Advanced Health Monitoring System

Nalini.N[1], Gokulnaath.D[2], Manoj.J[3], Dinesh Kumar.T[4]
[1]Assistant Professor,Dept of Computer Science and Engineering
[2, 3, 4]Dept of Computer Science and Engineering
[1, 2, 3, 4]Sri Shakthi Institute of Engineering and Technology, Coimbatore

Abstract*- Advanced IoT Health Monitoring System is used to monitor the health conditions of a person. This device is used as a gateway to communicate with various sensors such as temperature sensor, GSR sensor, Heartbeat sensor and MEMS sensor. The microcontroller picks up the sensor data and sends it to the network through Wi-Fi. The sensor data is stored in cloud. The uploaded data is analyzed and represented by a graph which depicts the person is in normal or abnormal state. Hence it provides real time monitoring of persons health. This system is efficient with low power consumption capability, easy setup, high performance and time to time response.*

Keywords- Geometrics parameters, Creo elements and FEM

I. INTRODUCTION

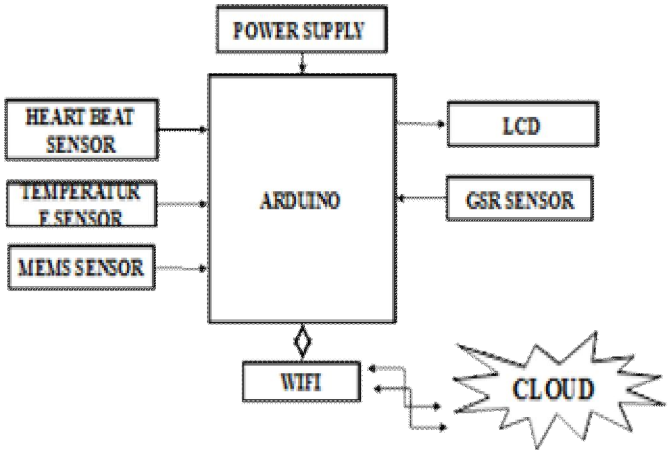
The healthcare system is currently experiencing challenges of low quality service provisioning, lack of easy accessibility to service varieties, high costs of services and a continuous increase in the population. The provisioning of high quality, easily accessible and cost-effective healthcare services are challenges facing the current healthcare system globally. The continuous increase in population has significantly contributed to an increase in the number of people suffering from age – related diseases. These challenges require development of better, smarter and cost effective healthcare systems to provide quality healthcare services at runtime. A ubiquitous healthcare system is an environment where quality healthcare services are available to everyone without time and location constraints. Ubiquitous healthcare systems hold the promise of maintaining wellness, disease management, support for independent living, prevention and prompt treatment, along with emergency intervention anytime and anywhere as and when needed.

Currently, there is need for a modernized approach. In the traditional approach the healthcare professionals play the major role. They need to visit the patient's ward for necessary diagnosis and advising. There are two basic problems associated with this approach. First, the healthcare professionals must be present on site of the patient all the time and second, the patient remains admitted in a hospital, bedside biomedical instruments, for a period of time. In order to solve these two problems, the patients are given knowledge and information about disease diagnosis and prevention. Second, a reliable and readily available patient monitoring system (PMS) is required. In order to improve the above condition, we can make use of technology in a smarter way.
A smart sensor-based Cloud Computing system is composed of several sensors based on top of the physical wireless sensors and data collection layer, which have the ability to receive and transmit data automatically and wirelessly by users based on application demand. The integration of Internet of Things (IoT), sensor technology and Cloud Computing is aimed at overcoming resource constraints as it enables different networks to cover large geographical areas so that they can be connected and used by several users at the same time when required. In addition, the recent emergence of Cloud Computing and sensor awareness of infrastructure-architecture methods, service-oriented architecture, software delivery and development models are also contributing factors to a smart environment.

In order to provide real-time healthcare informatics, hospitals need some type of monitoring system to track objects and medical equipment in which security, efficiency and safety are ensured, with reduced occupational risks. The key feature of the smart monitoring system is to provide identification of users and objects, so that an adequate service customization can be obtained. Accordingly, in this paper, a framework of integrating Cloud Computing technology and wireless sensor technology within the healthcare environment is proposed. The purpose of this framework is to apply the ever-expanding sensor data to our community-centric sensing applications that can be used as a real-time service in the Cloud. Several techniques can provide this framework with the ability to receive and transmit data automatically and wirelessly to multiple users.

