



SELF-ASSESSMENT SYSTEM FOR HEALTH ISSUES USING IOT

G.Theivanathan¹ S.Sandhya² R.Shankari³

^{1, 2, 3}Dept. of ECE, Assistant Professor,

Velammal Engineering College, Chennai-66, Tamil Nadu (India)

ABSTRACT

Nowadays, in this world we are facing many health issues due to environmental conditions and lifestyle changes. So in order to overcome this problem we are creating a system to monitor patient's health parameters. Here, the monitoring of the patient is done wirelessly with the help of sensors using Internet Of Things(IOT). In this project, various physiological parameters such as temperature, blood pressure, ulcer, thyroid, diabetes, pulse rate, ECG, calcium level for diagnosing joint pains, oxygen and saline level are detected. The detected datas are sent wirelessly to the doctor's monitor and hence the patient can be treated without visiting them. The patient information are recorded and updated periodically. The patient's reports are stored in a cloud whose server has an open access so that the doctor can retrieve the patient's report whenever required. With the help of this system, the health issues are prevented and cured before the onset of the diseases. The sensors are fixed externally without injecting into the patient's body. Thus, this sytem provides comfort to the patient at low cost with reduced risk of infection and failure.

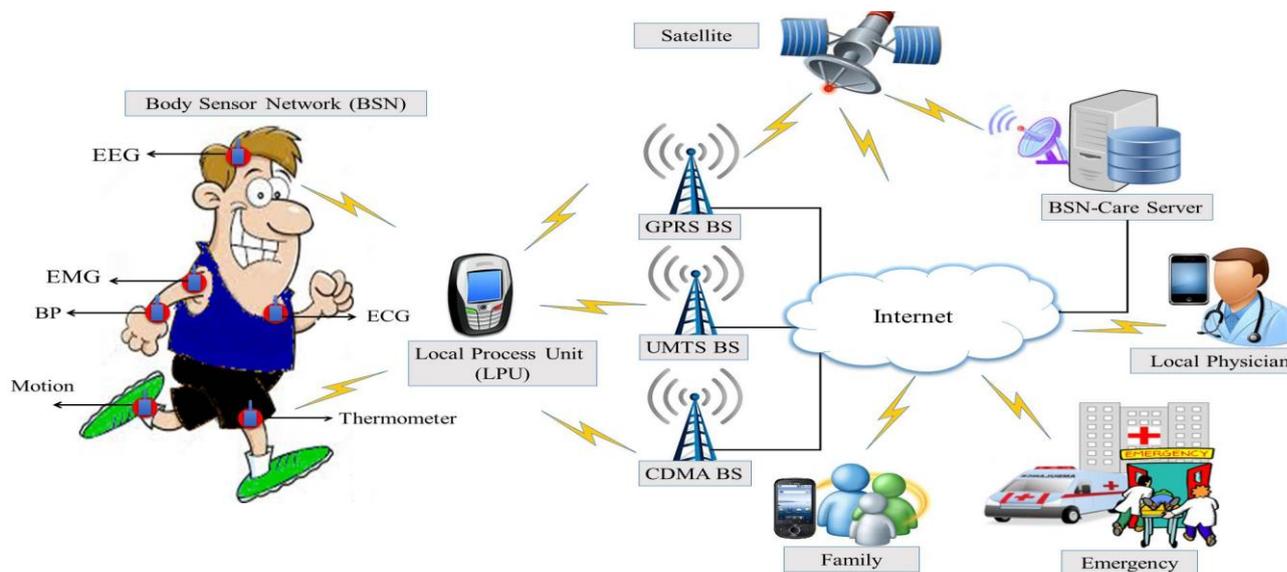
Keywords: Wireless sensors, NIR sensors, electrodes, MEMS accoustics, MEMS accelerometer, Code Composer Studio(CCS) Compiler IDE, Eclipse App Inventor, ESP8266, ESP Flasher.

