Wireless Family Health Care Monitoring System

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Abstract— **Intervention of the dedicated system for monitoring patient's health reduces service cost for the hospitals and medical agencies to a great extent. Also timely recording of patient's physical quantities is practically not feasible for the increasing number of patients further reducing the human error. Also doctors can manage time easily, thereby increasing the quality of service and simultaneously get alerted for any emergency kind of service. This project incorporates sensors to measure parameters like body temperature, heart beat rate and Saline level. Wireless Health Care System can be used for analysing the inputs from the patient and any abnormality felt by the patient causes the monitoring system to give an alarm and the SMS to the doctor and concerned authorities. All the parameters selected by the user are recorded to the common computer. This is very useful in future in reviewing patient's health condition.**

Index Terms— **GSM; Zigbee Technology; Health Care; SMS; Wireless Sensors.**

I. INTRODUCTION

The present patient monitor systems in hospitals allow continuous monitoring of patient , which require the sensors , , and confine the patient to hospital bed. Even after connecting the systems to a particular patient, a paramedical assistant is needed to monitor and note down all the parameters of a given patient by keeping track of all of his/her records manually. Adopting such a method is error prone and may lead to disaster in the case of a human error [4]. Health Care Monitoring System can help the residents to examine the parameters even at home using Zigbee technology. This will be useful for medical staff to examine more number of patients in a day. Record of patient can be kept for future use.

Health Care Monitoring Systems can help people by providing healthcare services such as medical monitoring, memory enhancement, medical data access, and communication with the healthcare provider in emergency situation through SMS [1]. In this system, the physical condition of the patient can be monitored directly by other family members and timely treatment can be obtained when an emergency occurs [2]. Family-based healthcare services allow patients full mobility at their homes, where health-care providers can monitor their health data remotely [10].

II. LITERATURE SURVEY

The System uses three different sensors that are Temperature, HeartBeat and Saline level. This system can be used only for admitted patient not for moving patient. At present this system can be helpful to doctor to diagnose the patient through Internet.

According to the World Health Organization (WHO), Cardiac disease is one of the leading causes of death in the developing world and is the leading cause in the developed world [5]. Also this system can be used to measure ECG in hospitals. The Holter Monitor system records electrocardiogram (ECG) on 24-hour basis and currently, this is the most powerful method to detect irregular heart activities during everyday life [3].

III. SYSTEM

Figure1 represents the System Block Diagram. Here patient data like heartbeat, temperature and saline level is observed using sensors.
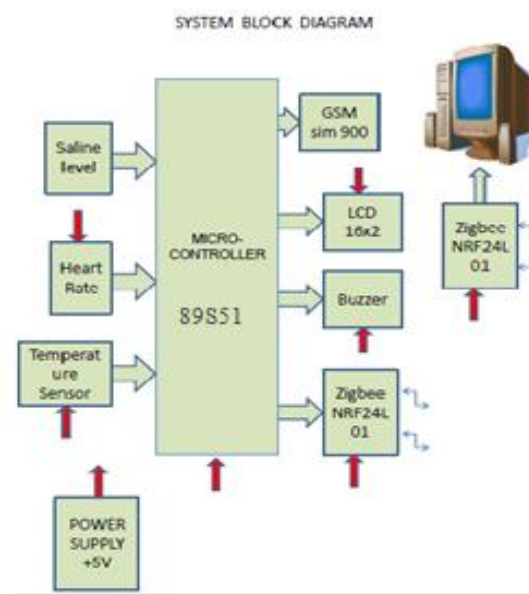

Figure1 System Block Diagram

Wireless Sensors Used are Heart Beat, Temperature and Saline Level.

A. Heart Beat Sensor:

Heart Beat Sensor consists of a simple device will be placed on the finger of the patient which will have one LED and LDR to measure the heartbeat. Heart beat sensor is designed to give digital output of heat beat when a finger is placed inside it [6]. Normal heartbeat of patient is 72 beats per min. We are going to set the level as 95 as upper level and 35 as lower level. Whenever heartbeat reaches above level SMS will be sent to the doctor and also buzzer sound will be heard. The Patient's heartbeat reading will be wirelessly transmitted to the control section through Zigbee. It uses LM358 IC which is an OPAMP used as a comparator.