II. IMPLEMENTATION

II.(a)BLOCK DIAGRAM:



II.(b)HARDWARE REQUIRED:

- ARDUINO
- TEMPERATURE SENSOR
- SKIN RESISTANCE SENSOR
- MEMS SENSOR
- 16X2 LCD
- WIFI MODULE

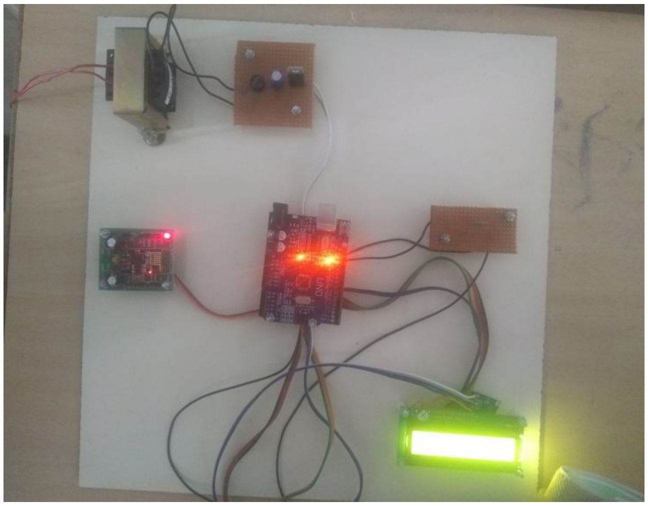
II.(c)SOFTWARE REQUIRED

- ARDUINO IDE

II.(d)TECHNICAL SPECIFICATION

- Microcontroller AT mega 328
- Operating Voltage 5V
- Input Voltage (recommended) 7-12V
- Input Voltage (limits) 6-20V
- Digital I/O Pins 14 (of which 6 provide PWM output)
- Analog Input Pins 6
- DC Current per I/O Pin 40 mA
- DC Current for 3.3V Pin 50 mA
- Flash Memory 32 KB
- KB used by Boot loader
- SRAM 2 KB
- EEPROM 1 KB
- Clock Speed 16 Mhz

III.WORKING PROCESS



This model consist of 4 sensors, the power supply and the components used in this model were described below,

III.(a)TEMPERATURE SENSOR LM35 FEATURES

Calibrated directly in ° Celsius (Centigrade).Linear + 10.0 mV/°C scale factor.0.5°C accuracy guarantee able (at +25°C).Rated for full −55° to +150°C range.Suitable for remote applications.Low cost due to wafer-level trimming.Operates from 4 to 30 volts.Less than 60 µA current drain.Low self-heating, 0.08°C in still air.Nonlinearity only ±1⁄4°C typical.Low impedance output, 0.1 W for 1 mA load

RANGE AND ACCURACY:

The LM35 measures a temperature range of -55 to 150 degrees Celsius. It produces an analog voltage signal that has a linear relationship to temperature, with a scale of 10.0 mV per degree Celsius. At room temperature, the LM35 has a typical accuracy of plus or minus 0.25 degrees Celsius, and plus or minus 0.75 degrees Celsius over the full temperature range. In still air, it takes three minutes for the output to reach its final value; at one minute, the output is about 70 percent of the value.

III.(b)MEMS SENSOR:

An **accelerometer** is a device that measures proper acceleration ("g-force"). Proper acceleration is not the same as coordinate acceleration (rate of change of velocity). For example, an accelerometer at rest on the surface of the Earth will measure an acceleration g= 9.81 m/s^2 straight upwards. By contrast, accelerometers in free fall (falling toward the center of the Earth at a rate of about 9.81 m/s^2) will measure zero. Accelerometers have multiple applications in industry and science. Highly sensitive accelerometers are components of inertial navigation systems for aircraft and missiles. Accelerometers are used to detect and monitor vibration in rotating machinery.

III.(c)HEART BEAT SENSOR:

Heart beat sensor is designed to give digital output of heat beat when a thumb finger is placed between the LDR & LED on it. When the heart beat detector is working, the beat LED flashes in unison with each heart beat. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse. The Heart Rate sensor monitors the light level transmitted through the vascular tissue of the fingertip and the corresponding variations in light intensities that occur as the blood volume change in the tissue. The ease of use makes it possible to measure everyone's heart rate, even in large classes.The Heart Rate sensor measures heart rate between 0 and 200 bpm

III.(d)GSR SENSOR:

The Galvanic Skin Response (GSR) is defined as a change in the electrical properties of the skin. The signal can be used for capturing the autonomic nerve responses as a parameter of the sweat gland function. The measurement is relatively simple, and has a good repeatability. Therefore the GSR measurement can be considered to be a simple and useful tool for examination of the autonomous nervous system function, and especially the peripheral sympathetic system.Several terms are used for this phenomena, such as EDA (electrodermal activity), EDR (electrodermal response), EDL (electrodermal level), SCA (skin conductance activity), SCR (skin conductance response)The GSR can be measured using several measurement methods: Electro-physiological measurement like ECG or EMG. Variation in resistance or conductivity. A combination of these two.

The power supply and the components in this model listed below.

