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Cardiac Patient Monitoring System with Medicine Reminder

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ABSTRACT- Cardiac patient monitoring system can be implemented in hospitals or useful for aged people or cardiac patient to constantly monitor their physiological parameters for example, if a aged persons such as blood pressure, pulse rate, temperature changes/ increases and person becomes unconscious, message will be given to a professional person (Doctor) through wireless medium using GSM. This paper presents, a monitoring system that has the capability to monitor different parameters as discussed above from various body parts. In this system the medium through which we are sending message to physician is wireless by using GSM. The main advantage of this system is that it can enhance the patients safety of life by monitoring continuous physical conditions of patient. The system is developed for home use by patients that are not in a critical condition but need to be constant or periodically monitored by clinician or family. In any critical condition the SMS is send to the doctor or any family member. So that we can easily save many lives by providing them quick service.

KEYWORDS: Patient, GSM, Temperature, BP, Pulse rate.

I. INTRODUCTION

In recent times, the expenses for hospitalization and medical care are unimaginably high and expensive. Hence the health policies in countries like USA, UK has shifted its focus from providing reactive, acute care to provide preventive care outside the hospital.

We are developing a system in which system checks the health parameters of the patient which plays key role in detecting an event where he/she may get cardiac arrest. The detection is done at very early stage so that patient gets service and treatment before the actual tragedy happens.

System measures the parameters and pass them through pre-defined algorithm to verify the pre-cardiac condition if condition found true the system then send SMS to relative number or/and ambulance stored in system. In normal mode system also keeps eye on time and gives reminder about medicine to the patient through local display and vibrator motor.

II. LITERATURE SURVEY

M.P.Nirmala, RampriyaMahendran from her mentioned paper The development of biomedical engineering is responsible for improving healthcare diagnosis, monitoring and therapy[2]. V.Ramya, B.Palaniappan, AnuradhaKumari from her mentioned paper Thepaper is implemented with microchip PIC16F877A micro controller, and sensors were used to sense the temperature and drip status. The ADCON0 register controls the operations of the A/D module. The ADCON1 register configures the function of the port pins[1].JaieeSitaramAdivarekar, AmishaDilipChordiafrom his mentioned paper Recently, the health care sensors are playing vital role in hospitals. The patient monitoring systems is one of the major improvements because of its advanced technology[5].Amna Abdullah, Asma Ismael, Aisha Rashid

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from his mentioned paper The patient's temperature, heart beat rate, muscles, blood pressure, bloodglucose level, and ECG data are monitored, displayed, and stored by our system[3].

III. SYSTEM DESIGN

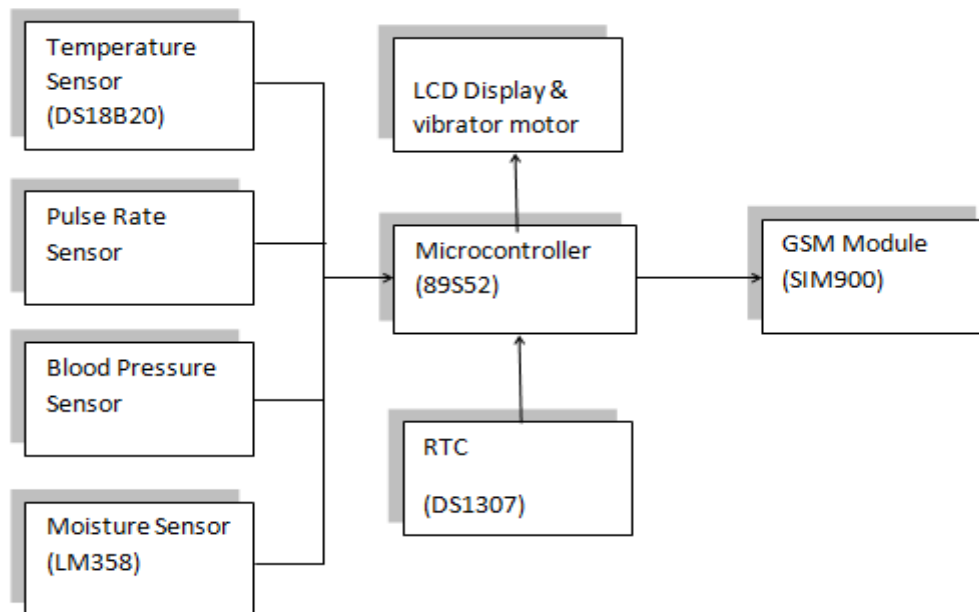


Fig. Architecture of System

In this system different input devices are used to sense the different body parameters. Sensors such as DS18B20 a temperature sensor with some special features like Internally Frequency Compensated for Unity Gain, Large DC Voltage Gain: 100 dB, Low Input Offset Voltage: 2 mV, Wide Power Supply Range: Single Supply: 3V to 32V Or Dual Supplies: $\pm 1.5V$ to $\pm 16V$. Advantages: Two Internally Compensated Op Amps , Eliminates Need for Dual Supplies, Allows Direct Sensing Near GND and VOUT, Compatible with All Forms of Logic, Power Drain Suitable for Battery Operation.

