ISSN (Online) : 2454-4159
International Journal of Advanced Research in Science Management and Technology
Volume 2, Issue 6, June 2016

A Novel on 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— An expansion in world populace alongside a critical maturing bit is constraining rapid ascents in healthcare costs. The healthcare framework is experiencing a change in which consistent observing of occupants is conceivable even without hospitalization. The progression of sensing technologies, embedded systems, wireless communication technologies, Nano technologies, and miniaturization makes it conceivable to create savvy systems to screen exercises of individuals constantly. Wearable sensors identify irregular and/or unexpected circumstances by checking physiological parameters alongside different manifestations. Thusly, vital can be given in times of desperate need. This paper audits the most recent reported systems on action checking of people in light of wearable sensors and issues to be tended to handle the difficulties.

KEYWORDS: Internet of things (IoT), healthcare costs, sensing technologies, embedded systems, wireless communication technologies, Nano technologies, and miniaturization and raspberry pi.

I. INTRODUCTION

WEARABLE sensors have turned out to be exceptionally prominent in numerous applications, for example, restorative, diversion, security, and business fields. They can be to a great degree valuable in giving precise and dependable data on individuals' exercises and behaviour's, in this manner guaranteeing a protected and sound living environment. It might be that the keen wearable sensors innovation will reform our life, social connection and exercises particularly similarly that PCs have done a couple of decades back. Wearable sensors as frenzy catches for crisis have been being used for quite a while and are an enormous business achievement [. Obviously for legitimate use the individual requiring help ought to be ready and sufficiently fit to press the catch. In particular, the frenzy catch ought to be light in weight with the goal that it is agreeable to wear every minute of every day. As of late there has been a surge of utilizations of wearable sensors, particularly in the restorative sciences, where there are a variety of uses in observing physiological exercises. In the restorative field, it is conceivable to screen patients' body temperature, heart rate, cerebrum action, muscle movement and other basic information. It is vital to have light sensors that could be worn on the body to perform standard therapeutic observing. It is conceivable to quantify the pulse utilizing wearable sensors through an altered volume-oscillometric method which disposes of the requirement for an inflatable weight sleeve and utilizing headphone and cell phone.

In the zone of game and preparing there is an expanding pattern of utilizing different wearable sensors. Something, for instance, estimation of sweat rate which was conceivable just in the research center based framework a couple of years back is currently conceivable utilizing wearable sensors.

The utilization of wearable sensors has made it conceivable to have the important treatment at home for patients after an assault of sicknesses, for example, heart-assaults, rest apnea, Parkinson diseasevand so on . Patients after an operation ordinarily experience the recuperation/recovery process where they take after a strict schedule. All the

physiological signs and additionally physical exercises of the patient are conceivable to be checked with the assistance of wearable sensors. Amid the restoration organize the wearable sensors may give sound input, virtual reality pictures and other rehabilitative administrations. The framework can be tuned to the prerequisite of individual patient. The entire action can be observed remotely by specialists, medical attendants or guardians.

II. LITERATURE SURVEY

The exploration and mainstream researchers are striving to plan and create keen wearable gadgets to be utilized for constant observing of various human exercises for twenty four hours and seven days a week. There are a few difficulties confronted on outline, advancement, creation, execution and use cum constant observing. While outlining wearable gadgets there are dependably plan challenges from the equipment and software imperatives emerging from the structure element, light-weight and low vitality operations, and also there are wellbeing necessities, for example, evasion of physical damage. The physical effect of a sensor operation should be taken

into thought and can be tended to by proper configuration of various sensor parts, for example, processor, radio, and advancement of information calculation. While the sensors are set on the body, the danger of warm harm to tissue may likewise be considered and can be decreased by constraining the sensing recurrence and additionally wireless recurrence, the calculation power, and the radio obligation cycle of the body worn sensor. A novel non-straight enhancement system has been exhibited

to consider wellbeing and supportability necessities that rely on upon the human physiology and determine framework level configuration parameters for wearable sensors application . In wireless

