Automated Paralysis Patient Healthcare Monitoring System Using IoT

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Abstract — Fitness is a metric that assesses a person's overall health. People are pursuing healthy lives in many ways, such as decent eating, frequent exercise, and adequate sleep, as more people emerge from poverty. With the rise of the Internet of Things and smart phones, fitness is becoming in-creasinglypopularthroughsmartwearable's.Electronicsareincr easinglybeing employed in clothes nowadays, making it smart and fashionable at the same time. Them a in goal of this project is to create as mart wear able fitness monitoring system that will aid athletes and regular individuals who need to keep track of their health when exercising, yoga, meditation, or jogging. This technique will assist them in keeping track of their health and increasing the effectiveness of their everyday workouts. As a result, the idea offers a system that may provide information on our fitness, such as the amount of calories burnt. Health care is a major concern in our people. In the rising technology, the Internet of Things (IoT) technology, captivate everyone's attention towards it for its potential to change the traditional health care system and to resolve the problem caused by the rise aging population and the continuing increase in chronic illness in the health care system. This paper mainly study about the conventional healthcare system which is used in past for providing healthcare services and the convergency of a new technology named IoT in the health care system to update the way of treating patients. This paper outlines how IoT has modified the traditional way of healthcare monitoring and make the services fast and efficient in a smarter way. In the end a research study has done on various IoT based healthcare monitoring system and farther more, a connection is made between these IoT based healthcare systems represent their goodness and weakness. Using ML we analysis health of person.

Keywords: Raspberry Pi, Temperature sensor, Heartbeat, Fall Detection, Flux Sensor

I. INTRODUCTION

It has been scientifically proven that people of all ages and conditions that regularly practice physical activity and sports benefit from a wide range of physical, social and mental health benefits. Fitness increases productivity, interacts positively with diet, enhances functional capacity, promotes social interaction, and reduces health care costs. Companies and researchers worldwide are devoting an increasing attention to sports, fitness and physical activities. Anathlete always needs to monitor, watch and record our daily burned and step counts, body temperature. Self-tracking allows them or normal people to stick toa healthier diet, exercise more and sleep better. Regular use of fitness tracker boosts your daily work outs and makes the machievable.[1] The main motivation of this project is to design a smart wearable fitness monitoring device which will help the athlete, normal people who need to monitor their health during exercise, yoga , running. This system will help them to monitor their health and boosts their daily work outs and makes them achievable. These people in most cases are not able to give their needs as they are neither able to speak well nor do they give through sign language due to loss in motor control by their brain. In such a case we propose a system that helps damage person in displaying a message over the LCD by just simple motion of any part of his body which has motion abilities. This system also takes care of the condition wherein no one is present to attend the patient and thus sending a message through GSM of what he wants to give. If there was no one to manage to the message displayed on the LCD, the patient can choose to tilt the device for some more number of time which will trigger an SMS to be sent by a GSM modem to the registered care taker of the patient with the message that the patient wants to give.

II. PROPOSED METHOD

Our proposed method is based on automating the method of gathering patients data via sensors connected to medical devices and conveying this information to the medical center cloud for the purpose of storage and processing using Raspberry Pi. The proposed method of patient health monitoring system is to monitor patient's body temperature, heart rate using Raspberry Pi. The temperature sensor senses the temperature from the patient's body and sends the information to the Raspberry

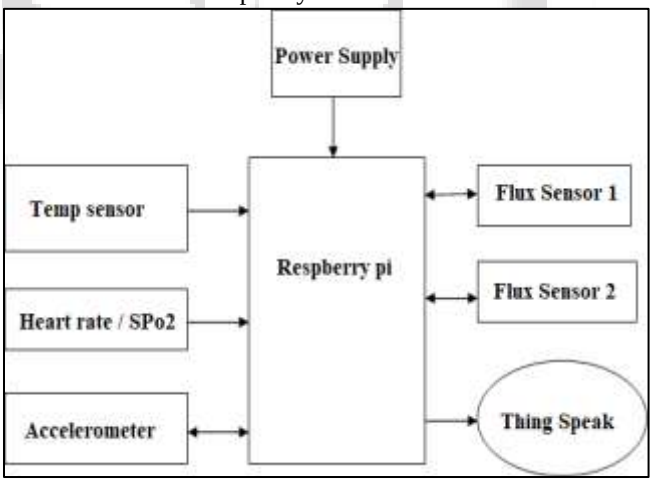

Fig. 1: Block diagram of Healthcare Monitoring System

The heart Rate sensor collect the heart beat from the patient, the information obtained from the heart beat sensor is in the analog form,in order to convert it into digital form Analog-to-Digital Converter is used. This obtained Digital output send to the Raspberry Pi. The output obtained from Raspberry Pi is displayed at the HDMI display and also the values are displayed in the LCD display. This Systemis made to avoid urgent situations and treatment on time and instantly. When abnormal data is announce, message will be transfer doctor's mobile. And it can avoid error and handle urgent situation. It also gives advantage that it reduces time laps between situation and their alert to doctor, that means doctor will know situation as immediately it happens.