I. INTRODUCTION

To render immediate health care support to the individuals expressing post- chemotherapeutic effects by monitoring the physiological parameters such as Blood Pressure, pulse rate, diabetes, Electro Cardio Gram (ECG), temperature and saline level[1]. Ulcers are generally painful and easily susceptible to infection. They are very slow to get healed. They are treated by monitoring the wound size and healing status. A simple digital camera is an essential requirement for detecting ulcer[2]. To identify the thyroid gland abnormalities, ultrasound imaging technique is used. The thyroid volume is estimated using a KNN classifier[3]. Recent advances in electronic field have enabled the development of small and intelligent bio medical sensors which is worn or implanted in the body[4]. The blood pressure is monitored by using smart android phones which is easy to handle and can be carried anywhere. Blood pressure sensor and heart beat sensor are used to receive the data which is given to microcontroller and these data are accessed using Bluetooth technology[5]. Moreover, the physiological data are detected and diagnosed wirelessly using Wi-Fi, Wi-MAX and ZigBee. Therefore it is not necessary for the doctors to visit the patient's continuously[6].

II PROPOSED SYSTEM.

Increasing population and rising cost of health care has stimulated us to introduce novel technology driven enhancements to the health issues. In this paper, several health parameters like human body temperature, diabetes, Electro Cardio Gram (ECG), pulse rate, Blood Pressure, saline level, thyroid, ulcer and arthritis can be self assessed in a single system using Internet Of Things(IOT). To implement a server based control unit which receives and sends the information to the mobile application. The control unit is used which acts as both embedded server and data transmission unit and we do not need any intermediate device to upload the data to the server. The controller is connected to Wi-Fi dongle. The ARM m4 cortex microcontroller acts as an access provider so that we can create a simple server program within the controller and access it through mobile application or by browsers. Mobile application acts as an access key to retrieve the data from the embedded server. Energy consumption is achieved by reducing the hopping of data between the sensor unit and web server. All the biological information from the patients are collected by the wireless bio medical sensors and these data are stored in cloud. This data can be accessed anywhere at anytime using cloud computing. These data are updated continuously. The reports are periodically sent to doctor's and relative's mobile phones using eclipse app inventor. The reports with normal values are indicated by a screen with green colour. Any abnormal values are indicated by a screen with red colour. Hence doctors do not require any traditional methods of visiting the patients bed on regular basis. Here the diagnosing of patient's health issues is done wirelessly.