wearable sensors distinctive information sources produce time-differing movement, the volume of which might be huge bringing about in tolerant inertness. It is a tremendous test to guarantee that the most critical information can simply be conveyed in a constant manner. In addition, information transmission may experience the ill effects of profound blurring and bundles misfortune because of the element on-body channel prompted by developments and encompassing environment. So vitality productive medium access control (MAC) is urgently expected to dispense transmission bandwidth and to guarantee solid transmission considering WBAN settings, i.e., time-differing human and environment [68]. The most imperative prerequisites for a powerful software structure, empowering proficient signalprocessing applications have been accounted for. Signal handling in hub environment (SPINE), an open-source programming structure, intended to bolster rapid and adaptable prototyping and administration of sensor applications has been displayed. It has been demonstrated that SPINE productively addresses the distinguished prerequisites while giving execution investigation on the most widely recognized equipment/software sensor stages. A wellbeing observing framework comprising of wearable sensors, for example, ECG, temperature, skin mugginess and accelerometer and cell phone based system has been accounted for to give tele restorative administrations. The enormous test of the work is to have an agreeable wearable sensor framework which can be worn by the patient or the individual ceaselessly with no sort of inconvenience. The issue of protection, force utilization, solid information accumulation, and patient recognizable proof additionally postures challenges towards the advancement of wearable sensing framework for consistent action observing. A nonlinear, reconfigurable design for the sound sensor interface has been proposed to

ISSN (Online) : 2454-4159
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address some of these difficulties. An outline of subtle sensing stages either in wearable frame or incorporated into situations is introduced. Issues, for example, client acknowledgment, diminishment of movement curio, low power plan, on-hub handling, and dispersed obstruction in wireless systems still should be tended to improve the ease of use and elements of these gadgets for down to earth use. The difficulties for outline, improvement and creation of sensors for checking persistent exercises in a home situation for determination of health of elderly are accounted for. The tremendous measure of information got from the sensors put an immense weight on the framework as far as capacity, investigation and future use. The abuse of information may make a colossal issue on the agreeableness of the framework in the general public so the fundamental security issues should be tended to in the outline of embedded wearable sensors and also interoperability, availability and vitality administration ought to be taken consideration. The test to give a constant supply of vitality for ordinary operation and in addition communication of measured information to the centra organizer is to be explained to make it adequate to more extensive group.

III. ARCHITECTURE OF THE HUMAN ACTIVITYMONITORING SYSTEM

The fundamental design of the human action checking framework can be spoken to with the assistance of a piece graph; the least complex one is appeared in Figure 1. Contingent upon the errand of checking, diverse sorts of sensors are utilized. The crude information from sensors are gathered by a processor. The information are prepared and then shown on a showcase. These sorts of basic wearable gadgets are utilized by typical individuals while running, running and different applications where the clients take a gander at the presentation to see the deliberate estimations of the sensors. In the event that the gadget has the component of wireless information transmitting capacity, the information can be sent to a focal station through a handset. The piece chart representation of a straightforward wearable wireless gadget is appeared in Figure 1. The information could possibly be totally handled at the sensing end yet a large portion of the information are put away, prepared in the PC. The square graph representation of the Human Activity Monitoring (HAM) framework [18].

