

# GSM based Health Care Monitoring System

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**Abstract:** Health care monitoring system nowadays requires instant sensing, precision predictions and of immediate response with medication which contains sensing modules to measure parameters like temperature of body, beat rate of heart, sweat rate and transfer it to the computer so that health condition of a patient can be analyzed remotely. Thus, it reduces the doctor's workload and also gives accurate results. Further this system uses GSM technology which enables the monitoring of all parameters on the mobile phone. The inputs are analysed through micro controller platform from the patient and any abnormality felt by the patient causes the monitoring system to send a message to the respected caretaker. These are the essential data for the future analysis and review of patient's health condition. This may be added with additional features like monitoring pressure of blood modules, dental screening modules etc. so as to make this a very real time application oriented device. This will enhance the another stepping stone towards patient care systems

**Keywords:** GSM module, health care monitoring, Heart beat sensor, GSR sensor, Photo Phlethysmography.

## I. INTRODUCTION

The technologies of information and communication can be used here so that the data can be exchanged every where and also every time when ever the requirement is needed. The event of technologies for health has much enhanced within the last years, particularly within the field of health and health care. The shrinking of the devices is important to supply mobility of the systems for the acquisition and elaboration of important signals. Shrinking and mobility ends up in power consumption issues. For that reason, a lightweight and low-power system could be a real would like for applications during this field. A potential resolution is to develop a system for getting and analysing very important signals exploiting smart phone devices.

## II. PROPOSED SYSTEM

In this proposed system, changing the parameter values manually and if the maximum limit reaches, it intimates by either using alarm or through SMS so that we can enhance the performance of doctors in the hospital and also the patient could be treated timely and save their life.

Wireless telemedicine, additionally mentioned as mobile health, that capitalizes on advances of wireless technologies to deliver health care and exchange medical data anyplace and anytime, overcomes most of geographical, temporal and even structure barriers to facilitate remote diagnosis, observance, transfer of medical data and records.

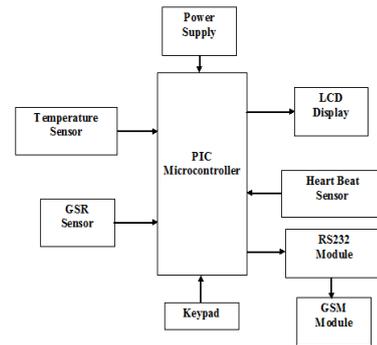


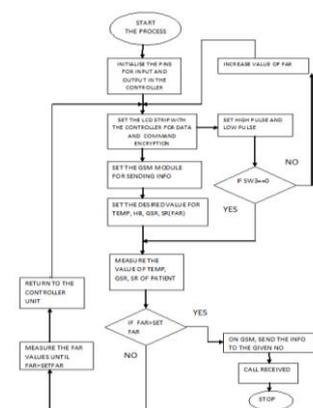
Fig.1 Block Diagram Of Proposed System

The proposed system has a PIC micro controller based wireless technology as that of Fig.1 and utilises the GSM technology and sensors to monitor and real time observations of patient's body parameters, transmits medical data, alerts the care takers and most of all, the recording system can be incorporated to have a thorough history of health records.

## III. SENSOR MONITORING SYSTEM

### A. Heartbeat Measurement

Conventional: Every person's right side wrist and neck are the two locations where the beat rate of heart can be measured. This method uses the ideology of placing the index finger and middle finger on the wrist. This also may be done in neck below the windpipe and counting the number of pulses for 30 seconds. This pulses then multiplied with two will give the beat rate. The readings will be closer if pressure is applied as minimum. In this condition, the fingers also made to go 'to and fro' till the feeling of pulse is observed. Using Sensors: The sensor technology utilizes the principle that when light is disturbed which flows in blood path. This will stimulate the heart rate to be changed. This difference are measured



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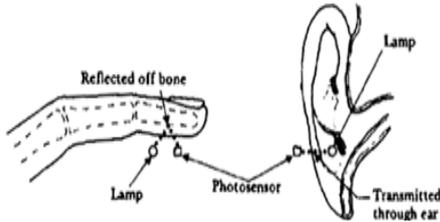
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## B. Heartbeat Sensor Principle

This is done by the technological term called as 'Photo Plethysmography'. When light passes through the organ in a body, the intensity interprets with its condition. The volume of blood varies with the light intensity. The heart pulses decides the blood volume flow. These signals are due to heart beat rate

## C. Photo Phlethysmography



**Fig.2 Photo Phlethysmography**

Any region of the body may be used for transmission of light which can be emitted by a light emitting methods. For example, a region like earlobe. Such types of regions are considered under this technology.

## D. Heartbeat Sensing

A detector and a light emitting device are the essential elements of sensing the heart beat. When a tissue is illuminated with the light source, i.e. light is transmitted or reflected in the tissue. Here, blood absorbs a portion of light. Then the remained transmitted light or reflected light is with the absorbtion of the detector in the circuit.

The volume in the blood determines the amount of light received in the particular body region. The detector output is in form of electrical signal and is proportional to the heart beat rate.

AC signals are synchronous with the rate of the heart. The DC signal is related with the tissues and the volume of blood. The AC signals are due to the changes in volume of blood in arterial which is super imposed on the previous DC signal. Thus the major requirement is to isolate that AC component as it is of prime importance.

