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An IOT based Portable Health Monitoring Kit

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Abstract: ***In this daily life being healthy and being busy in hard work is nearly impossible, have turned into a matter of worry for the huge majority of the general population. Long waiting periods at the hospitals or monitoring patients becoming a serious issue. The issues request for a health observing framework which can screen the day by day routine parameters, check heart rate consistently and can report the same to the concerned individual with the assistance. Our framework advances the technique which utilizes the sensors to track patients' health and using web, inform their friends and family if there is any occurrence of any issues. Our framework utilizes temperature and in addition heart beat detecting to monitor patients' health. The sensors are associated with Arduino microcontroller and IOT module to track and maintain health, also wireless connections keeping that in mind the end goal to transmit alarm. On the off chance that framework distinguishes any sudden changes in heart beat or body temperature, the framework consequently alerts the client about the status over IOT and furthermore indicates points of interest of heartbeat and body temperature, live using the internet. Subsequently this IOT based framework adequately utilizes web to screen the statistics of health and save lives on time.***

Keywords: Health Monitoring, Heart Rate, Body Temperature, Body Humidity, IOT, Advance Health Kit.

I. INTRODUCTION

In this paper, we proposed a system, which can use to monitor the heart beat and body temperature of any individuals. To measure the body temperature, we can use two ways firstly we can use thermometer, and secondly we can use the body temperature sensor. In the same way to detect the heart beat we can use two processes. One way is we can manually check the pulse rate either at wrists or neck and the other way are to use a heart beat sensor. In this project, we have outlined a system consist of Heart rate and body temperature monitoring using Arduino Uno. The utilization of these sensors, their principals and working process are described elaborately in this paper.

Checking heart rate is imperative for athletes, senior citizens and also working individuals as it decides the condition of the heart or just heart rate. There are numerous approaches to quantify heart rate and the most exact one is utilizing an Electrocardiography. But more simple approach to screen the heart rate is to utilize a Heartbeat Sensor. Same way measuring body temperature is also mandatory for everyone as it describe the condition of health. Many processes are there which gives the acute measurements about temperature and the best way is the use of bodily temperature sensor. All comes in various shapes and sizes and enables the processing of the measurement of pulse and body temperature.

Heart beat Sensors are accessible in Wrist Watches (Smart Watches), Smart Phones, chest straps, and so forth. But these all products are very costly and not possible for everyone to buy and use it. In this project we have described about the system where a patient can get to know about its heart rate and body temperature not only in acute measurement but also they can see the graph which changes second to second according to their breathing or pulse rate and the whole procedure is done using Arduino which shows the graph and the whole process and these whole process will be delivered to the doctor because the procedure is processed wirelessly and connected through the Wi-Fi. So it becomes very easy for doctors to check the full process and give command according to those details.

II. INTERNET OF THINGS

Internet of Things is an interesting and exciting field. The Internet of Things was first used in 1999 by Kevin Ashton. It proposes that all the nearby electronics devices connected to internet and interacting with them from anywhere. Nowadays we want everything in our finger tip such as shopping, bill payment, banking system and many more. We are progressing towards improvement in this field day by day. It can be estimated that there will be 50 billion IOT devices in the world by 2020. IOT give us the opportunity to maintain our daily life with specified and time managed way.

Fig: 1 Internet of Things

IOT based applications

1) *Smart Health Care:* There are number of specific instruments for measuring and maintain health parameters. Health status of a person can be known by finger tip and remind doctors and family members in case of any emergency arises.
2) *Smart Home Automation and Security:* Home networking, integration, automation, security, and control mechanisms are hitting the market very frequently. A compact device of the house can be control and maintain different devices like AC can be shut down or turn ON from anywhere, notified about the unavailable items of Fridge, Gezer can be automatically set after the gets OFF, Coffee maker will be start after the Gezer turn OFF as many more.
3) *Smart Traffic Management:* IOT provides real time road traffic system to vehicle's driver and also provide the safety and security of passenger.
4) *Smart Display:* IOT provides all kinds of machines such as ATMs, vending machines, television sets, security video cameras, sign posts, and dashboards can be intertwined together at strategic locations. As an example a hungry person could order his pizzas on his mobile phone yet see the pizza details and pictures on the larger screen of any one of these machines or with connected projectors showing the images on a white wall to give a clear vision.