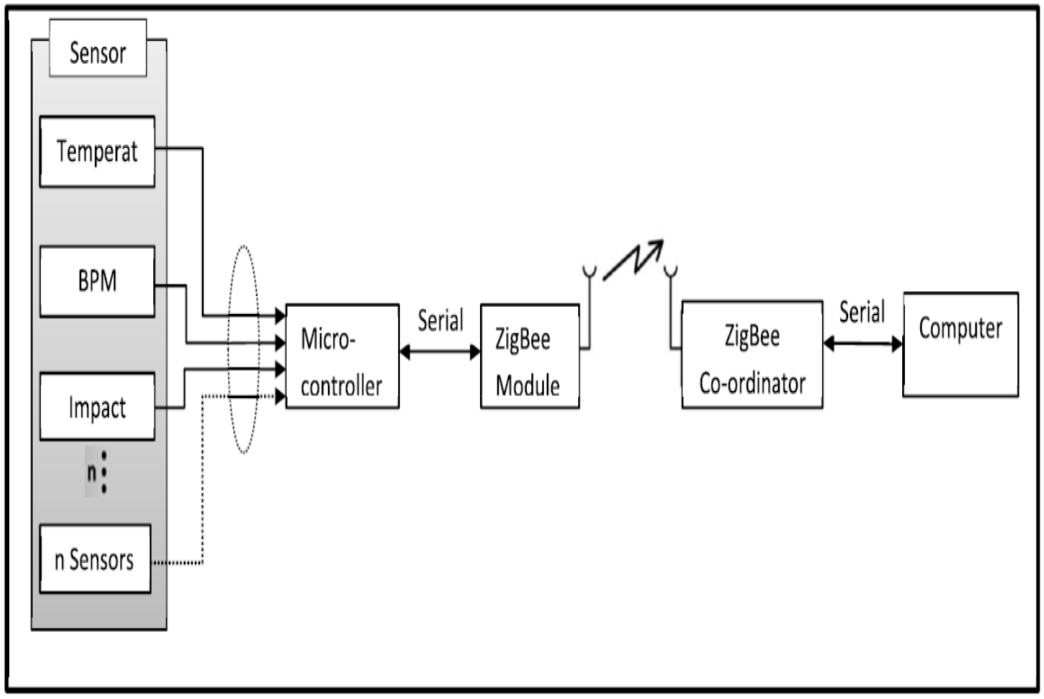

Fig. 1 The block diagram representation of the Human Activity Monitoring (HAM) system

IV. SYSTEM WORKING

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The undertaking is utilized to screen a patient's Blood Pressure, body temperature, ECG. Temperature sensor can sense the temperature of the human body. The yield voltage is straightly relative to Celsius (Centigrade) temperature. This sensor gives the yield into structure is simple sign and this sign is food to ADC which will change over it into computerized structure. The ECG is into type of simple sign. This sign is food to ADC which will change over it into computerized structure in the µC. ECG chart waveform can be seen on website page and esteem can be shown in PHP. The Patient Body Temp and Blood Pressure is presentation on screen. And Also Body temperature and Blood Pressure qualities and ECG Graph show on specialist Android versatile. The framework enhances the nature of patient observing and dispenses with the human blunder.

