HEALTH MONITORING SYSTEM USING MACHINE LEARNING

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ABSTRACT

The proposed method is used to measure the physical parameters like body temperature, heart beat rate, and oxygen level monitoring with the help of biosensors. In the novel system the patient health is continuously monitored and the acquired data is transmitted to a using Wi-Fi wireless sensor networks. Processor supports for analyzing the input from the patient and the results of all the parameters are stored in the database. If any abnormality felt by the patient indications will send to the medical officials. Most monitoring systems that are in use in today's world works in offline mode but our system is designed such that a patient can be monitored remotely in real time. The proposed approach consists of sensors which measures heartbeat and body temperature of a patient which is controlled by the Rpi. Wireless system is used to transmit the measured data from the remote location. The heartbeat sensor counts the heartbeat for specific interval of time and estimates Beats per Minute while the temperature sensor measures the temperature and both the data are sent to the Rpi for transmission to receiving end. Finally, the data are displayed at the receiving end. This system could be made available at a reasonable cost with great effect. Nowadays in Hospitals and healthcare sectors have low cost IOT (Internet of Thing) based remote health monitoring system and labs, to collect a subject or patients' real-time data is vital to save life and it is also helpful for early detection of a disease. Prototypes of a system which can be set for remote supervising of heart rate, and body temperature have been discussed in this paper. The system is developed with the help of The Raspberry pi development board is been programmed to transmit the data efficiently to a remote server station using a wireless network then the patient data can be monitored using any internet browser which are connected to that network.

Index Terms: Health Monitoring, Contactless Sensor, Raspberry pi, Machine Learning.

ARTICLE INFO

I. INTRODUCTION

Technology has always been there to simplify and makes the human life much easier. It affected the various areas of life; the medical field is one of them. It benefits from the technology in different ways; now it is easier to diagnose internal diseases using some digital devices. The healthcare sector is going through a huge change, with digital capabilities changing the way doctors interact with their patients. Nowadays, patients have the tools to view their key vitals themselves and help doctors to have immediate access to patient data on-the-go. In a form of wearable devices e.g. Apple watches. However, we note that these devices are quite expensive and it is difficult to find these devices used by poor people, who are facing the biggest part of diseases

burden. Moreover, most of the existing medical devices are still need some investigations once it comes to the concept of the Internet of Things. The concept of the IOT entails the use of electronic devices that capture or monitor data and are connected to a private or public cloud, enabling them the automatically trigger certain events. Medical data such as blood pressure and heart rate are collected by sensors on peripheral devices; these data are transmitted to healthcare providers or third parties via wireless telecommunication devices. The data are evaluated for potential problems by a health-care professional and health providers are immediately alerted if a problem is detected. As a result, timely intervention ensures positive patient outcomes. As illustrated in the figure 1-1. Two groups of people, who have high-levels of medical-care need, are the elderly and the

chronically ill. The World Health Organization (2016) indicates that elderly people, who frequently suffer from chronic disease, require a highly effective and efficient provision of care. According to the National Broadband Plan (2015) by the Federal Communications Commission (FCC), the use of remote patient monitoring under IOT technology will save the healthcare industry $700 billion over 15 to20 years. Then it is important to focus on the IOT technology to benefit from the most recent technology. Bluetooth, ZigBee, and Wi-Fi are the common wireless technologies for remote patient monitoring systems. However, their suitability and usability for this task are widely varying. Therefore, there are significant considerations while selecting a technology for IoT medical devices; you need to be aware of what their characteristics for specific requirements. The proposed system will help patients in remote places (e.g. home healthcare) and that is not just about monitoring a chronic disease state but about helping prevent patients from getting to that state.

By implementing this project, it will offer an inexpensive system for remotely patient's health monitoring, which can save their lives by giving emergency alert in real-time. Patient Monitoring systems are the most important diagnostic systems in the critical care units (CCUs) of hospitals, providing continuous display and interpretation of the patient's vital functions. The patient monitoring system utilizes telecommunication technology for patient care. The collected sensor data will support the doctor in the emergency situation for the better and improvement of Patient health.