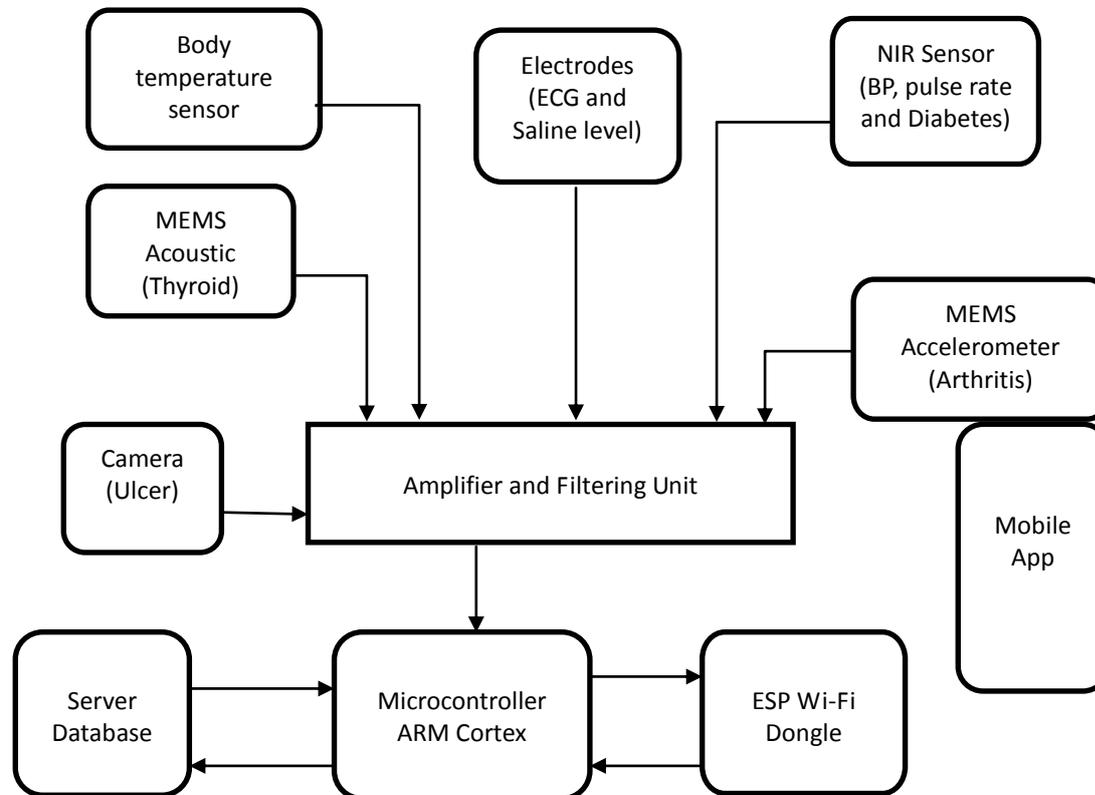


Fig.1 Block diagram

III. SYSTEM DESCRIPTION

The data are recorded and updated periodically in the network within few minutes. The accurate results are obtained by using wireless sensors. The bio signals received are in analog form, hence it is then converted into digital form to have high accuracy and to improve readability. The recorded values are precise.

IV. COMPONENTS USED

1. ARM CORTEX m4 MICROCONTROLLER

It is a latest embedded processor. It is a combination of cortex m3 and DSP instruction set. It is efficient and easy to use. It is highly configurable, wide range of implementations. It is a 32-bit RISC (Reduced Instruction Set Computer).

2. NIR SENSOR

This sensor works in the near infrared region. Its range is 700nm to 2500nm. It is a phosphor coated that emits clearly visible light when illuminated by NIR sources. It is very accurate. It is used to detect pulse rate, diabetes and blood pressure. The pulse rate is calculated based on the amount of infrared light reflected by blood circulating inside the body. Based upon the frequency of blood flow and absorbance of light by the NIR sensor, the diabetes level can be measured. The blood pressure is measured by the rate or speed at which the light gets

reflected by NIR sensor.

3. MEMS ACOUSTIC

This sensor is used to detect thyroid volume. The function of the thyroid gland is to make and store hormones which help to regulate blood pressure, body temperature, heart rate. Based upon the water level, the sensor detects the presence or absence of thyroid. The types of thyroid are hyperthyroidism, hypothyroidism and goiter.

4. MEMS ACCELEROMETER

It is used to detect arthritis. Accelerometer is an electromechanical device that is used to measure acceleration and the force producing it. It has high sensitivity, high accuracy and it does not change values depending on base materials used. It depends only on capacitive value that occurs due to the change in distance between the plates.

5. ELECTRODES

It is used to detect the ECG and saline level. The electrodes are placed on the body using electromagnetic gel and the bio signals are sensed by the electrodes and the values are displayed. Based upon the salinity in the sweat, the saline level in the body is measured.

6. INFRA RED CAMERA

It is used to detect ulcer. Damage in skin or mucous membrane with loss of surface tissue, disintegration of tissue causes ulcer. Ulcers can have various causes, depending on their location. Laser technology is a non invasive method used to treat ulcer.

7. ESP8266

It is a Wi-Fi dongle. It has TCP/IP stack and microcontroller unit. It is self-contained system on chip(SOC). It is capable of hosting an app and it is pre-programmed. It has high storage capacity and is cost effective. ESP Flasher is used to compile and run the program in ESP8266.

8. CODE COMPOSER STUDIO(CCS) COMPILER IDE

IDE is Integrated Development Environment. It supports microcontroller and embedded processors portfolio. It contains tools used to develop and debug embedded applications. It includes optimizing c/c++ compiler, source code editor, project build environment, debugger and profiler.