Moisture sensor is used to sense the moisture of the body i.e. whether the patients body is sweating or not which is one of the symptoms of cardiac patient.

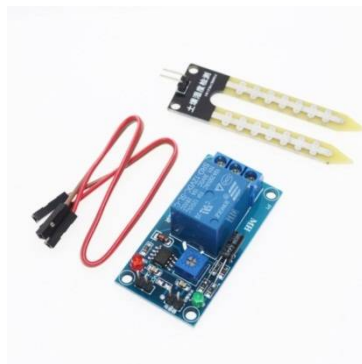


Image 1 :Moisture sensor

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Another sensor which we have used is Sunrom Blood Pressure sensor along with pulse rate sensor combined. With features such as Intelligent automatic compression and decompression, Easy to operate, switching button to start measuring, 60 store groups memory measurements, Can read single or all measures, Fully Automatic, Clinical Accuracy, High-accuracy.



Image 2 BP sensor

Also we have used GSM sim900 for communication purpose. SIM900A features - GPRS multi-slot class 10/8, GPRS mobile station class B, Compliant to GSM phase 2/2+, Class 4 (2 W @850/ 900 MHz), Class 1 (1 W @ 1800/1900MHz), Dimensions: 24 x 24 x 3mm (Modem Only), Control via AT commands (GSM 07.07 ,07.05 and SIMCOM enhanced AT Commands).



Image 3. GSM Module

LCD is use to display the readings of mentioned sensors and act as output device. It is a 16*2 LCD with 16 pins interfaced with 89S52 microcontroller. The 89S52 microcontroller functions as per the programming in keil software. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. Commands such as 0x30, 0x38, 0x08, 0x0C etc are used.

To convert the analog output of sensors into digital output ADC0804 is used. The ADC0801, ADC0802, ADC0803, ADC0804 are different series of ADC. Features - Compatible With 8080- μ P Derivatives – No Interfacing Logic Needed – Access Time 135 ns, Easy Interface to All Microprocessors, or Operates as a Stand-Alone Deivce, Differential Analog Voltage Inputs, Works With 2.5-V (LM336) Voltage Reference, On-Chip Clock Generator.

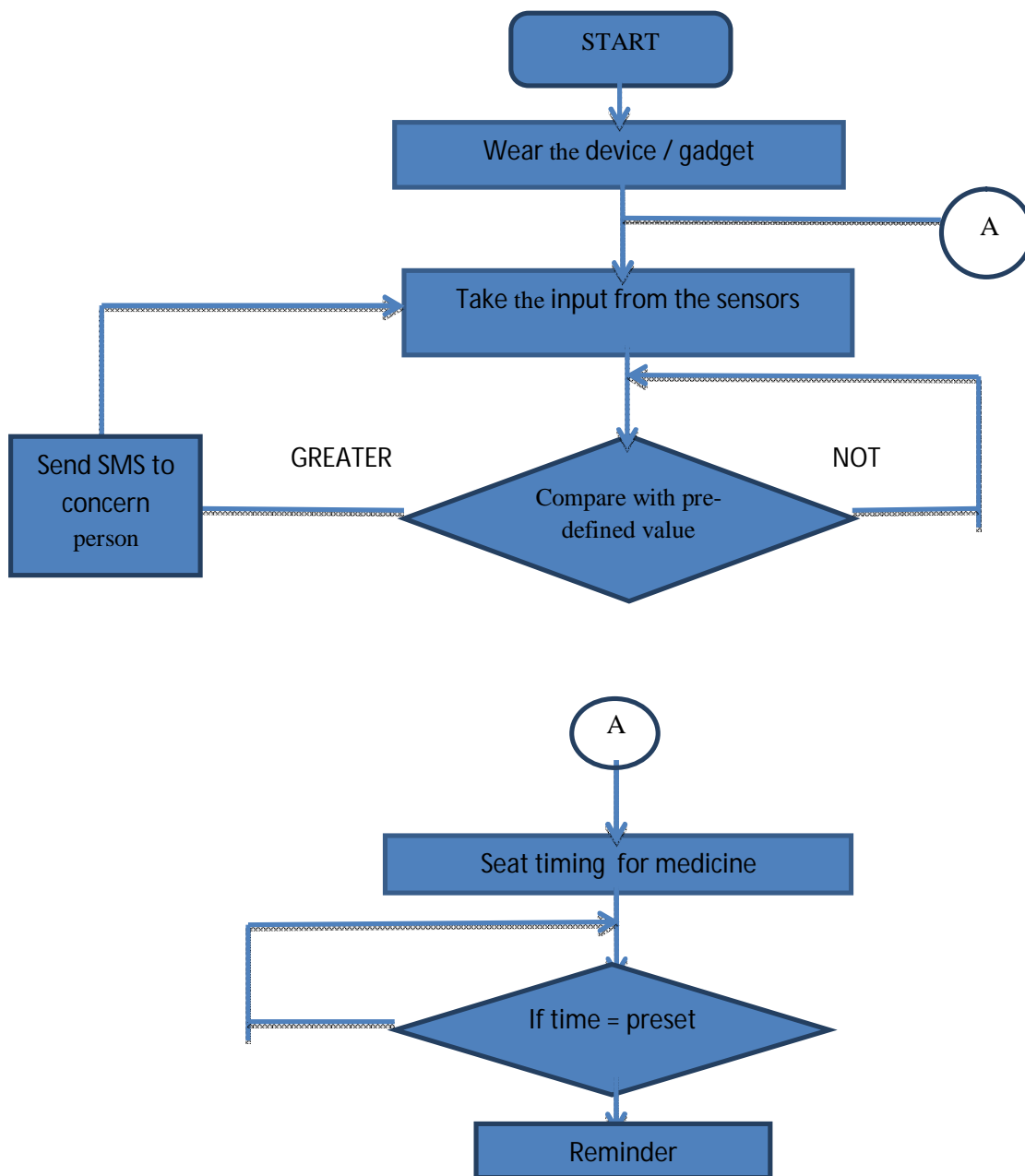
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IV. WORKING