III. SYSTEM DESCRIPTION

A. *Overview*

IOT based health monitoring system deals with the measurement of human body parameters such as body temperature and heart beat and sends the real time parameters to the doctor and the patient's relatives over the phone. This module is handy and it measures the parameters with good accuracy. This module is encapsulated with WI-FI module, which sends a message alert to doctor at any emergency condition and this will be helpful to take necessary action.

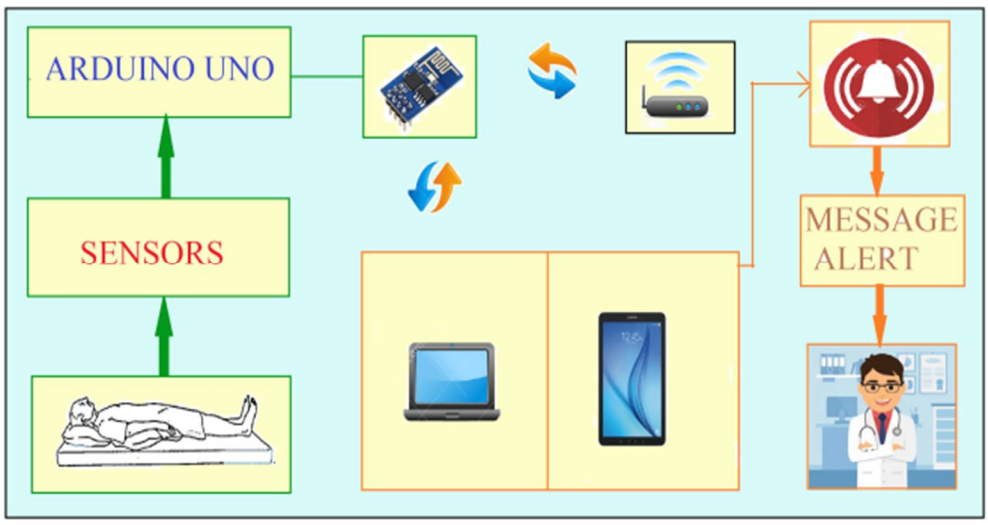

Fig: 2 proposed model on side of young engineers

This system has some restriction and advantages like

1) *Reliability:* This proposed system is reliable due to its small and compact device for measurement of different human body health parameters. It is easy to accessible and with less system failure. In case of any emergency the doctor will easily get a feedback about patient's health status.
2) *Flexibility:* This device is made with Arduino Uno and module based sensors, which are easily available in market with an affordable cost. Implementation of the framework, change of any circuitry and modification of the software as per system requirement is very easy.
3) *Restrictions:* The device is made up with all electronics components so it should be carefully handled and keep it at a safe place. It always powered with 9 volt battery and get message alert from the device it should be connected with internet.

B. Hardware Description:

1) *Arduino Uno:* Arduino Project started back in 2005; over 150,000 boards have been used worldwide to date. Arduino is a compact microcontroller that can be programmed to process inputs and outputs between the devices and external components which have connect to it. The Arduino Uno is a microcontroller board with ATmega328 microprocessor. It has 14 digital input/output pins of which 6 can be used as PWM pin, 6 analog input pin, a 16 MHz crystal oscillator, a USB connector, a power supply jack, an ICSP header, and a reset button.

Fig: 3 Arduino Uno Microcontroller Board

2) *IOT module (ESP8266-01):* In market many types of IOT modules present among them ESP8266-01 is tiny, cost efficient but not compatible with standard breadboard. ESP8266-01 is consists of total 8 pins such as Tx , Rx, Vcc, GPIO 0, GPIO 2, RST, GND, CH_PD (EN). It gets power from Arduino Uno and in this project we use Arduino as a secondary device but USB FTDI can be used as a power supply which typically supply 3.3 volt. Therefore for most ESP8266 module needs dedicated power supply that can give at least 300 mA to be safe.