II. LITERATURE SURVEY

In this work maker, Amna Abdullah and et al. demonstrate a LabVIEW based patient checking framework. The framework undertaking is done in five key advances. We think about two frameworks to execute the structure. In the rule system, we interface the sensors joined with the patient's body to a transmitter unit related with a ZigBee or GSM orchestrate. The transmitter transmits the information remotely to a recipient that is additionally connected with a ZigBee or GSM engineer. The beneficiary is connected directly to the USB port of a near to watching unit (which is a Laptop with LabVIEW programming in it). The region watching unit shows the last information. This paper exhibits the upgrade of a microcontroller based structure for remote heartbeat and temperature watching utilizing ZigBee. In India, different patients are passing on due to heart assaults and illumination for that they are not getting profitable and reasonable help. To give them worthwhile and bona fide enable first we to need to unending seeing of patient flourishing.

The settled watching structure can be utilized precisely when the patient is on intriguing little lodging framework are enormous and just open in the retouching workplaces in ICU. The framework is made for home use by patients that are not in a central condition but rather should be persistent or sporadically observed by clinician or family. In any major condition, the SMS is sent to the expert or any relative. With the target that we can without a considerable amount of a stretch additional different lives by giving them brisk association.Online telemedicine structures are noteworthy because of the likelihood of promising and productive social insurance associations. These structures depend after frontline remote and wearable sensor advancements. The snappy progression being developed has astoundingly improved the level of remote flourishing watching structures. In this paper, a consistent heart watching structure is made contemplating the cost, ease of use, accuracy, and information security. The framework is conceptualized to give an interface between the master and the patients for two-way correspondence.

The real motivation driving this examination is to empower the remote cardiovascular patients in getting most recent therapeutic organizations associations which in all likelihood won't be workable generally in perspective of low ace to-consistent degree. The made watching framework is then assessed for 40 people (built up someplace in the extent of 18 and 66 years) utilizing wearable sensors while holding an Android contraption (i.e., cell phone under the supervision of the aces). The execution examination demonstrates that the proposed structure is dependable and obliging because of brisk. The examinations displayed that the proposed framework is advantageous and solid and guarantees information security expecting no effort .The Body Sensor Network (BSN) improvement is a hero among the most basic advances utilized in IOT based present-day therapeutic organizations system. IOT has now changed into the most remarkable correspondence standard of the 21st century, by broadening the likelihood of Internet and making it increasingly inevitable, permitting unsurprising relationship among various sorts of contraptions. In the con text of that reason, IoT has now wound up being increasingly advantageous in two or three zones, for example, social security structure. This paper proposes a structured plan for marvellous helpful organizations dependent on GPS and GSM Technologies, containing cut back body sensor units(Buss), which can quantify beat, heartbeat rate and body temperature and pass on them in instances of excellent practices to supervision healing segments utilizing GSM, GPS to pass on inciting activities to anchor patients nearness with likelihood later on to fuse other essential parts estimations as indicated by accessible sensor in the market which can accomplish the goal of giving a solid sensible application to constant flourishing checking and following . Future in various nations has been broadening constantly over the few couples of decades as a result of basic enhancements in prescription, general flourishing, and besides individual and ordinary tidiness. In any case, expanded future joined with falling birth rates are relied on to actuate a wide creating estimation in- side the not so distant future that would drive massive loads on the cash related structure of these nations. Therefore, it is basic to make fiscally clever, simple to- utilize structures for elderly social security and achievement. Remote flourishing checking, in context of non-intruding and wearable sensors, actuators and current correspondence and data movements offers a skilled and shrewd strategy that engages the elderly to keep living in their satisfying home condition rather than costly human organizations work environments. These frameworks will in like way engage helpful organizations to work capacity to screen essential physiological indications of their patients constantly, diagram flourishing conditions and give commitment from far away from work environments.

