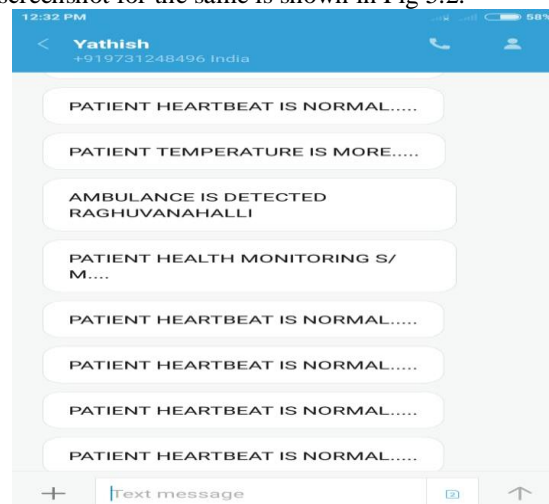

Fig 5.2 Patients Status delivered via GSM Module

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