When the system is turned ON it will continuously read the different body parameters of the patient and also keeps an eye on time to give medicine reminder. To give the medicine reminder we are using RTC (DS1307). The system checks the different parameters especially the temperature and sweating of the patient and as the temperature increases above a cut-off value it will automatically start measuring the Blood pressure and the pulse rate of the patient for which

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we have used sunroom BP sensor which also includes pulse rate sensor in it. All the parameters will get display on the LCD which is easily understood by the patient due to its digital output. All the sensors are acting as a input to the device whose output is given to ADC as the signal from sensors are in analog form i.e electrical signal which will get converted to digital signal by ADC0804. This ADC is interfaced with microcontroller 89S52 and then the signal is further passed to LCD to get digital output. GSM sim900 is use for the communication purpose which will send the message to the concerned persons.

V. RESULTS

Here are the results of our designed system. When the system is turned ON, firstly it will display the name of our system and then the readings of the sensors will start getting displayed on the LCD screen as shown in image.4



Image.4 Display

We have used RTC i.e. Real Time Clock which will give the medicine reminder on the set time. In our system the time for medicine reminder is set for morning and evening, this will get display on the LCD screen as "MORNING MEDICINE" or "EVENING MEDICINE" shown in the Image 5 below.



Image 5. Medicine Reminder

The next thing which will get display on the LCD screen is the different body parameters of the patient, though the medicine reminder will get display on the set time. The temperature will continuously get display. Temperature sensor DS18B20 is acting as a input to the microcontroller interfaced with 16*2 LCD to get the digital output to be displayed on the screen as shown in image.6

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Image 6. Temperature & Sweating display

As the temperature crosses the cut-off level and the body starts sweating, the system will start reading blood pressure and pulse rate of the patient. And it will get displayed on the LCD as shown in image.7



Image 7. Reading Blood Pressure & pulse-rate

The message “NEEDING EMERGENCY MEDICAL HELP” with blood pressure readings is send to the concerned person using GSM as shown in image.9

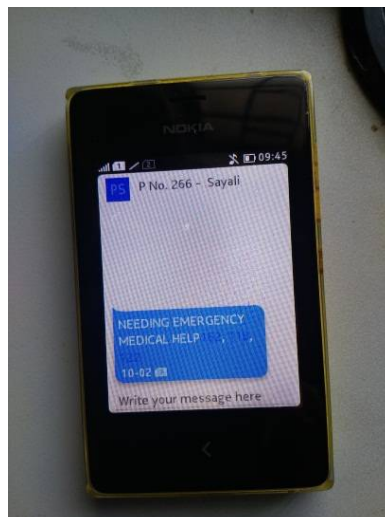


Image 9. Sends SMS to concern person

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VI. FUTURE SCOPE

Message through server – the message can be given to all the concerned person.



MERITS

- Real time monitoring
- Precision detection
- Instant alert, thus helpful for life saving

VII. CONCLUSION

A wireless communication medium has been used in our system to provide the emergency medical help especially to the cardiac patients. In this paper we have designed a system which will continuously monitor the different body parameters of the patient. The system consists of four different sensors to sense the parameters and to give the output accordingly, also GSM is used for transmission of patients' present health conditions along with the message indicating the need for emergency help when the patient becomes unconscious.

Also we have medicine reminder using RTC. All the programming is done in the Keil and Proteus. In terms of accuracy, portability, energy consumption we have found our system better than other systems available in the market now-a-days.

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