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A Review on system of IOT Based Human Activity Monitoring By Using Raspberry Pi

Ms.Kalyani D shinde[1], Prof. Sagar B. Shinde[2], Prof.S.S.Savkare[3]

PG Scholar, Dept. Of VLSI & Embedded System Engg ,RSSOE JSPM NTC, Pune, M.S., India[1]

Assistant Professor, Dept. Of VLSI & Embedded System Engg, RSSOE JSPM NTC, Pune, M.S., India[2,3]

ABSTRACT— In the wake this time, the rising technology empowering answers for make human way of life exceptionally agreeable and shrewd, the forward stride of improvement is web of things (IOT). This IOT comprise of cell phones, RFID, Wireless detecting gadgets and raspberry pi processor. As the quick moving exercises of person, the medicinal services issue is required to be brilliant so this paper proposed framework that conveys to screen human exercises through wearable sensors. This framework recognizes circulatory strain, ECG, Heart rate and temperature. Along these lines information is observed and gathered at nearby and in addition remote client by web of things (IOT).

KEYWORDS: Internet of things (IoT), Smart technology, Smart media, Health care, wireless sensor network, physiological parameter and raspberry pi.

I. INTRODUCTION

In the recent scenario of technology and wireless technology the world, need to be communicate from any field any place at any time of instance. It is most challenging aim that, this service should be impact the complete lifestyle of human being [1]. The Internet of Things (IoT) is concept, which objects devices are always stay connected by the mean of physical parameter to real virtual world. Here for medical and health care system the Internet of Things (IoT) helps to monitor patient and its physiological parameters [2].The Internet of Things (IoT) has various services like advance manufacturing, smart transport, best media control, environment monitoring, and many more such applications can be developed [3].

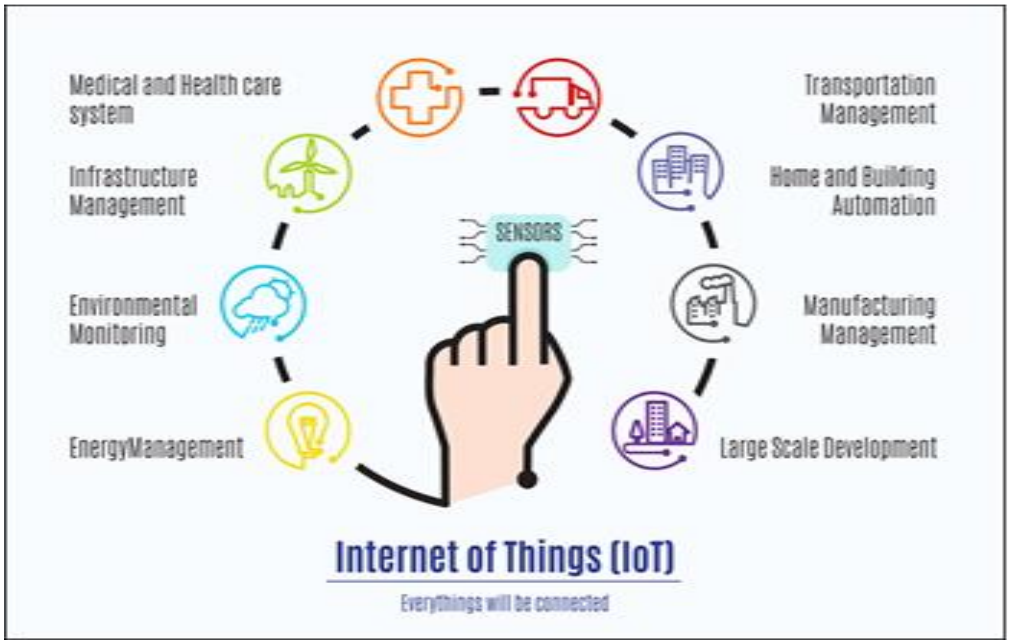

Fig. 1 Internet of Things

The wireless technology makes it user friendly to wear sensors on body for diagnosis the system which consist of healthcare must send the physiological data to control center so that human activity monitoring can be carried out any place by 24/7. Also the panic button in wearable sensor will help the patient in case of emergency [3]. In this case the subject is to be monitored so the system should be reliable to provide the real time data, to meet the specification of recent type of monitoring, that physical object can behave like physical point to service provider. Smart home automation raises a few possible applications like Surveillance cameras, vehicle detection, lightings, telephones etc. In smart healthcare system also helpful to monitor patient's dieses like blood pressure, heart rate, temperature, body glucose, electrocardiogram etc. [4].