## E. Working Of A Temperature Sensor

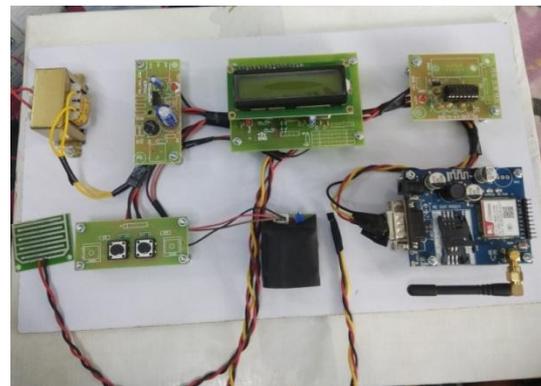
The temperature sensor is used is LM35 IC which uses approximately +5VDC power. The IC has just 3 pins, 2 for the power supply and one for the analog output. The temperature in centigrade will be given by the output pin of this IC. Pin 2 gives an output of 1 millivolt per 0.1°C (10mV per degree). For finding out or calculating the degree value, if we divide the value given by the output pin by 0.01, we can get the temperature in degree celcius value. If the output pin value is 205mV or 0.205 volts, then the temperature in deg celcius is 20.50C. For converting this Celsius value into Fahrenheit is calculated with precise mathematical equation. By writing proper codes with reference to this and upload it to a PIC to convert this Celsius temperature into Fahrenheit.

## F. Skin Response

Emotion makes a very drastic significance in body condition especially in the skin conductance. The mood of a human being wether he is in happy mood or threatened

mood affects skin tissues. This is termed as Galvanic Skin Response. This is in other ways termed as Electro dermal activity or skin conductance. The emotions results in sweat of a skin. This will be in highest order in the foot and hand regions. Skin conductance is not under conscious control. Instead, it is driven in activity based behaviour of humans and their patterns. This is done without awareness of human mind. Skin conductance, as illustrated gives when identified by some means, the direct insights into autonomous emotional periodicals. This important parameter is very importance in sensing the heart failure at "earliest stage" by sweating of skin

## IV. PROPOSED SYSTEM OPERATION



**Fig.3 Hardware Model of Proposed System**

Initially the three different sensors includes temperature, heartbeat sensor, GSR the body condition of the humans and sends message to the doctors or caretakers to monitor the patient's health.

We can monitor them by analyzing the parameters received from the sensor through computer and do the necessary immediate action to the patients which reduces the workload of doctors. It consist of transmitting unit and receiving unit.

The transmitting unit is placed near the patient and receiving unit is placed near the doctors. The microcontroller gains the parameter values from sensor in form of voltage and it compares with predefined value. If it not matches, the receiver unit will receives the signal and it intimates through alarm .Then the patient could be easily treat according to his body condition.

In the system, various call forward options, barring options of incoming calls or going out calls. This is also done when travelling in another country. Several add ons can be added as multiple channels, identification of a call, conference proceedings through phone etc. The conversations can be made to record for flexible recalling the data for the requirements and analysis purpose.

## V. RESULTS AND ANALYSIS

### A. Temperature Sensor

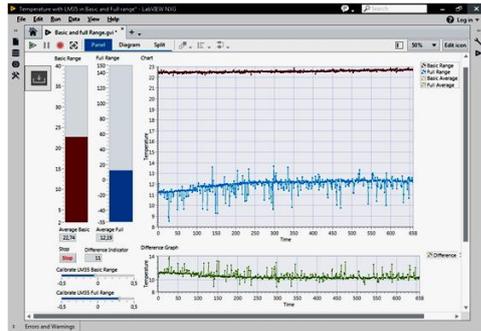


Fig.4 LM35 Calibration Ranges In Labview

The LM35 temperature sensor and other sensors parameters can be analysed and simulated with the softwares like LabVIEW for different values of the parameters and their performance can also be predicted before real time establishments. Fig.4 shows calibrating the LM35 to the basic range used in the system to the full range in the system using LabVIEW software. Likewise, other parameters also can be experimented and the simulation results can be viewed for analysis of approximation Since there is no variations in the temperature the PIC controller will not give any message or the signal call to the GSM module. If there is a variation in the temperature as proposed in the program then there will be a call and the message production is done

### B. Heart Rate Sensor

Since there is no variations in the heart beat the PIC controller will not give any message or the signal call to the GSM module.

If there is a variation in the heart beat as proposed in the program then there will be a call and the message production is done for dealing with illness.

### C. Gsr Sensor

When there is an abnormal condition the patient may press the emergency button and once this is done the emergency signal is displayed in the display and the communication is given to the nearby health center.

## VI. CONCLUSION

The proposed system enables to evaluate the performance of the doctors in the hospital and also the patient can be treated truly and save their life. From this proposed system, the love fit of making the patient towards the awareness of healthy life style is also initiated. By incorporating the blood pressure sensor and dental care monitoring systems the progression of the system is upgraded in the future for the health monitoring system. By proper precise experiments, they system may be incorporated into real time environment in the hospital which may save lives for several patients. The quick, accuracy and real time methodologies can be imposed to the proposed system to make this system into more efficient. The cost reduction also one of the main key factor focus to adopt this system to all levels of patients irrespective of their level of diseases.

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