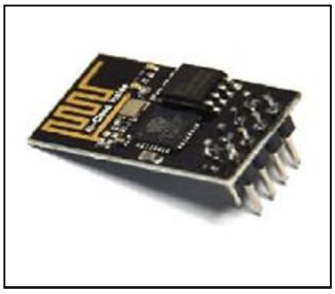

Fig: 4 ESP8266-01 IOT Sensor Module

3) *Heart Beat Sensor (KY 039):* Heartbeat Sensor is working on the principle of Photoplethysmograph. As indicated by this guideline, the frequent changes in the volume of blood in an organ are estimated by the adjustments in the power of the light going through that organ. For the most part, the source of light in heart beat measuring sensor would be an IR LED and the

detector would be any Photo Detector like a Photo Diode, a LDR or a Photo Transistor. With these two i.e. a light source and a detector, we can organize them in two different ways: A Tran missive Sensor and a Reflective Sensor. In a Tran missive Sensor, the light source and the detector are put facing each other and the finger of the individual must be put in the middle of the transmitter and receiver. Reflective Sensor has the light source and the detector adjacent to each other and the finger of the individual must be put in front of the sensor.

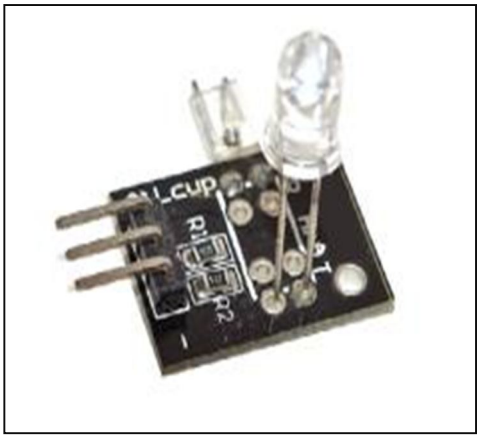

Fig: 5 KY 039 Heart Beat Sensor Module

4) *Temperature Sensor (LM35):* The temperature sensor used in this project is LM35. The series of LM35 are accurately integrated circuit temperature sensors. The voltage which comes out as an output is straightly corresponding to the Celsius temperature. The LM35 is works at - 55˚ to +120˚C. The temperature sensor has three terminals and required Maximum of 5.5 V supply. This sort of sensor comprises of a material that plays out the task as indicated by temperature to vary the resistance. This difference in resistance is detected by circuit and it calculates temperature. At the point when the voltage builds up then the temperature likewise rises. We can see this activity by utilizing a diode. Temperature sensors specifically associated with microprocessor input and in this manner able to do immediate and dependable correspondence with microprocessor. The sensor unit can discuss viably with ease processors without the need of A/D converter.

Fig: 6 LM 35 Temperature Sensor

C. Software Specification

The proposed project made with open source software, they are easily accessible from internet and user friendly. The software implementation made with **ThingSpeak** software and **Virtuino** android application. ThingSpeak is an open source IOT platform and API to store and retrieve data from things over internet using HTTP. This project made up with Arduino Uno, that's why the code uploaded to Arduino IDE and sensor data exported to ThingSpeak. The data also exported to Virtuino application which is shown in internet connected mobile phone anywhere from world. According to this project here two step vigilance as from laptop or desktop in charge ward boy or nurse which is setup in medical ward, another to Doctor in charge and patient's relative who present in hospital. Not only in hospital but also when patient's relatives are not present in hospital they can take an observation from residence.

D. Project Implementation

The health monitoring system consists of ESP8266-01 as an IOT device which is of low cost and very efficient. The microcontroller board, Arduino Uno which has been used here for transmitting and receiving purposes and provide power to ESP8266. Here, the Pulse Sensor that is used acts for the purpose of measurement of heat beat and LM-35 is for measurement of body temperature.