Such as an Internet of things can be used in daily life appliance to make life easy and comfortable. Raspberry pi processor used in this system is middle way between biological and digital world, thus raspberry pi having specifications like vast storage, high operating frequency and also because of its operating frequency enables it to perform monitoring operation and sending its data, thus all is available on single board which is develop by raspberry pi foundation in UK. The system on chip proved reduced size of system.

II. LITERATURE SURVEY

In [1] by the innovations and research on sensor which are wearable devices are enhanced a step where it must be used as general house material or device, but because it is costly it brings it back. So smart healthcare system is elaborated. A new arterial blood pressure holter based on oscillometric method which shows a kind of BP measurement [2], any of the examples stated here are either part of healthcare, i.e. it doesn't consist of the whole system integrated, for example for to calculate sodium content in the sweat is studied [3].

For integration of the wearable sensors to e-health application is developed in [4], and the system which is to design can sustain in movement and falls of human body [5] is detailed in IEEE sensors, for the sake of designing the integrated system which is studied in this paper, part of ECG measurement is taken from the [6], which also deliver the idea of sensor which can sustain for long term.

In the current technology of health care monitoring individual has to go himself at hospital or doctors to be called at home for check-up of pathological testing but this process not always easy and in case of elders or senior citizen one has to be under surveillance 24/7. Because of health issue such as heart attack, pyrolysis, blood pressure and temperature [7]. So immerging of wireless sensor technology individual test like only blood pressure, heart rate, temperature etc. can be measured but this research project enables all this parameter together to be measured under single system, and also thus all can be worn by patient and processed data send toward internet through internet of things(IOT).

III. PROPOSED SYSTEM'S METHODOLOGY

In this section architecture of the HAM system is shown by the help of above fig. as the system is based of monitoring various types of sensors are used. The raw data from sensors are to be collect by a raspberry pi. Then thus data are obtained and shown on a display. These types of simple wearable devices are use by normal human being. While jogging, running and in case of patient suffering from any cause of illness applications where the users look at the display shows the measured values of the sensors. The device has the feature of wireless data transition capability; the data can be sent to a server station through a Wi-Fi module. The block diagram shown in a simple wearable wireless device is shown in Figure. Most of the data are stored, processed in the computer or the processor chip.

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The main source of smart health monitoring system is when patient is at the rest position at present stage. While the patient is in hospital or at rest position the phenomenon like blood pressure, ECG, Heart rate and temperature can only possible to measure. So this paper presents a perfect system to overcome the disadvantages whichever is present in previous systems.

The proposed system consists of Raspberry pi model, blood pressure measurement sensor, ECG Circuitry, heart rate, temperature sensors and power supply unit. The block diagram for the health care system is as follows,

i. Raspberry-Pi:

As stated by the raspberry pi is an organization [6] which is a single board computer developed in United Kingdom by raspberry pi foundation. The raspberry pi is designed on Broadcom BCM2836 processor which include ARM Cortex-A7 based quad core processor which runs on 900 MHz and has RAM of capacity 1GB. Raspberry pi required 5V 2A power supply. It has graphic processing unit Dual Core Video Core IV multimedia Co-Processor it provides Open GL.ES-2.0, accelerated-hardware Open-VG, also it has 1080p30 H.264 high-profile decode Capable of 1Gpixel/s, 1.5Gtexel/s or GFLOPs 24, with texture filtering and DMA infrastructure. It also has four USB connector, one audio output, camera connector, forty pin GPIO connector, one displays serial interface and one High-Definition Multimedia Interface [9].