III. IMPLEMENTATION METHODOLOGY

A. Hardware Description

This deals with the physical entity used in the system. The heart of the system is Raspberry Pi, which controls and monitors theoverall behavior of the system. The Hardware's are

1) Heart Beat Sensor
2) Raspberry Pi 3
3) Temperature Sensor
4) Accelerometer Sensor
5) LCD Display

1) Heart Beat Sensor (TCRT1000):

The Heart Beat Sensor is based on the principle of photo plethysmography. It count the variation in the volume of blood through any regions of the body which element a change in the light intenseness through that region (a vascular region).When the index finger is placed on the heart beat sensor, the form in an optical control place when the light falls on the index finger is scattered or absorbed by the pathway through the blood as the changein heartbeat.

2) Raspberry Pi:

This powerful credit - card sized single board computer can be used for many applications and supersedes the original Raspberry Pi Model B+ and Raspberry Pi 2 Model B. Raspberry pi 3 is a credit card size single board computer along 40 pin extended GPIO, Broad cam BCM2387 chipset, 1.2GHz Quad-core ARM Cortex-A53(64Bit), 802.11 B/G/N Wireless LAN and Bluetooth 4.1, GPU(Dual Core Video Core IV Multimedia Co-Processor), Camera connector, Display connector, Memory card slot,1GB LPDDR2 memory, Ethernet port, USB host, Micro HDMI on it. Raspberry pi3 is a general cause computer normally with Linux OS.

Fig. 2: Raspberry Pi 3 B Model

The Raspberry Pi is the Third generation Raspberry Pi as shown in Fig. 2. It has 10/100 Base Ethernet socket to quickly connect the Raspberry Pi to the Internet and Micro USB power source socket with 5V voltage and 2A current. The Raspberry Pi board proceed equipped with an SD card. This slot permits us to put an SD card and that can use it as our tools. The SD cardis a main storage tool for Raspberry Pi board like a hard disk of a personal computer.

3) Temperature Sensor (DHT11):

The DHT11 sensor is digital temperature and humidity sensor. It is very popular as it is very cheap but still providing great successful result. The temperature ranges from0 to 50 degrees Celsius with+/- 2degrees accuracy. And the Humidity range is from 20 to 80% with 5% accuracy. The sampling rate is 1Hz or one reading all second. The operating voltage is 3 to 5 volts, the max present used when measuring is 2.5mA. It includes humidity measurement component in order to scale the humidity and an NTC temperature measurement component for scale Temperature. It offers best quality, fast response, anti-interference ability and cost-efficacy.

4) Accelerometer Sensor (ADXL345):

The recently introduced ADXL345 is an iMEMS 3-axis accelerometer with digital output.It features a selectable ±2-g, ±4-g, ±8-g, or ±16-g measurement range, resolution of up to 13 bits; fixed 4mg/LSB sensitivity; a tiny 3mm × 5mm × 1mm package, ultralow power consumption (25 µA to 130 µA). iMEMS semi semiconductor technology combines micromechanical structures and electrical circuits on a single silicon chip. Using this technology, iMEMS accelerometers sense acceleration on one, two, or even three axes, and give analog or digital outputs. Depending on the application, the accelerometer may offer different ranges of find, from several g to tens of g. Digital versions may even have several interrupt modes. These features offer the user suitable and flexible solutions.

5) LCD Display:

Liquid Crystal Display a type of display used in digital watches and many portable computers. It is utilized to display the measured data. In this project 16 x 2 Alphanumeric Display are used, it can display two lines with maximum of 16 attribute in one line. A 16x2 LCD means it can display 16 aspect per line and there are 2 such lines. In this LCD all attribute is displayed in 5x7 pixel matrix.

This LCD has two registers, that is, Command and Data. Liquid Crystal Display has the distinct pros of having low power utilization than the LED. The command register stores the command order given to the LCD. A command is an order given to LCD to do a decided task like initializing it, clearing its screen, setting the cursor position, controlling display etc.

B. Software Description

It deals with the Raspbian Operating System (OS) that is utilized in the Raspberry Pi, python language such used for programming of Raspberry Pi and putty simulator.