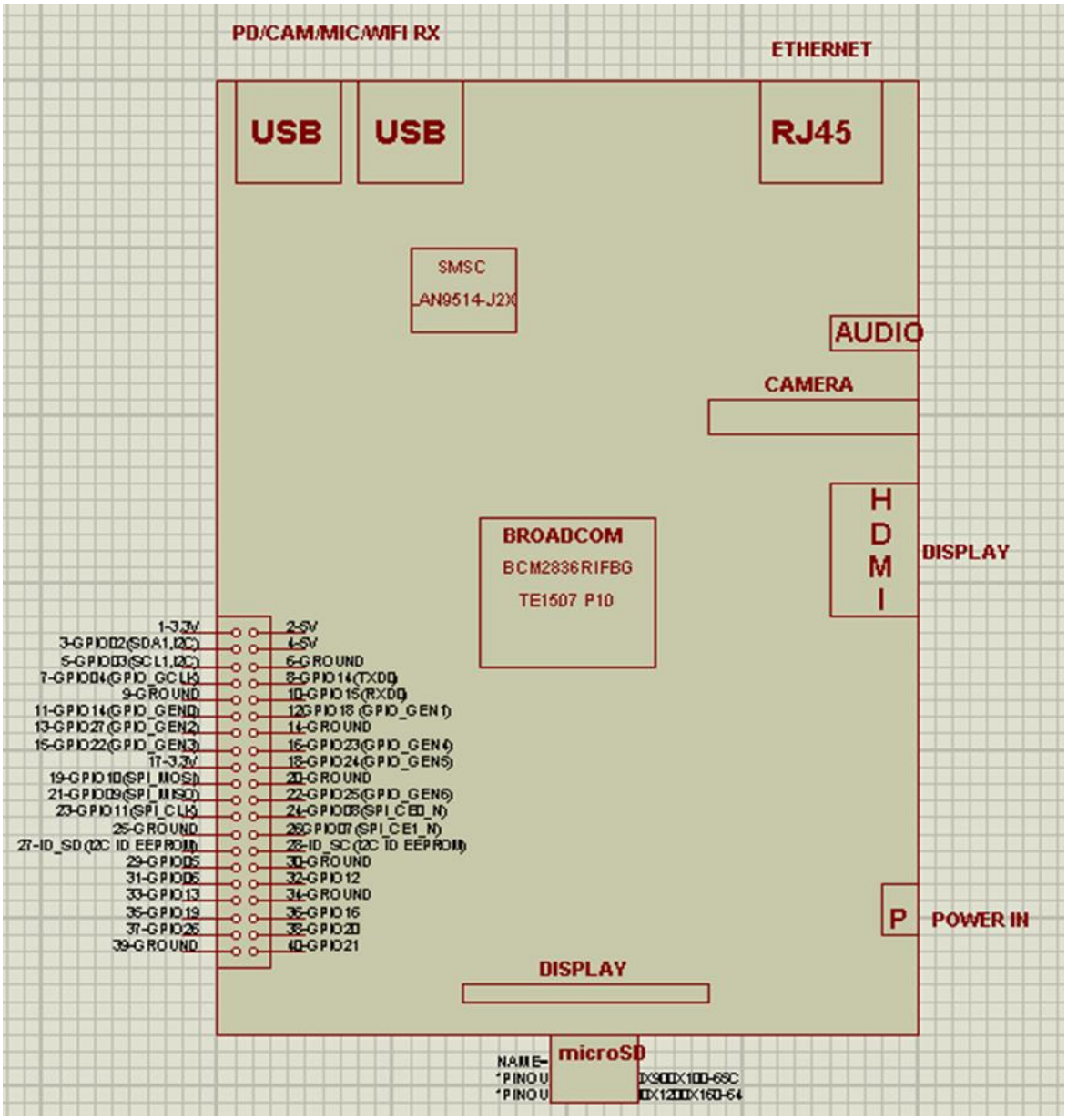

Fig. 2 Circuit diagram

VI. PROPOSED APPROACH

The primary wellspring of shrewd social insurance framework at present stage is that when patient is at the rest position. The wonder like pulse, ECG, Heart rate and temperature can just conceivable to quantify while the patient is

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in hospital or very still position. So this paper introduces a productive framework to defeat the downside whichever is available in past systems.

The proposed framework comprises of Raspberry pi model, circulatory strain estimation sensor, ECG Circuitry, heart rate, temperature sensors and force supply unit. The square chart for the medicinal services framework is as per the following