In this paper, we have appeared and contemplated a few unimportant efforts and non-intrusive thriving and movement watching frameworks that were spoken to recently. An examination on material based sensors that can be utilized in wearable frameworks has moreover appeared. At long last, the closeness of several correspondence types of progress and in like manner future points of view and research difficulties in re- mote watching structures will be investigated . A man who requires treatment in crisis conditions must be accepted beyond what many would consider possible the time delay. This implications of a man getting to be sudden sick can be found with the assistance of electronic structures, for example, sensors and controllers. Eventually, this information must be exchanged to the relatives to screen the patient's flourishing condition. The present success watching structures works completely fine. Regardless, these advancement trackers shift information of the individual from the gadget to the adjacent telephone through short-range correspondences like Bluetooth. The client can screen or the information would now have the ability to be exchanged to the web or relatives from the near to dealing with the unit like versatile or pc.

The present paper consolidates the most recent improvement of microcontroller from which the information of the patient can be exchanged to the web from the patient's wearable gadget itself. In this structure, we utilized heartbeat sensor to quantify the heartbeat rate of a man, and accelerometer to check the number of steps, free, speed, calories ate up and a controller board Ti's CC3200, which has inbuilt Wi-Fi that works in both station mode and way mode. The beat sensor's information goes to controller, by then the controller sends this information to the web-connected with the versatile application by utilizing accessible Wi-Fi plan. The data can be seen from the versatile application with security accreditations like login motivations behind interest.
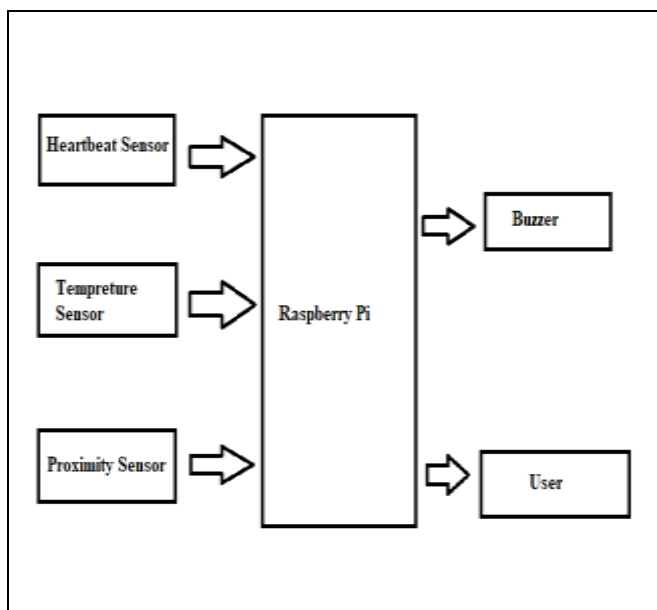
III. BLOCK DIAGRAM

Fig 1. Block Diagram

A. Methodology

The heart of the system is Raspberry pi to which different sensors are connected such as heartbeat, temperature,

Proximity Sensor to detect fits. Figure 1 shows the system architecture of the hardware setup of the health monitoring system.

● Collect the data from the patient through sensors.
● Rpi these real time values Show to user.
● Perform analysis on the values of the sensors.
● If any abnormality is noticed then notify the doctor or patient using Buzzer.
● Perform Machine Learning on the values of the sensors and determine the condition of the patient i.e. whether the patient has Normal or not.

Temperature sensor is used to measure temperature with an electrical output proportional to the temperature. The Temperature Sensor module can be used to detect ambient air temperature. A heart beat rate monitor is a personal monitoring device that allows one to measure one's heart rate in real time or record the heart rate for later study. It is largely used by performers of various types of physical exercise. The normal resting adult human heart rate ranges from 60–100 bpm. A Proximity Sensor is a ultrasonic Sensor that device detects Distance, often as part of a safety system. This type of equipment is used to detect a Distance and interface with a control system so this sensor used for social distancing, if any one brake this rule a process can be automatically ON Buzzer. The data collected from the sensor is then sent to the user.