1) Python:

Python is an interpreted, object oriented, high-level programming Language with dynamic definition. Its high-levelbuilt in data structures, combined with dynamic typing and dynamic binding makes it very attractive for Rapid Application Development, also for use as a scripting or glue language to connect existing components together. Python's simple, easy tolearn syntax emphasizes clarity and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourage modularity and code reuse. The python Convert and the large standard library are available in source or binary form without charge for all major platforms, and can be freely delivery. Python 2.7 version, like pre- installed in Raspbian OS, is applied in the project for programming of Raspberry Pi.

2) Putty Simulator:

The name "Putty" has no explicit meaning. Putty was originally written for Microsoft Windows, but it has been

bearer to various other operating systems. Official ports are accessible for some Unix-like stage, with work-in- progress ports to Classic Mac OS and macOS, and unofficial ports have been coordinate to platforms such as Symbian, Windows Mobile and Windows Phone.

3) Raspbian Operating System (OS):

Raspbian is a free operating system based on Debian advance for the Raspberry Pi hardware. An operating system is the set of basic programs and usefulness that make Raspberry Pi run. However, Raspbian provides more than a pure OS: it comes with over 35,000 packages; pre-compiled software bunch in a nice format for easy installation on Raspberry Pi. Raspbian is highly advance for the Raspberry Pi line's low-performance ARM CPUs.

IV. SYSTEM DESIGN

The Fig.3 shows the Circuit working module. It include of Raspberry pi board, Temperature sensor (DHT11), Heart Beat sensor,Accelerometer sensor and LCD Display.

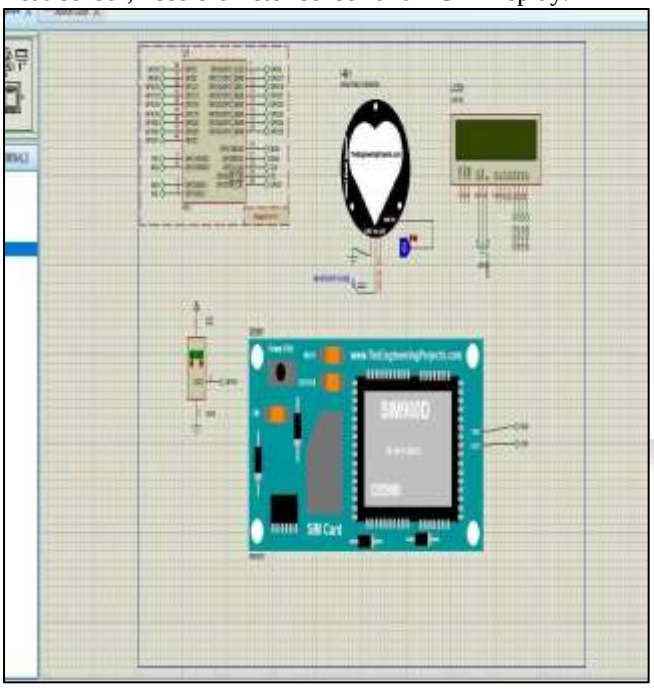

Fig. 3: Circuit diagram

A. Theoretical Description of Project:

Machine Learning is a discipline which is elevate out of Artificial Intelligence (AI). appeal artificial intelligence, we can build better and shrewd machines. Machine Learning is a plan to gain from example and experience, without being expressly altered. Instead of writing code, the data is fed to the common algorithm, and logic is built based on the data given. Machine learning is applied in web searches, spam filtering, ad placement, stock trading and so on [15]. Machine Learning gains same importance and recognition as that of big data and cloud computing by survey those big chunks and simplifying the task of data scientists in an automatic process. costly scale informational collections are collect and examined in various areas, from planning sciences to social organizations, business, bio molecular research, and security [16]. Most traditional machine learning algorithms are engaged for data that would be completely loaded into memory [17]. Even though learning from these plenty data is expected to bring substantial science and engineering advances along with improvement in quality of our life [18], it carry tremendous encounters at the same time.

B. Theoretical background:

We propose an Organic manure monitoring system that comprises of hardware. The pro-posed hardware solution consists of controller (Raspberry pi), GSM module, temperature humidity sensor, Controller continuously monitors the sensor value.