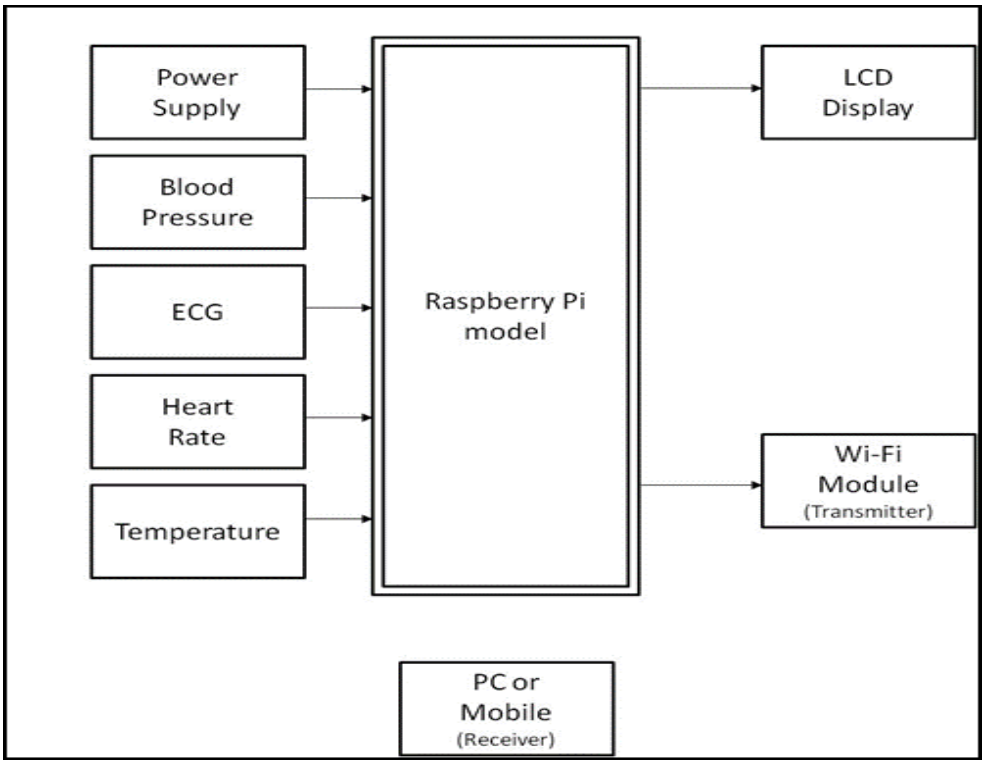

Fig. 2 Proposed Smart Health Care System

ii. Blood Pressure Measurement:

It can be done with the help of two distinct technique which are technique of Auscultator and Oscoillometric technique. In Auscultator, technique is acquiring of Korotkoff sound which gets created by body during the blood pressure measurement [2].

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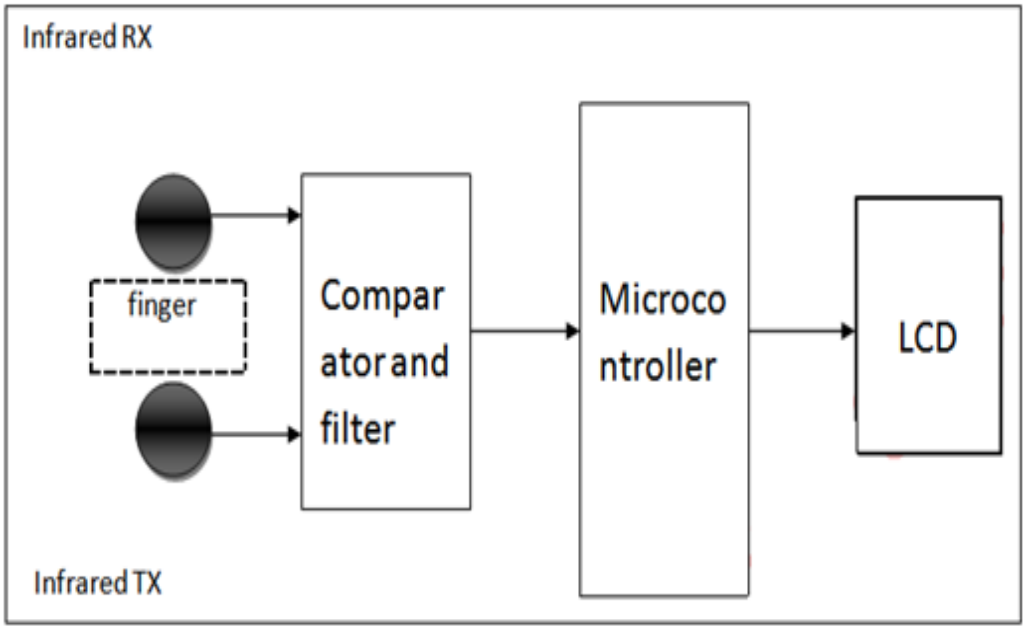

Fig. 3 Blood pressure measurement

The correct measurement is depending on cuff size, wrapping technique and release of the pressure. The first time korotkoff sound refers to systolic blood pressure and at the second time, korotkoff sound refers to as diastolic blood pressure.

The oscillometric technique depends on measuring oscillation signals in the cuff. It is measure by oscillometric ratio; systolic blood pressure can be measure by systolic ration and diastolic pressure measure as a diastolic ratio [7]. The oscillometric technique is quite easy and automated technique. Oscillometric technique is less accurate than that of Auscultatory technique.

iii. Electrocardiogram Measurement (ECG) & Heart rate

The starter block diagram for electrocardiogram measurement contains an electrode, instrumentation amplifier, low pass filter, amplifier, microcontroller and a LCD display [8].

