Portable e-health tracking kit

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Abstract : The e-Health Acquisition system allows the user to perform biometric and medical applications where body monitoring is needed by using 3 different sensors: pulse, airflow (breathing), body temperature. This information can be used to monitor the condition of a patient or to get sensitive data in real time to be subsequently analyzed for further medical diagnosis. If real time image diagnosis is needed a camera can be attached to the 3G module in order to send photos and videos of the patient to a medical diagnosis centre. Data can be stored on cloud and even represented in graphical form to get a statistical comparison for the day to day monitoring of a patient, which can be used to understand whether the health of the patient is improving or degrading which can be very useful data for any further diagnostics. Data can be sent to the Cloud servers in order to perform permanent storage or visualized in real time by sending the data directly to a laptop or Smartphone. Software applications have been designed in order to easily see the patient's data. This application will also sense and compare your data with a normal healthy human being's data and will notify you accordingly that whether you are a healthy person or not, it will also suggest you to consult a doctor immediately or not. It can also suggest you some medicines which are usually prescribed. This system will be beneficial to patient who requires regular check-up, people who stay in remote places and don't have access to hospitals or doctors and even for a family.

IndexTerms **- Acquisition, cloud, e-health, patient, health monitoring.**

I. INTRODUCTION

Data Acquisition is a broad term that includes a suite of different tools and technologies that are designed to accumulate data. This system generally consists of Data Acquisition software and hardware along with sensors and actuators, and they generally require a medium for data communication between the hardware and software.

The hardware typically consists of components in the form of external expansion cards and sensors. They can be connected to the computer through a communication interface such as a PCI or Wi-Fi module, or can be directly installed onto the motherboard.

The hardware is connected with an input device such as different sensors or ADC. The signal from the input device is sent to the hardware device/card which acts as a medium, processes and sends it to the software, where it is recorded for the further review and analysis.

The Arduino Uno is primarily an open source microcontroller chip board which is based on the Microchip ATmega328P. Generally, the Arduino Uno consists of 14 Digital pins and 6 Analog pins. the main advantage of using Arduino Uno is that it can be easily programmed using the Arduino IDE. The Arduino Uno Generally consists of a B type which is generally used for the programming purpose only.

There are a lot of different types of pins specifications which are mentioned below: -

1. LED
2. RESET
3. GND
4. VIN
5. 3V3

Now a day the Arduino Uno is used in a lot of things which are mentioned as below: -

1.Traffic Light Count Down Timer
2. Parking Lot Counter
3. Weighing Machines
4. Medical Instrument
5. Emergency Light for Railways

Generally, the input voltage hat is available with an Arduino Uno is generally from 5 to 20 Voltage. The flash memory that is available with it is 32k KB out of which generally 0.5 KB is generally used for Bootloader.

The limitations of using the Arduino Uno are that Arduino shields away a lot of complexity which is an advantage to get started, but limits you later. It also ensures that some of the things will work more difficultly, but that's inevitable. And the second is that the Arduino IDE is not a good code editor.

System on a chip is basically a type of integrated chip which usually integrates all the different components of a computer system. The basic parts of a SOC are CPU (Central Processing Unit) memory, input and output and the secondary storage, Operating system and a power management system, ROM and RAM. The system on a chip are generally used a lot in embedded systems and internet of things, mobile computing and the most in the personal computers. SOCs are used to optimized and maximize computational and communicational throughput.

II. BACKGROUND STUDY

IoT is also popular in health care field. Nowadays, various health monitoring devices are getting wearable/portable, including body temperature monitors, glucose monitors, ECG monitors, pulse oximeters, and blood pressure monitoring system are described in [1]. The IoT is a megatrend in next-generation technologies that can impact the whole business spectrum and can be thought of as the interconnection of uniquely identifiable smart objects and devices within today's internet infrastructure with extended benefits [2-3]. Various nonintrusive sensors have been developed for a diverse range of medical applications [5], particular for WSN-based healthcare services. Such sensors are prospective enough to deliver the same services through the IoT. On the other hand, wearable devices can come with a set of desirable features appropriate for the IoT architecture [4]. Human fall detection system is very helpful for monitoring the older people who lives in alone. A prototype fall detection system based in Internet of Things is presented in [6-7]. The function of the wearable pulse oximeter. Wrist OX2 by Nonin is illustrated in [8]. This device comes with connectivity based on a Bluetooth health device pro_le, and the sensor connects directly to the Monera platform. An IoT-optimized low-power/low-cost pulse oximeter for remote patient monitoring is proposed in [9]. This device can be used to continuously monitor the patient's health over an IoT network. An integrated pulse oximeter system for telemedicine applications is described in [10]. A wearable pulse oximeter for health monitoring using the WSN can be adapted to the IoT network [11]. Body temperature monitoring is an essential part of healthcare services because body temperature is a decisive vital sign in the maintenance of homeostasis [12]. In [13], them-IoT concept is verified using a body temperature sensor that is embedded in the TelosB mote, and a typical sample of attained body temperature variations showing the successful operation of the developed m-IoT system is presented. A Temperature Measurement system based on a home gateway over the IoT is proposed in [14]. The home gateway transmits the user's body temperature with the help of infrared detection. Another IoT-based temperature monitoring system is proposed in [15]. The main system components responsible for temperature recording and transmission are the RFID module and the module for monitoring body temperature.