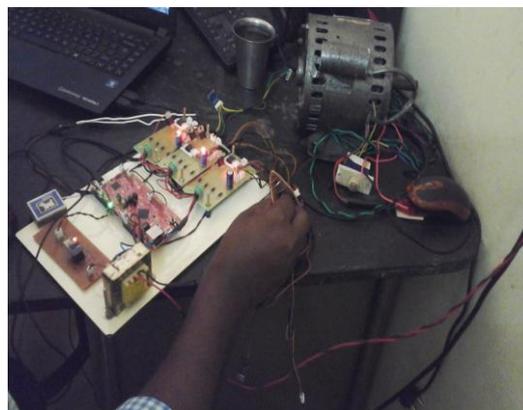


Fig 2: Project set up

V. RESULT

The experimental results of this paper are:



Fig 3: For normal body temperature

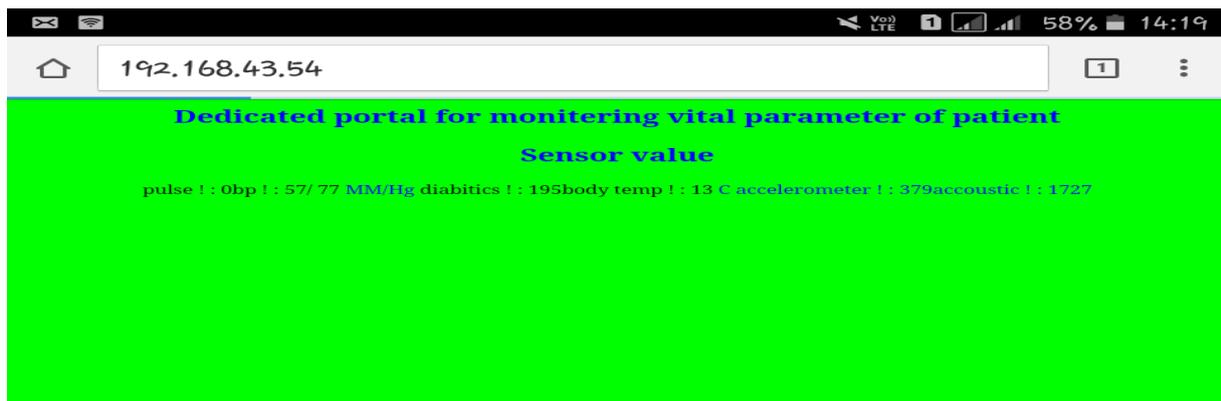


Fig 4: For abnormal body temperature values

VI. CONCLUSION

Thus the various parameters of the patient are monitored wirelessly and the reports are updated and generated periodically. Our system is portable, single gadget, long distance communication is possible.

REFERENCES

- [1] Mendrela Biswas, Rupali S. Landge, Bhagyashree A. Mahajan , Sharada Kore, "Raspberry Pi Based Patient Monitoring System Using Wireless Sensor Nodes", International Research Journal Of Engineering And Technology (IRJET) , Volume: 03 Issue: 04, Apr-2016.
- [2] M. Saratha, V. Mohana Priya,"Detection of Diabetic Wounds Based on Segmentation Using Accelerated Mean Shift Algorithm", International Journal of Advanced Research in Computer Science and Software Engineering, ISSN: 2277 128X , Volume 6, Issue 2, February 2016.
- [3] Gouri S.Yende, Krushil M. Punwatkar,"Thyroid Segmentation and Volume Estimation Using Image



Processing “, International Research Journal of Engineering and Technology (IRJET) , e-ISSN: 2395 - 0056 , p-ISSN: 2395-0072, Volume: 03 Issue: 04 , Apr-2016 .

- [4] Moeen Hassanaliereagh, Alex Page, Tolga Soyata, Gaurav Sharma, Mehmet Aktas, Gonzalo Mateos, “Health Monitoring And Management Using Internet-of-things (IOT) Sensing With Cloud-based processing: Opportunities And Challenges “, IEEE Computer Society, DOI 10.1109/Sc.2015.47, 2015.
- [5] K.Sivanantham, S.Barath, K.V.Nagendra, “Personal Monitoring Of Blood Pressure Using android Smart Phones ”, International Journal For Research In Applied Science & Engineering Technology (IJRASET), ISSN: 2321-9653, Volume 3 Issue IV, April 2015.
- [6] Rajasekaran.S, Kumaran.P, Premnath.G, Karthik.M, “Human Health Monitoring Using wireless Sensors Network (WSN)”, International Journal Of Application Or Innovation In Engineering & Management (IJAIEM), ISSN 2319 – 4847 , Volume 2, Issue 12, December 2013 .