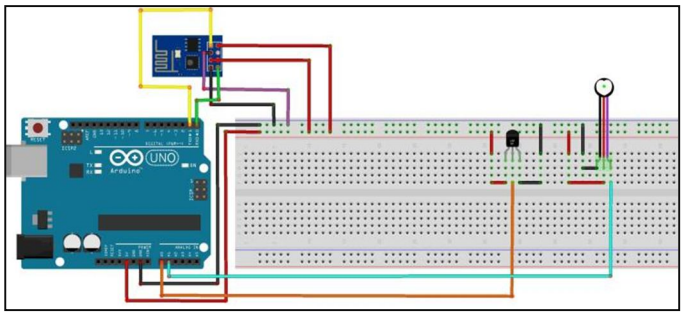

Fig: 7 Circuit Representations through Software

The link shown below is tabulated the components used in this particular project
file:///D:/project/biomedical/bio_bom.html

E. Flow Diagram and Operation

The health monitoring device that fully operates on program execution is written here in the Arduino Uno microcontroller. Below the flow chart describe the execution of program and its working principle.

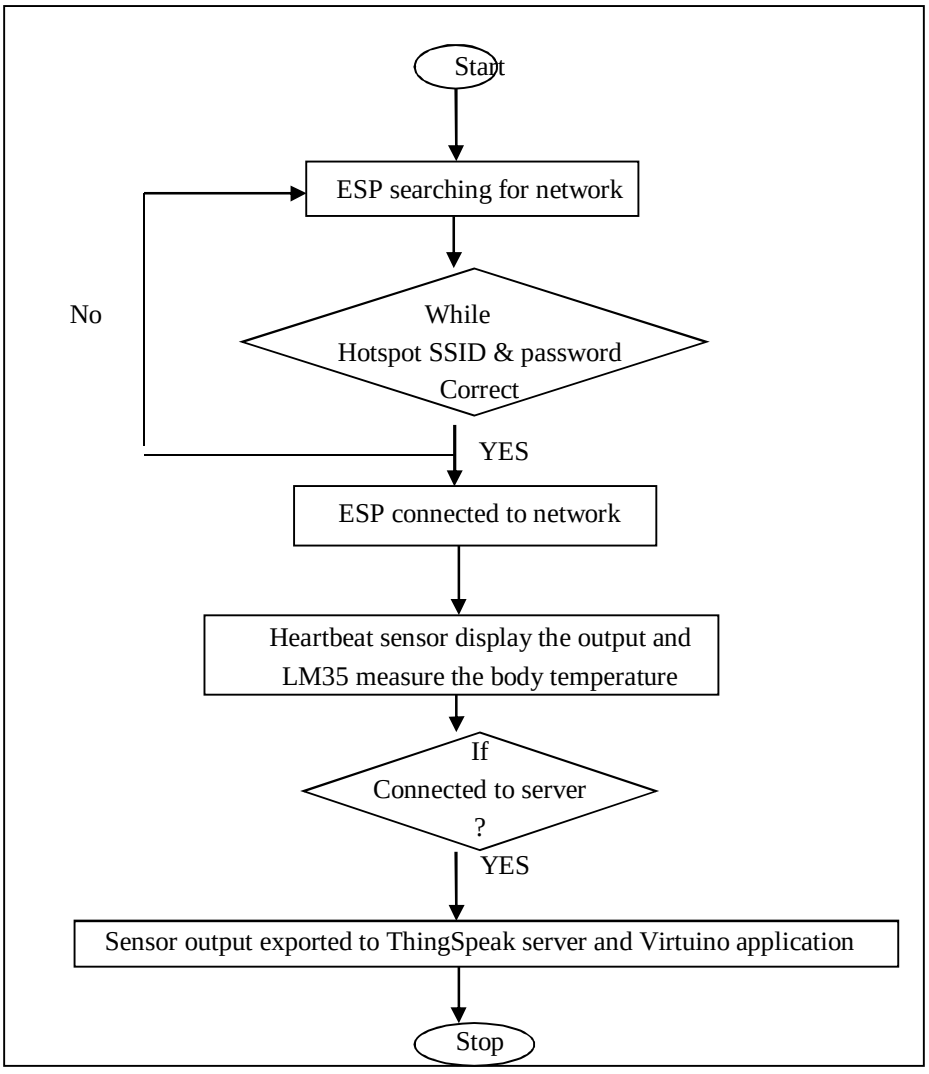

Fig: 8 Flow Chart of the Proposed System

The above flowchart described that, firstly, that when ESP8266 connected to powered mode, code snippet is flashed to the microprocessor and after being successfully uploaded it is searched for available network. Now when it finds the available network, programmer should be input SSID & password of the WI-FI network. Thus after the successful connection heartbeat sensor and LM35 sensor reads data and upload it to ThingSpeak server and also Virtuino (Android application) and the corresponding data shown in particular IP address and Android phone.

