

IOT based Real Time Patient Health Monitoring System

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Abstract - In today's tautness life, individuals face multiple physical, physiological, and psychological issues. Recent analysis in omnipresent computing uses technologies of Body area networks to observe the person's mechanics and physiological parameters. In this project work we have tendency to propose a true time mobile health system for observing patients from indoor or out of door atmosphere. The continuous viewing of the integrals can be done on LCD screen wherever as remote users (Family or medical personnel) would receive a warning message if the vitals crosses the threshold values. The message would contain the patient's vitals and dynamic link to that location on their cell phones. Wireless Sensor Network technology is one of the main analysis area in Computer Science (CS) and in the healthcare industry. The motive of this project is to produce a photograph of current developments and analysis on wearable gadgets for continuous observation of health attributes with emphasis on pulse rate, temperature and circulatory observation. These are expected to bring a great change in health care services in the home and workplace as well as in hospitals and nursing homes

Key Words: Heartbeat, Temperature, Arduino, GPS, GSM

1. INTRODUCTION

A person's health is the most important thing in his life, but as a human being, we tend to neglect it to a great extent. To regularly observe the health of a patient, is not an easy task, even for medical staff. Monitoring the patient health remotely from a distance is not possible if the doctor or nurse is not present at the time. This may cause additional workload to them as they tend to take care of many patients at a time. A real time health monitoring system which would be able to monitor the temperature and heartbeat of the patient and with the help of it, anyone would be able to check it and the vitals.

The project is divided into 4 categories:-

- 1.1 The vitals are measured from the patient and transmitted
- 1.2 Processing and conversion to digital form
- 1.3 Decision making algorithm which would be used to compare the values of patient's vitals to set values.

1.4 Transmission of parameters to the person's contact.

Health Monitoring System is a compact device to observe the health of the patient. Vitals like Temperature and Heart Beat of the patient will be observed by the device and be wirelessly transmitted. The device would be able to alert the patient's emergency contact if the vitals go beyond the set limit by a message through GSM module. In the modern times that we are living, technology advancement has played a vital role in the life of every human being. The use of advanced technology in the form of compact devices to sense some serious problem in the health infrastructure of a human being so that help can be provided in appropriate time. In times of emergency, a message would be sent to the person's emergency contact even if he/she is in a remote location or travelling at anyplace. If the body temperature or heart beat rises or go below the ideal vitals parameter then the algorithm would be activated automatically and a trigger response would be generated in the microcontroller. The message would be in pre-defined format including the location, BPM and temperature of the patient.

2. LITERATURE SURVEY

2.1 Existing System

In the current existing approach there are number of Health Monitoring System available for the ICU patient. Most of the system available in the wards have cable connection approach in which the instruments are connected with wires to each other. The systems are humongous in size. If the patient gets discharged from the hospital, then the observation of them is not viable. Regular transmission of data is also not viable in the existing system.

2.2 Proposed System

The proposed system consists of small sensors and boards which are capable of regularly monitoring the data like the vital parameters of patient. The system proposed in this paper is able to observe the data regularly and that too in any available area. The proposed system is able to fetch the location along with the vitals of the patient if they go above

the ideal values as stated by the expert doctors. The proposed system is also able to alert the patient’s emergency contact

3. Technology Used

The technologies used here are as follows:

1. Easy pulse sensor
2. Temperature sensor
3. Microcontroller
4. GSM
5. GPS
6. LCD Display

3.1. Easy Pulse Sensor

Pulse of a person is the easiest way to check anyone’s heartbeat. Heartbeat is directly linked with an individual’s cardiovascular health. The pulse sensor that we are using in the project is a sensor that detects pulse by the principle of photo plethysmography to senses the heart beat from the fingertip. Arduino board pick up the output which is transferred to PC through serial interface. A code is written in PC to display the received PPG signal and pulse.