B. Hardware Used:
• Raspberry pi
• Contact less Temperature Sensor(MLX90614)
• Heartbeat Sensor
• Proximity Sensor(HC-SR04-Ultrasonic)
• Buzzer

IV. CONCLUSION

Health factors of human if left unnoticed will result in serious issues and even cause danger to their life. Automating the continuous monitoring of heath parameters through IoT is discussed as novel solution. Technology plays the major role in health care not only for sensory devices but also in communication, recording and display device. Initial training and validation of machine learning algorithms are performed using the UCI dataset. Testing phase estimates the prediction of abnormalities from the sensor data collected through the IoT framework. Statistical analysis is performed from data accumulated into the cloud from IoT device to estimate the accuracy in prediction percentage. In this project we just tried to help the society to fight against COVID-19. In the absence of a vaccine for COVID-19, social-distancing is the only solution left with human beings. Hence, in this short note, we have tried to use the proximity sensor of the car for humans. In case of emergency interaction or in any other circumstances when interaction cannot be avoidable by using this S2D device the users can maintain a safe distance from each other. The alarming system of S2D warns the human when they cross the threshold minimum safe distance.

V. REFERENCES

[1] J. Saha et al., "Advanced IOT based combined remote health monitoring,   home automation, and alarm system," 2018 IEEE 8th Annual Computing and   Communication Workshop and Conference (CCWC), Las Vegas, NV, 2018.

[2] Rahaman A, Islam M, Islam M, Sadi M, Nooruddin S. Developing IoT based smart health monitoring systems: a review.   Rev   IntellArtif.   2019;33:435–40. https://doi.org/10.18280/ria.330605.

[3] Development of Smart Healthcare Monitoring System in IoT Environment. By Md. Milon Islam, Ashikur Rahaman and • Md. Rashedul Islam. 14 May 2020.

[4] Wang L, He W, Yu X, Hu D, et al. Coronavirus Disease 2019 in elderly patients:characteristics and prognostic factors   based   on   4-week   follow-up.   J   Infect 2020.https://doi.org/10.1016/j.jinf.2020.03.019.

[5] https://www.medscape.com/viewarticle/923881.

[6] "Naming the coronavirus disease (COVID-19) and the virus that causes it". World Health Organization (WHO). Archived from the original on 28 February 2020. Retrieved 28 February 2020.

[7] WHO Director-General's opening remarks at the media briefing on COVID-19". World Health Organization (WHO) (Press release). 11 March 2020. Archived from the original on 11 March 2020. Retrieved 12 March 2020.

[8] D. S.; I. Azhar E.; Madani, T. A.; Ntoumi, F.; Kock, R.; Dar, O.; Ippolito, G.; Mchugh, T. D.; Memish, Z. A.; Drosten, Christian; Zumla, A.; Petersen, E. (February 2020). "The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health—The latest 2019 novel coronavirus outbreak in Wuhan, China". Int J Infect Dis. 91: 264–66.

[9] "Symptoms of Novel Coronavirus (2019-nCoV)". www.cdc.gov. 10 February 2020. Archived from the original on 30 January 2020. Retrieved 11 February 2020.

[10] "Coronavirus Disease 2019 (COVID-19) Symptoms". Centers for Disease Control and Prevention. United States. 10 February 2020. Archived from the original on 30 January 2020

[11] Hopkins, Claire. "Loss of sense of smell as marker of COVID-19 infection".Nose and Throat surgery body of United Kingdom. Retrieved 28 March 2020.

[12] "Coronavirus Update (Live): 1,001,069 Cases and 51,378 Deaths from COVID-19 Virus Outbreak—Worldometer". www.worldometers.info. Retrieved 2 April 2020.

[13] "Coronavirus COVID-19 Global Cases by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)". ArcGIS. Johns Hopkins CSSE. Retrieved 4 April 2020.

[14] B. Patil and R. Kadam, "A novel approach to secure routing protocols in WSN," 2018 2nd International Conference on Inventive Systems and Control (ICISC), 2018, pp. 1094-1097, doi: 10.1109/ICISC.2018.8398973.