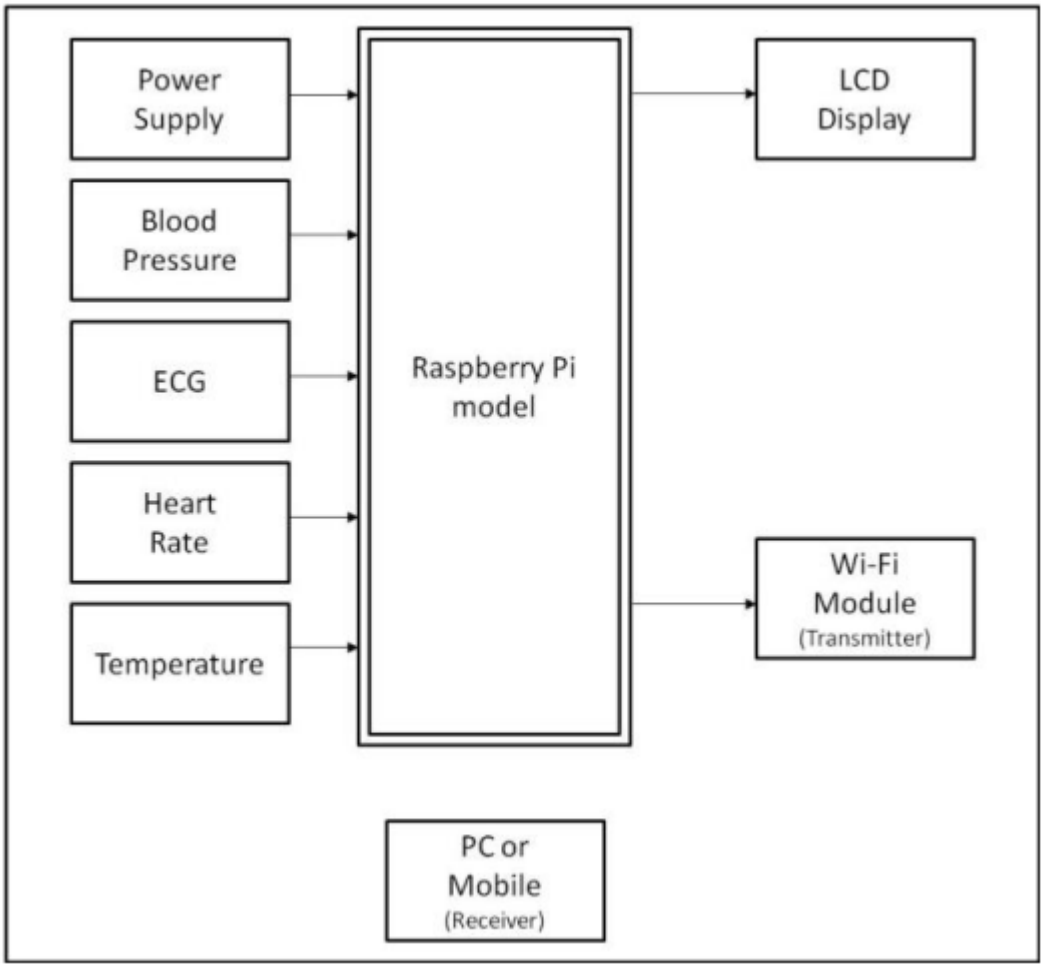

Fig. 3 Proposed Smart Health care System

V. APPLICATIONS

A. Raspberry Pi -

As expressed by the raspberry pi association it is a progression of charge card size single board PC created in UK by raspberry pi establishment. The raspberry pi depends on Broadcom BCM2836 processor which incorporate ARM Cortex-A7 based quad center processor which keeps running on 900 MHz and has RAM of limit 1GB. Raspberry pi required 5V 2A power supply. It has realistic handling unit Dual Core Video Core IV sight and sound Co-Processor which gives Open GL ES 2.0, equipment quickened OpenVG, and 1080p30 H.264 prominent interpret Capable of 1Gpixel/s, 1.5Gtexel/s or 24GFLOPs with composition sifting and DMA framework. It likewise have one sound yield, four USB connector, forty pin GPIO connector, camera connector, one showcase serial interface and one High-Definition Multimedia Interface to associate with different peripherals [6].

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B. Blood Pressure Measurement-

Pulse estimation can be conceivable with the assistance of two distinct procedures which are Auscultatory system and Oscillometric method. In Auscultatory strategy is listening of korotkoff sound which gets made by body amid the circulatory strain estimation with the assistance of stethoscope. The right estimation is relying upon sleeve size, wrapping system and arrival of the weight. The first run through korotkoff sound alludes to systolic pulse and at the second time korotkoff sound alludes to as diastolic circulatory strain.

Fig. 4 Auscultatory technique

The oscillometric method relies on upon measuring wavering signs in the sleeve. Essentially it is measure by oscillometric proportion; systolic circulatory strain can be measure by systolic apportion and diastolic weight measure as a diastolic proportion [7]. The oscillometric procedure is very simple and mechanized system. Auscultatory system is more exact than that of oscillometric procedure.

Fig. 5 oscillometric technique

C. Electrocardiogram (ECG) & Heart rate Measurement-

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

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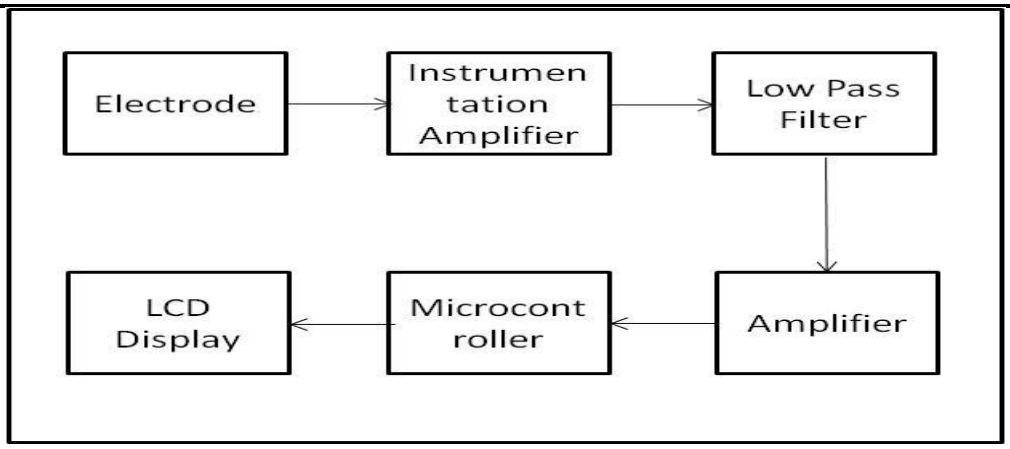

Fig. 6 ECG Block diagram

V. CONCLUSION

The reported writing on wearable sensors and gadgets for observing human exercises. The human action observing is an energetic territory of examination and a considerable measure of business advancement are accounted for. It is normal that numerous all the more light-weight, superior wearable gadgets will be accessible for observing an extensive variety of exercises. The difficulties confronted by the present configuration will likewise be tended to in future gadgets. The improvement of light-weight physiological sensors will prompt agreeable wearable gadgets to screen distinctive scopes of exercises of tenants. Formal and Informal review predicts an expansion of interest and subsequent utilizations of wearable gadgets in not so distant future, the expense of the gadgets is likewise anticipated that would fall bringing about of wide application in the general public.

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