Features of LM358 IC:

- ➢ Very Low Supply Current/OP (500microAmperes).
- ➢ Low input bias current is 20nanoAmperes.
- ➢ Low input offset voltage is 2milliVolts.
- ➢ Low input offset current is 2nanoAmperes.

B. Temperature Sensor:
Temperature sensor uses LM35 IC. We are going to set a threshold level and whenever temperature crosses that level the doctor will be informed immediately. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified [7]. The LM35 sensor 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 to +150°C temperature range [8].

C. Saline Level Sensor:
Saline Level Sensor also uses a saline probe. Level will be marked on the saline bottle. When the level reduces the doctor will be informed.

D. GSM Modem:
GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique mobile number [9]. **GSM 900** modem uses a set of AT commands. These commands are defined in GSM Standards. We can do things like:

- • Messages can be written, read and deleted.
- • Sending SMS.
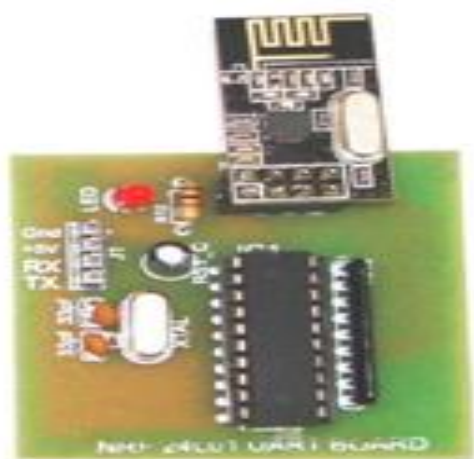- • Monitoring charging level of battery.

E. Zigbee:

Figure 2 NRF24L01 (Zigbee) Module
Features:

- ➢ NRF24L01 RF Module is a transreceiver module.
- ➢ Data transmission rate is at 9600 baud.
- ➢ It works in half duplex mode as it can transmit as and receive simultaneously.
- ➢ Auto re-transmits if no authentication.
- ➢ Input Voltage is 5Volts Direct Current.
- ➢ Range is 30 Meters.

F. LCD:
LCD 16 X 2 is used to display the information from the patient. It will display two parameters at a time and it will toggle the parameter depending upon the requirement.

G. Buzzer:
Buzzer is also used to intimate the doctor about the health of the patient. A transistor is placed in series with the buzzer. It will give maximum sound when connected to the supply.

H. Computer:
Computer is used for displaying the parameters of a patient.

I. Microcontroller 89S51:
- • The AT89S51 is a low-power reprogrammable microcontroller.
- • Atmel AT89S51 is a microcontroller with a highly-flexible and cost-effective solution to many embedded control applications.
- • The AT89S51 provides the features like 4K bytes of Flash, 128 bytes of RAM, 32 Input and Output lines, two data pointers.
- • The AT89S51 has a static logic for operation down to zero frequency and supports two software selectable power saving modes.

MODES:
The Idle Mode stops the CPU and allows the RAM, timer/counters, serial port, and interrupts system to continue functioning.
The Power-down mode saves the contents of RAM but freezes the oscillator, disabling all other chip functions until the next external interrupt or hardware reset.

IV. WORKING

The input to the microcontroller is through patient. Whenever there is abnormality seen in the patient the message will be given to appointed mobile phone through GSM Modem and it will be given to the Zigbee Module and then the message will also be displayed on the LCD an also on Computer. HeartBeat in Pulse, Temperature in Centigrade and Saline level in terms of level is measured.

V. FUTURE SCOPE

This system can be improved by adding more applications like Blood Pressure and Dental Sensors making it more efficient.

VI. CONCLUSION

This paper is an approach of how to design and implement a Microcontroller based system. This system is stable and can be used at home. This System can be used by all residents of the society so it is of family use.

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