IV. RESULT AND DOCUMENTATION

In this section the corresponding measured data shown in ThingSpeak server and Virtuino application.

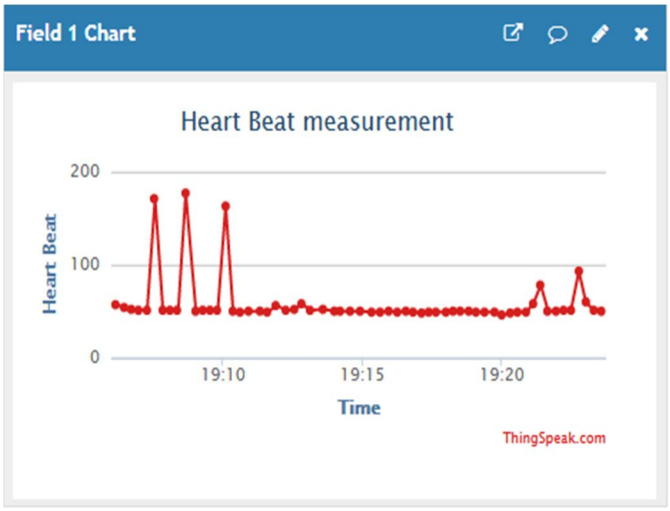

Fig: 9 Response of the Heart beat from ThingSpeak

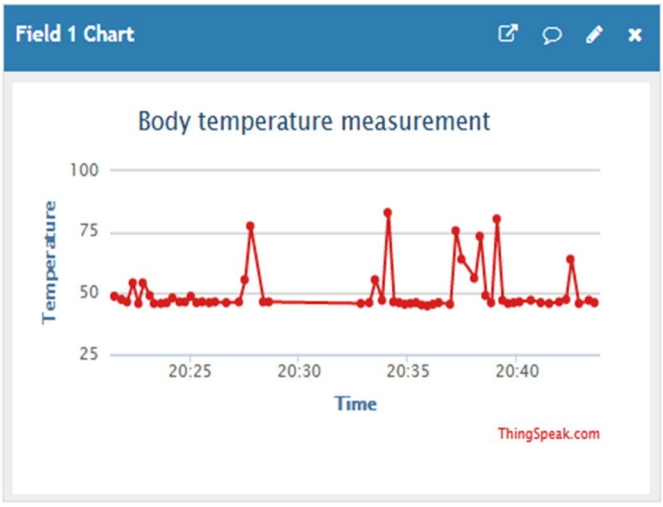

Fig: 10 Response of the Body Temperature from ThingSpeak

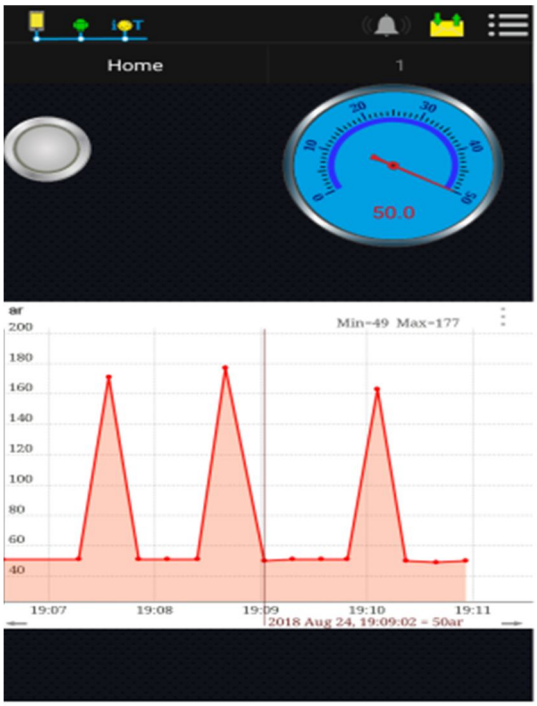

Fig: 11 Response of the heart beat from Virtuino

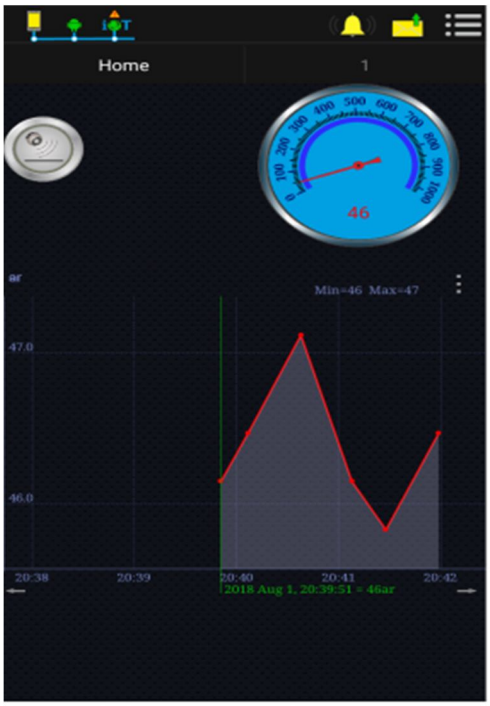

Fig: 12 Response of the Body Temperature

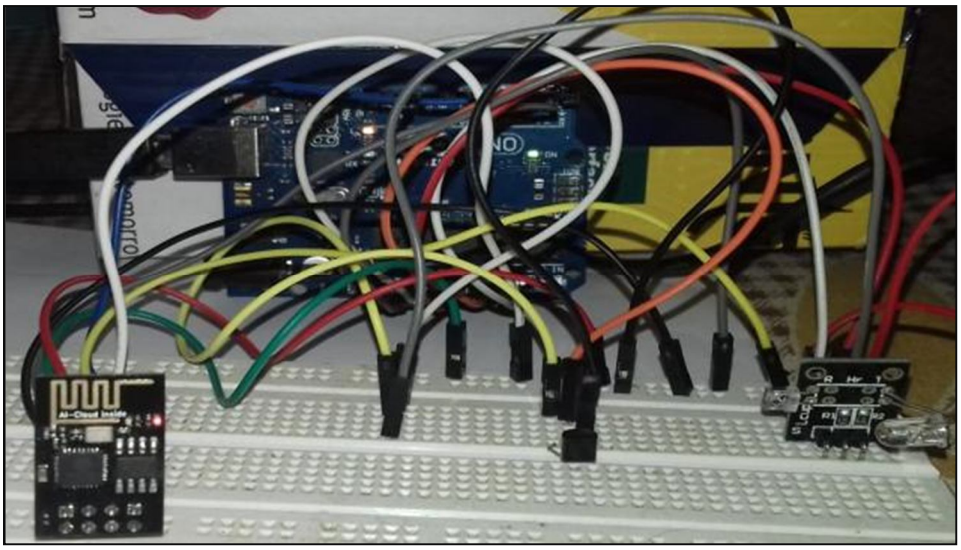

Fig: 13 Real Time Set up of the Proposed System

The Fig 9 and Fig 10 shows the data chart of the LM 35 and Heart beat sensor from ThingSpeak. The Fig 11 and Fig 12 shows data chart of the LM 35 and Heart beat sensor from Virtuino application and Fig 13 shows real time setup of the proposed project. From the analysis of data it can be said that its accurate and easy to observe but it can be malfuction if it can not handle with care. All the data are shown is always presence of internet connecton and 9volt powered battery. The above shown data is only for testing or project research purpose so that it may not be same as per real data. This device made for reserch and devolopement purpose so it can not be used commercial purpose.

V. CONCLUSION

This paper proposed an IOT based body temperature and heartbeat monitoring system which overcomes the problems faced by doctors and hospital authority caused by instruments which are used in hospitals, nursing homes and other health care sectors. This system is less bulky, cost efficient, simple circuitry, low maintenance cost, and portable in comparison with respect to those instruments which are available in market. The incorporated WI-FI module has make the system IOT, that means if the patient is in serious condition or not feeling well then take him/her to the health center. This IOT based portable device helps to quick measurement of temperature and heartbeat and can send the measured data using internet to the doctor in charge over mobile and then doctor take suitable action as soon as possible. According to our observation and research this device is advantageous to health sectors as well as patients. Simply using particular IP address the doctor and patient's relative could know about the patient's health status online by using Laptop or Smart mobile by using Virtuino application and obviously this device should be connected to Internet. According to our research and analysis this device is of good accuracy, very efficient, portable and cost effective product for our Health Sectors.