3.2. Temperature Sensor

This sensor allows the device to measure temperature. The temperature of a human being is also linked to health. Certain Diseases can also be monitored by measuring the temperature.

3.3. Microcontroller

Microcontroller is a small computer on one silicon chip containing a processor, memory, and programmable input/output peripherals. Microcontrollers are used to design embedded system.

3.3.1. Arduino board

Arduino senses the outer-environment by getting input from a group of sensors. The microcontroller on the board can be programmed by Arduino programing language. At a conceptual level, when using the Arduino software stack,

boards can be coded over an RS-232 serial connection, but it often depends on the hardware version of Arduino.

3.4. GSM

GSM is a telecommunication network, which suggests cell phones connect with the tower by catching the cells within the vicinity. The coverage area of cell changes constantly with the implementation environment. It helps in transmitting signals from the module to the nearby network and convey those signals to the receiver.

3.5. GPS

GPS module is a type of device that catches Global Positioning System (GPS) signal to triangulate the device on earth. GPS module provide geographical information based on the latitudes and longitudes of the device. GPS devices are also used by defense sector to monitor different aspects. It can also be used in health monitoring system for observing the location of the patient.

3.6. LCD Display

An LCD is a device used for displaying the process of the algorithm being executed in the module. It uses liquid to supply a clear screen. The 16*2 Liquid Crystal Display may be a very basic module commonly utilized in circuits. The 16*2 display 16 characters per line in 2 such lines

4. ARCHITECTURAL DESIGN

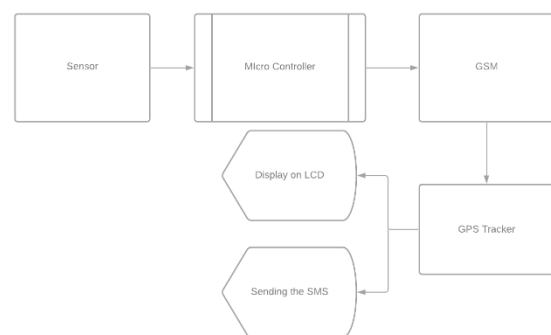


Fig -1: Architectural Design

5. RESULT

After the integration of all the individual components, the code was uploaded and compiled successfully and the following results were recorded. In the beginning, Human Health Monitoring was displayed on the LCD.



Fig -2: Screen at the beginning

The body temperature was recorded by the temperature sensor when in contact with the human body and was displayed on the LCD. Beats per minute (BPM) was recorded by the pulse rate sensor when the person touched the finger to the sensor and was displayed on the LCD.



Fig -3: Vitals reading of person

In case the value of the parameters recorded crosses the upper or lower threshold values an alert message is send to a predefined number through the GSM module. In this message the coordinates of the person's location are also transferred through GPS module.



Fig -3: Message to a number including live location

6. APPLICATION

The implementation of the proposed system allows the patients and the medical staff to observe the status of patient. Alert, reminders and emergency measurements help medical staff to decide what precautions are needed to be taken if any unforeseen condition arises at any remote location. The developed application also works as reporting tool where patient is discharged from the Hospital and continuous monitoring of situation is mandatory. Applications also focused on:

- 1) Home rehabilitation
- 2) Early detection of disorders
- 3) Health and wellness monitoring
- 4) Assessment of treatment efficacy
- 5) Safety monitoring

7. CONCLUSION

The implemented device from the proposed system is a compact, low-cost, portable and easy to use health observing system. Cardiac-problem patients can use the device to monitor their vitals at all the time , can receive help or suggestions form the doctor in case of any emergency or get help by their emergency contact. It can be used by everyone as it is affordable too. The objectives stated in the paper are reached and the device created in this project shows most of the time correct vitals. The module observes main objectives, Heart Rate and Temperature accurately.

- 7.1 Low cost: The total cost incurred in the gadget is low and hence can be used by everyone.
- 7.2 Good efficiency: The project is highly efficient.
- 7.3 Portable

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