There are several ways to convert an AC voltage at a all receptacle into the DC voltage required by a microcontroller. Traditionally, this has been done with a transformer and rectifier circuit. There are also switching power supply solutions, however, in applications that involve providing a DC voltage to only the microcontroller and a few other low-current devices, transformer-based or switcher-based power supplies may not be cost effective. The reason is that the transformers in transformer-based solutions, and the inductor/MOSFET/controller in switch-based solutions, are expensive and take up a considerable amount of space. This is especially true in the appliance market, where the cost and size of the components surrounding the power supply may be significantly less than the cost of the power supply alone.
Transformer less power supplies provide a low-cost alternative to transformer-based and switcher-based power supplies. The two basic types of transformer less power supplies are resistive and capacitive .

LCD:

A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

WIFI MODULE:

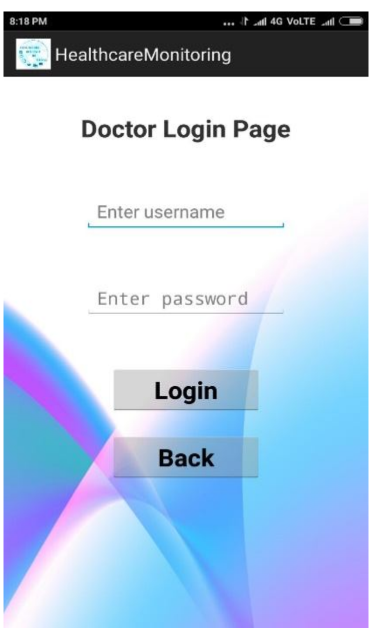
ESP-12E is a low power consumption of the UART-WiFi module, with very competitive prices in the industry and ultra low power consumption technology, designed specifically for mobile devices and IOT applications, user's physical device can be connected to a Wi-Fi wireless network, Internet or intranet communication and networking capabilities. ESP-07 the use of small ceramic antenna package can support IPEX interface. Users have a variety of installation options.

- When the power supply of 240v is converted into 12v suitable for the circuit to work in process
- 12v AC voltage to convert DC voltage we use bridge rectifier when the controller arduino Uno is working in 12v DC controller will separate all the 12v DC voltage to 5v DC all the component will be work.
- All the sensors were prensented in the band and thus the sensor sense the data from the body.
- IR sensor will sense the pulse value for heat beat sensor and taken the output, the taken data will be sending to arduino Uno.
- Temperature sensor is suitable for the analog value, so the analog value is generated in arduino circuit.

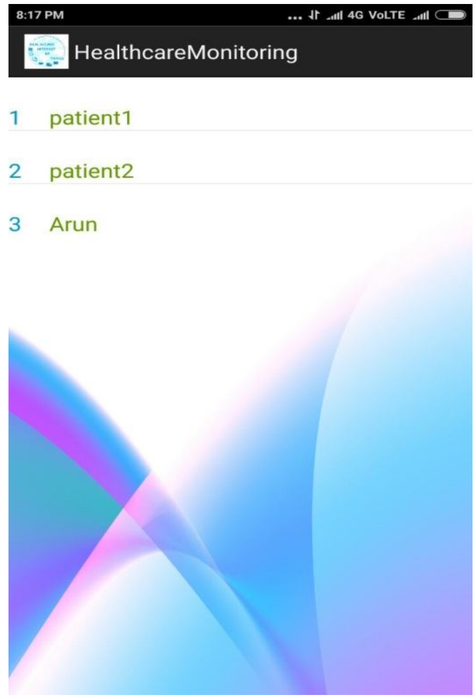
- GSR also a sensor which is based measuring of stress GSR circuit is having two nodes is stick in the skin to measure the stress.
- Mems sensor is used to measure the movement of body, the output will give to the arduino Uno to give the output value.
- When the error has to be checked in the patient body and taken the output by LCD to display.
- All the output is uploading to the cloud by using of Wi-Fi to store the value and information to clarify the human illness.
- Cloud information has to be retrieve in the sector and given to the android app for quick action.

IV.LOGIN PAGE

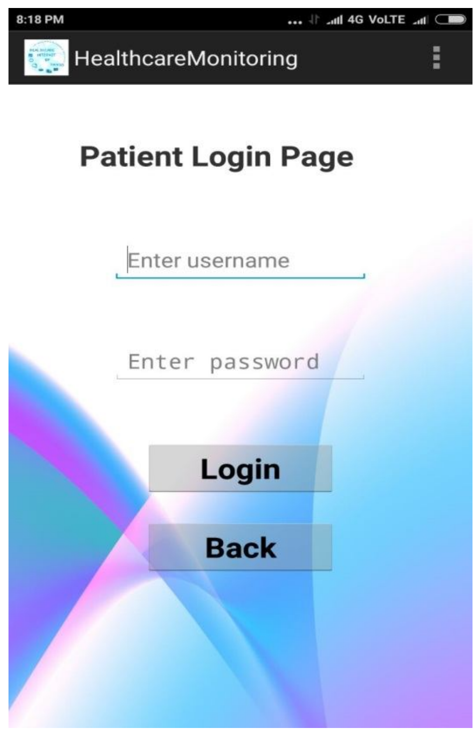
IV.(a)DOCTOR LOGIN:



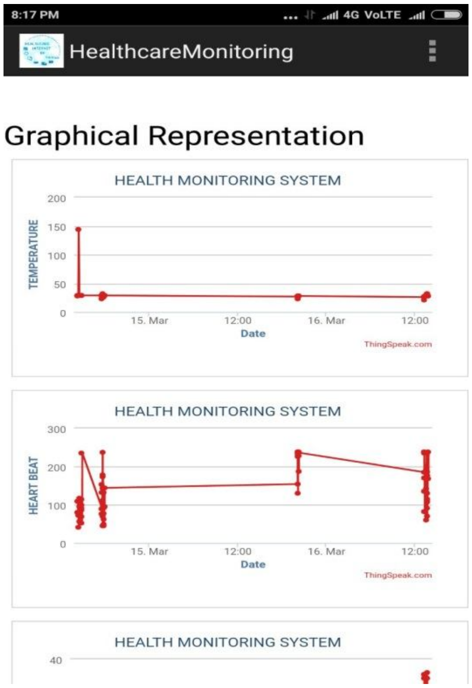
IV.(b)PATIENT LIST:



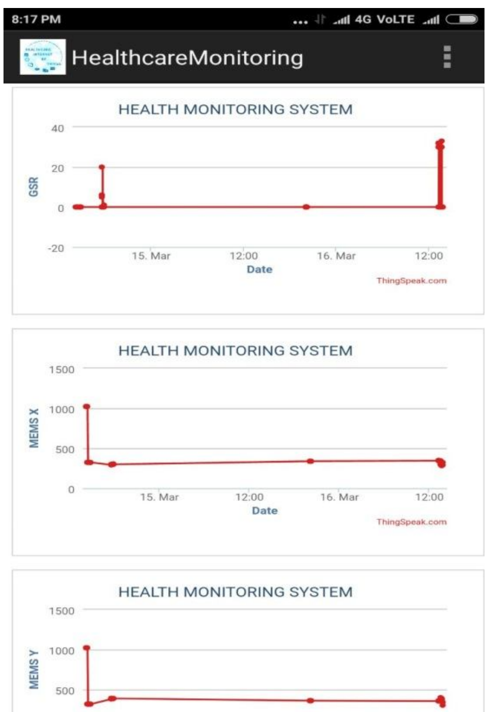
V.(a)PATIENT LOGIN:



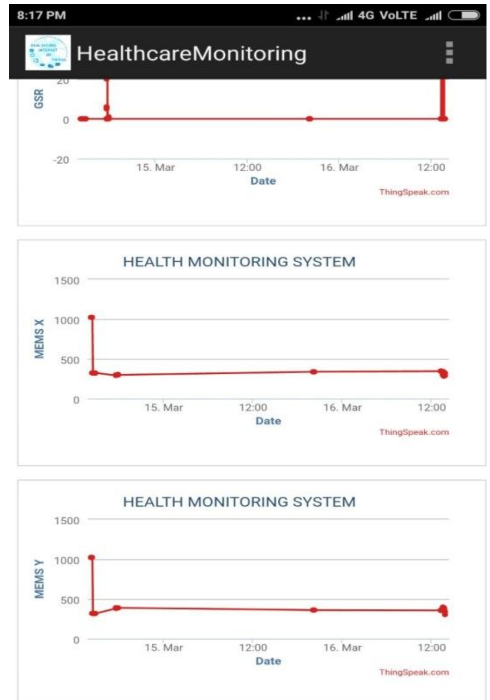
V.(b)PATIENT DETAILS:



V.(c)PATIENT DETAILS:



V.(d)PATIENT DETAILS:



VI. CONCLUSION

This system, Advanced IOT Health monitoring is used to monitor the health condition of the person. It is proposed to improve approaches of monitoring the human health. With the use of IOT technology our project enhances the process of monitoring various aspects of human health such as blood pressure, heart-beat, GSR and MEMS.

REFERENCES

[1] https://www.tinkercad.com/
[2] https://circuits.io/
[3] https://www.arduino.cc/
[4] https://circuitdigest.com/ microcontroller - projects / iot - air-pollution-monitoring-using-arduino
[5] Riteeka Nayak, Malaya Ranjan Panigrahy , Vivek Kumar Rai and T Appa Rao:IOT based air pollution monitoring system Vol-3, Issue-4, 2017