III. PROPOSED SYSTEM

The basic plan of this particular system is that a particular individual can easily keep the track of his of her own health by just using the kit that we have developed in our project. The main aim of this project is that the health of a particular individual can be improved. In this project with the help of different sensors that we have used (Pulse rate sensor, Body temperature sensor, Respiration sensor) we will collect all the data from the individual's body and as soon as the results are obtained the results are matched with the previous results stored in the system using the concept of pattern matching. After this the results will either be shown in the graphical way or in the normal way using the google sheets. Now in case the results obtained by doing pattern matching are not according to the criteria that has been already set, then the particular patient is informed using the Video playback module. The processor that we have used in this is the Arduino Uno which furthermore will be connected to the internet using the Ethernet Shield or a Wi-Fi module.

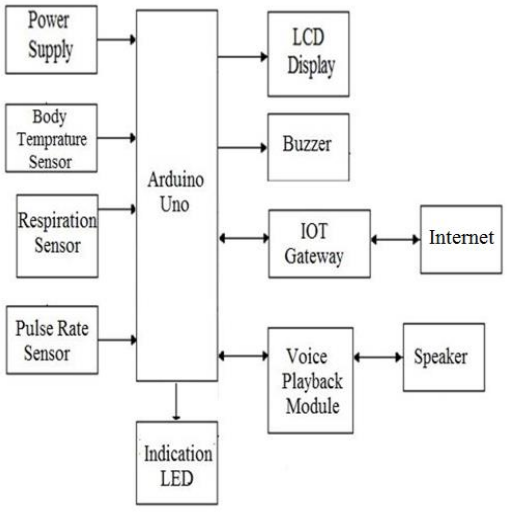

Fig :- Block Diagram Of System

figure 1: block diagram of the e-health tracking kit

IV. FUTURE SCOPE

As we can refer to the flow chart below, in the third stage, we can use various other sensors to gather more readings and information about the patient's health. Moreover, in the fourth stage, we can use Bluetooth module to give notifications to any individual to notify about their health. In fact, we can create an alert system about any critical information and notify to doctors or other family members about the patient.

A. What is the system used for?

The system is basically an e-health acquisition system, so as the name suggests with the help of this system we can acquire various statistical data about any individual and with the help of these readings the further diagnostic can be done.

B. What are some of the real life applications of this system?

1) This kit can be installed in ambulances so that whenever there is a critical situation to be handled the basic medical conditions of the patient can be acquired in the way to the hospital, which will save the time and can be ultimately proved as a life saver kit.

2) Every family can invest in this kit which is portable and acquires enough statistical data of an individual to keep a track of his/ her health.

V. CONCLUSION

With the help of this kit people can easily keep a track of their health. Hence, they don't need to go to the hospital for regular check-ups. In the kit that we have proposed the normal body temperature is 37-degree Celsius and the normal blood pressure is 120/80. The main aim of this is to allow every keep a track of his or her health.

VI. RESULT ANALYSIS

In this system we can not only gather the statistics or data about the patient's health condition, rather we can compare the gathered data on daily basis to know the health condition is enhancing or degrading day by day. Even the push notifications can be use to alert the family members or the doctors related to the patient/individual. Also the data can be compared with the healthy person's statistics to determine the individual is healthy or not.

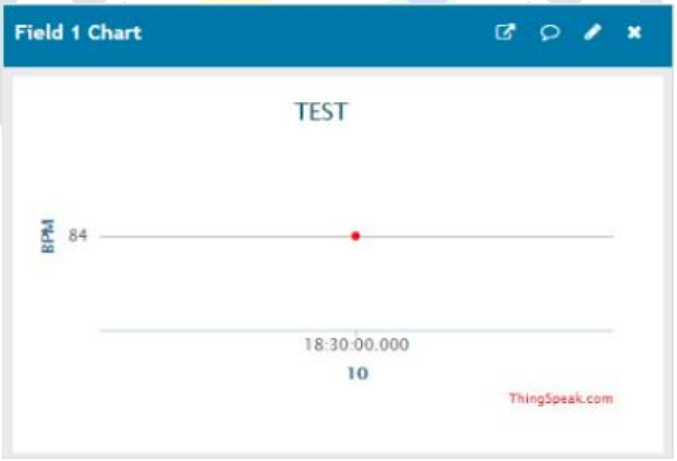

figure 2: blood pressure monitor results shown in a graphical representation.

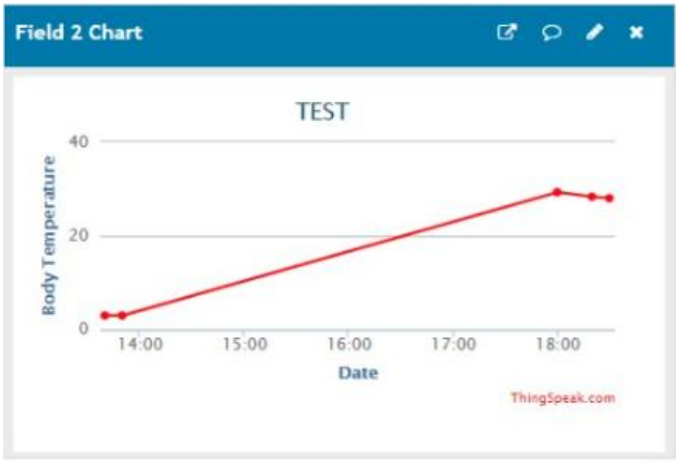

figure 3: body temperature shown in graphical representation on real time basis.

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