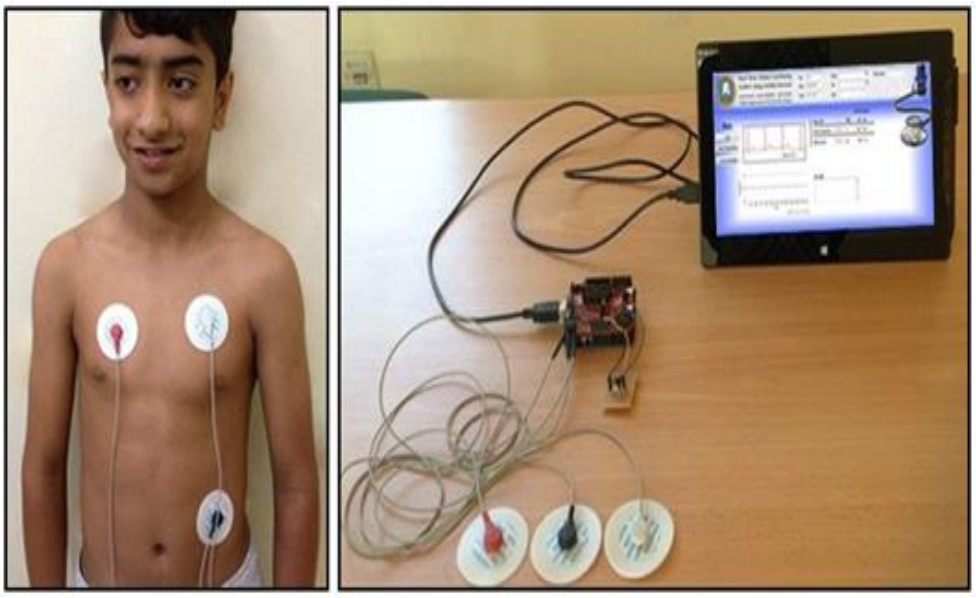

Fig. 4 ECG Electrode placement

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iv. Electrode

It is used to convert patient's physical signal into electrical signals. The electrode gets stick to the right arm and left arm of patient on cuff and one electrode on the right leg of patient. For measurement of ECG we are using Wilson Electrode System.

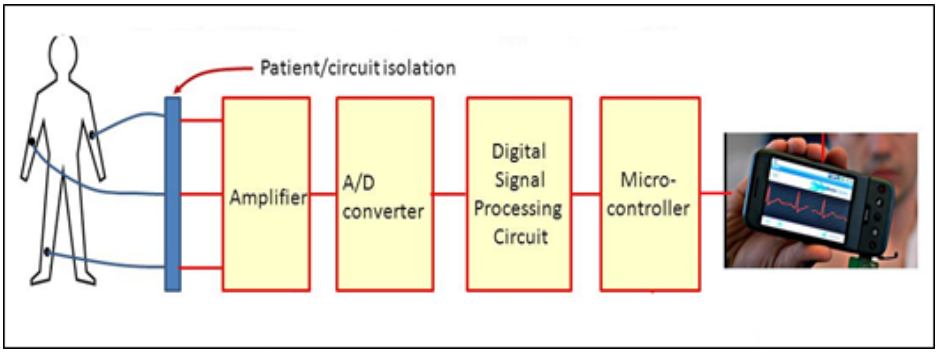

Fig. 5 ECG Block diagram

a. Instrumentation amplifier:

It is followed by electrode to amplify the output ECG signal of electrode.

b. ADC

Analog to digital converter converts the sensed analog data into encoded digital signal data for further process.

c. Amplifier

It is basically used to amplify signal is then provided to microcontroller for heart rate count. It is counted for one minute.

d. LCD display

It is use to display the result of the system.

e. Temperature measurement:

Body temperature of the patient can be calculated using LM35 sensor. It can operate on for full −55°C to 150°C range with accuracy of ±0.2°C.

IV. RESULT

The system designed for the monitoring patients gives the brief description of ECG temperature, blood pressure and heart rate, the results can be taken on PC. Some examples of the observed results are as shown below. The raw sensor signal contains a combination of heart rate, and other data can be obtained on the monitor.

Fig. 6 screenshot of Temperature measured

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Fig. 7 Screenshot of blood pressure measured

Fig. 8 Screenshot of ECG measured

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V. CONCLUSION

The objective of smart healthcare through Internet of things to provide low cost solution with great reliable also real-time data transfer at wide points and almost negligible cost. This low cost solution on the one hand would save the user from high one time and running costs and on the other hand provide a reliable, efficient and real time monitoring system. It is desired that many more high-performance wearable devices are available in market as lightweight will be for monitoring a vast range of activities can be carried. The challenges faced by the current design will also addressed in future devices.

Another strong factor regarding our Internet of things system is the extent of coverage it can provide i.e. anywhere in the world-it can connect wherever Internet facility is present. The objective of system is to monitor and intimate critical surveying patient's health directly to doctor and Emergency contact number to save patients life.

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