VI. FUTURE SCOPE

The device may be upgraded by adding more sensors with the proposed system described above. Its function can to measure many other health parameters of human being like Blood Tests for Malaria or Dengue, Blood Sugar, Creatine Test, Urine Test etc. And can be made more advance to provide more accessibility and extended functionality. Mess network can also be used to enlarge the operating range of the communication, so that doctors can see the health status of many patients at the same time in a real time, thus it makes it less time consuming and very efficient digital monitoring.

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REFERENCES

A. *Research Articles*

[1] Ahmed Abdulkadir Ibrahim, Wang Zhuopeng, "IOT Patient Health Monitoring System", Sangeetha.C.N. Int.Journal of Engineering Research and Application", ISSN: 2248-9622,Vol.8, Issue 1, (Part-III) January 2018, pp.77-80.
[2] D.Gurvinder Singh, G.Balram, "IoT-Temperature and Heart Beat Detection over the Internet using Arduino", IJERCSE, Vol 5, Issue 4, April 2018.
[3] Gowrishankar S., Prachita M.Y., Arvind Prakash, "IoT based Heart Attack Detection, Heart Rate and Temperature Monitor", International Journal of Computer Applications (0975-8887), Volume 170-No.5, July-2017.
[4] Meria M Jeorge, Nimmy Mary Cyriac, Sobin Mathew, Tess Antony, "Patient Health Monitoring System using IOT and Android", Journal for Research, Volume 02, Issue 01, March 2016, ISSN: 2395-7549.
[5] Mohammad Wajih Alam, Tanin Sultana, Mohammad Sami Alam, "A Heartbeat and Temperature Measuring System for Remote Health Monitoring using Wireless Body Area Network", International Journal of Bio-Science and Bio-Technology, Vol. 8, No. 1(2016), pp.171-190.
[6] Nisha Singh, Ravi Mishra, "Microcontroller Based Wireless Temperature And Heart Beat Read-Out", IOSRJEN, e-ISSN: 2250-3021, p-ISSN: 2278-8719, Vol. 3, Issue 1(Jan. 2013),V5, PP 01-06.
[7] R. Mohana Priya, M. Akshaya, S. Gomathi, S. Lavanya, "A Smart Network: IoT to Monitor Temperature and Heart Beat of a Person using RFID Technology", Int. J. Chem. Sci.: 14(S3), 2016, 901-905, ISSN 0972-768X.
[8] Shivam Gupta, Shivam Kashaudhan, Devesh Chandra Pandey, Prakhar Pratap Singh Gour, "IOT based Patient Health Monitoring System", IRJET, Volume: 04, Issue: 03, Mar-2017, e-ISSN: 2395-0056, p-ISSN: 2395-0072.
[9] Tanya Gupta, Bhuvnesh Wadhwa, Yuvraghi Sharma, Omankit Juneja, Jyotiadityan, Rajat Butola, Shruti Karkra, "IOT Based Vitality Measurement System", IJCSMC, Vol. 5, Issue. 5, May 2016, pg. 549-554.
[10] Varun Goel, Sharad Srivastava, Dharmendra Pandit, Dhirendra Tripathi, Pankaj Goel, "Heart Rate Monitoring System Using Finger Tip through IOT", IRJET, Volume: 05, Issue: 03, Mar-2018.