C. Raspberry Pi:

Raspberry Pi characterize minicomputer the size of a credit card that is compatible with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – completely converting the set-up into a full-fledged PC at a low cost

D. Diagram:

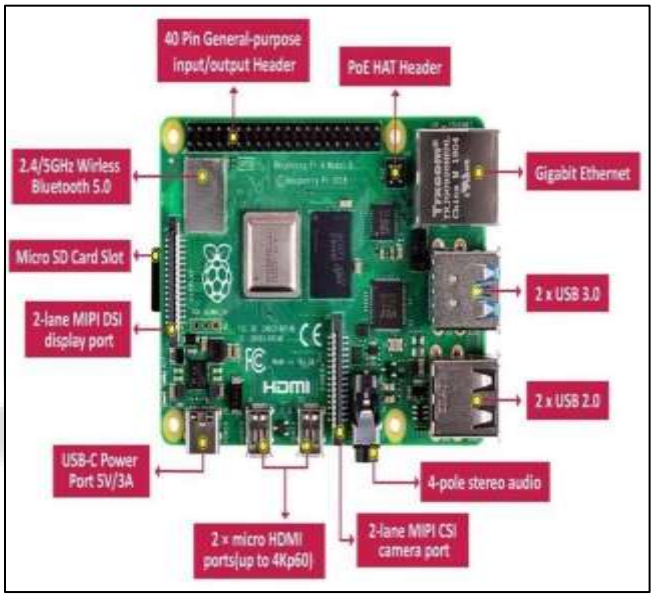

Fig. 4: Rasberry Pi Model

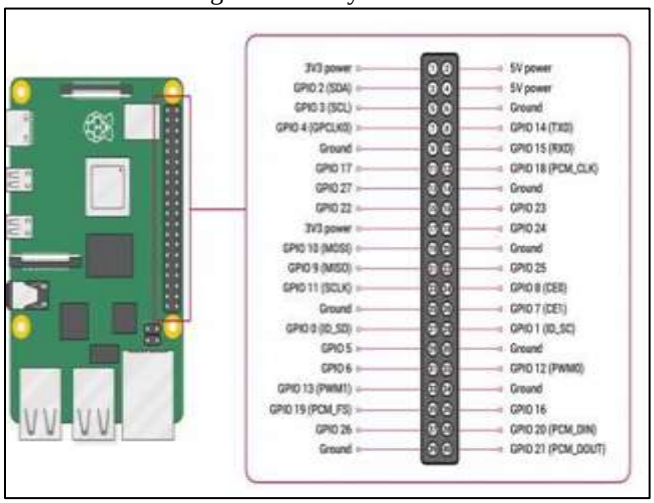

Fig. 5: Rasberry Pi Model Pins

V. APPLICATION

- health informatics, for example heart rate, blood oxygen level, blood pressure and temperature monitoring;
- contactless payment and digital wallet applications;
- messaging and calling features, similar to those on a smart phone;
- emergency calls for helper if the watch detects the wearer has fallen;
- social media and other notifications from synchronized smart phone applications;
- games, music, photos and other entertainment options; location features, for example maps, a compass and an altimeter;

VI. CONCLUSION

The wearable landscape is in constant change. New devices and brands are expressed every year, Hopeful improved measurements and user experience. At the same time, other brands dissipate from the consumer market for various reasons. Improve in device quality offer new opportunities for research. However, only a few well-established brands are frequently used in research projects, and even less are in depth validated.

With this project, we conclude that this system is going to be very helpful for athlete, for the people who wants to monitor the health parameters.

REFERENCE

[1] Tyler Hayes "What's inside fitness tracker, anyway?", In November 29, 2014 1:00 PM2Innavishi,Moverofmirrors"How do optical heart rate sensor work?",written in Jun 20,2015
[2] GubbiJ, Buyya R., Marusic SP alaniswami M "Internet of Things (IoT): A vision, architectural elements, and future directions", In Future Generation Computer Systems,29(7),1645-16602013.http://doi.org/10.1016/j.future.2013.01.010
[3] OpenshawE, HagelJ, WoollM, WiggintonC, BrownJ. SBanergeeP "The internet of things ecosystem: Unlocking the business value of connected devices", Deloitte2014.
[4] SchatskyDTrigunaitA"InternetofThingsDedicatednetworksandedgeanalyticswillbroadenadoption", In Deloitte University Press, 2011307–323.
[5] Anupaa Kaushik "IoT- An Overview", In Maharaja Surajamal Institute of Technology, Delhi, India.
[6] Sreekant K U, Nitha K P "A study on health care in Internet of Things" , In Vidhya academy of science and Technology.
[7] GengHJohnWileySons"Internet of Things and Data Analytics Handbook", In 2017.
[8] Minerva R, Biru A Rotondi D "Towards a Definition of the Internet of Things (IoT), In IEEE 2015.
[9] ShenX "Emerging technologies for e-healthcare", In IEEE Network, 26 (5) 2012, https://doi.org/10.1109/MNET.2012.6308066