B. *Books*

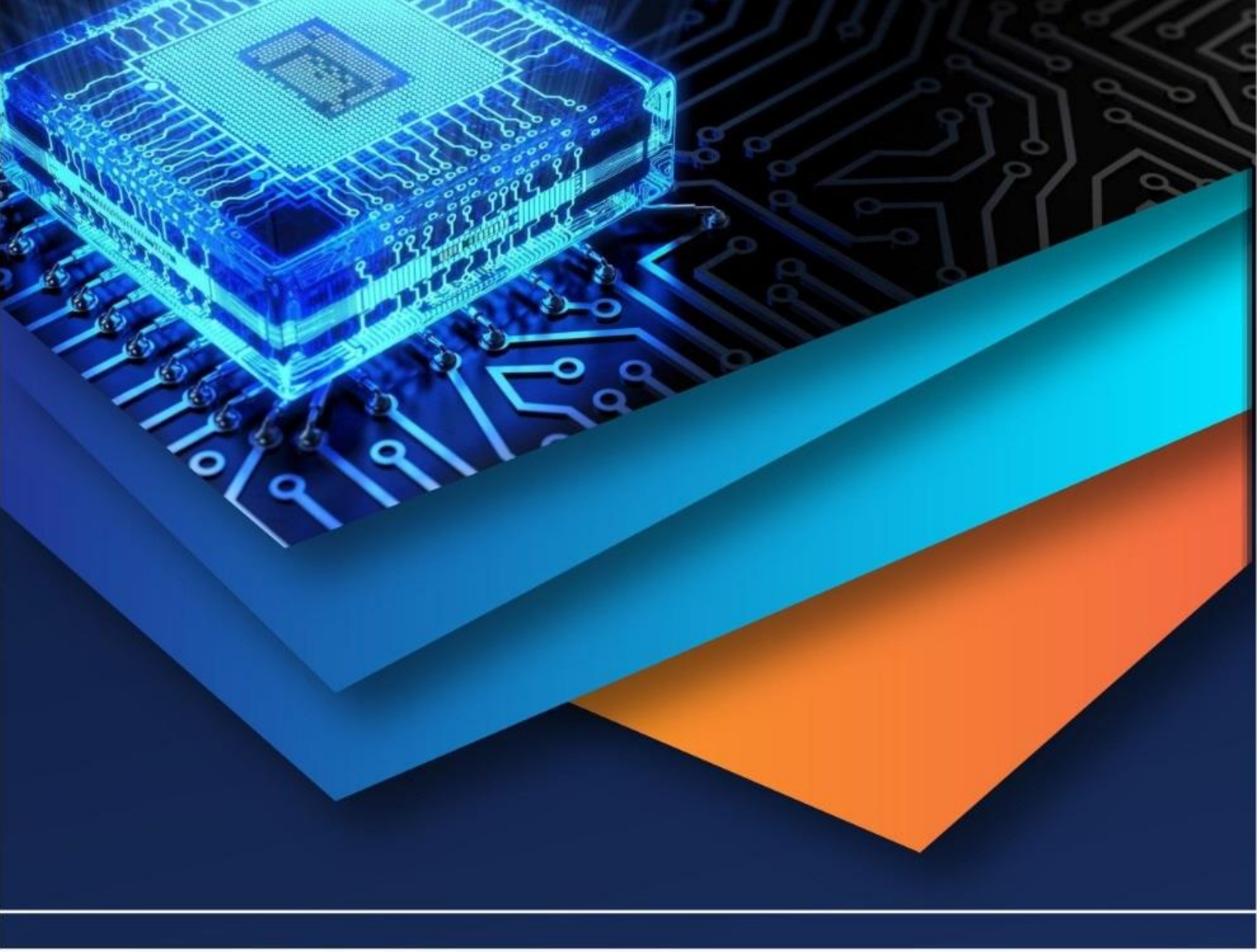
[1] Pethuru Raj, Anupama C. Raman, " The Internet Of Things – Enabling Technologies, Platforms and Use Cases" 1st Edition, CRC Press, Taylor & Francis Group, 2017.
[2] Donald Norris, "The Internet Of Things – Do It Yourself Projects with Arduino, Rasberry Pi and Beagle Bone Black 2015 by McGraw-Hill Education.

C. *Sofware*

[1] Arduino IDE, Version – 1.8.5, OS - Windows.
[2] Fritzing, Version – 0.9.2b.32, OS – Windows.
[3] ThingSpeak.com.
[4] Virtuino Android Application.

D. *Website*

[1] https://blog.v-comply.com/internet-of-things-iot/



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