

MONITORING OF HEALTH PARAMETER VIA SMART WATCH

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Abstract

IoT in healthcare is the key player in providing better medical facilities to the patients and facilitates the doctors and hospitals as well. The system consists of different medical devices, such as sensors and web-based or mobile-based applications, which communicate through network-connected devices and help track and record the health data and medical information of patients. The proposed outcome of the paper is to build a system to provide patients with world-class medical assistance even in the most remote areas without hospitals in their areas by communicating over the internet and collecting information about their health status via the wearable devices included in the kit using a raspberry pi microcontroller that would be able to record the heart rate, blood rate of the patient. The system would be smart to intimate the patient's family members and their doctor about the patient's current health status and full medical information in case any medical emergency arises.

Keywords: *Intelligent Watch, Medical, Health care, IoT, Patient, IoT system, Information system.*

I. INTRODUCTION

Kevin Ashton's IoT was first proposed in 1999. It is a network of communication in which physical objects are linked to each other or to larger structures. This network gathers billions of data and converts it into useful information from the many different devices we use in daily life. There are about 20 billion devices in the world today that communicate with each other, and it is projected that up to 75 billion devices will be available by 2025. This shows that the cities we live with IOT are going to become smart cities in the coming years that will keep pace with the more paced and organized life. This transition will provide us with many ways to make our lives easier [1]. E-health programmers that are closely connected to all of us are one of these major opportunities. Day by day, IoT applications in the health sector are rising. Owing to a lack of infrastructure, people living in rural areas cannot benefit from preventive health

services. As a consequence, in these areas, deaths happen very early. Furthermore, with the rapid ageing of the world's population, with the shift in family structure, the needs of the elderly for life support are growing.

In addition to chronic heart disease, there is a high probability that the patient will lose his or her life as a result of excessive fatigue of the heart during sleep at night, especially in Chronic Obstructive Pulmonary Disease (COPD) and Obstructive Sleep Apnea syndrome. Tools that provide constant monitoring of these patients are very costly and sensitive and require the use of trained staff. Such patients can be constantly tracked with wearable health devices while keeping their everyday lives in the social world. These wearable devices continuously monitor the patient's heart values and will send the family members and the doctor information about the patient's health status when a symptom of a heart attack has occurred. HR and HRV are mainly used to diagnose heart and non-cardiac disorders such as heart failure, ageing, Parkinson's disease, diabetes, etc. IoT is a modern reality that transforms our everyday lives entirely. It is also a way for modern health care to be revolutionized by offering more personalized and preventive care. Mutual sharing of information between various smart devices has been enabled everywhere in the world thanks to IOT technology. Studies on smart health systems, which can include remote disease detection, are also being accelerated in this area. Thanks to low cost, low power consumption and high performance, smartphone apps may send devices that can collect patient heart data to the family or doctor of the patient.

Body temperature and heart rate are two of the most important vital indices of human health that are of major concern and can be easily obtained. The heart rate is the number of beats per minute in the heart, also known as the pulse rate. The arteries expand and contract with the flow of the blood as the heart pumps blood into the arteries. This change in blood flow volume is used to calculate the pulse rate, so we can measure the heart rate by taking the pulse. For a healthy adult, the average heart rate varies from 60 to 100 beats per minute. For adult males and 75 bpm for adult females, the normal resting human heart is around 70 bpm. This rate may fluctuate and increase with exercise, illness, injury and emotions. Females aged 12 and older; in general tend to have faster Heart rates as compared to males. Sportspersons and athletes follow a daily routine of exercises and healthy diet. Their exercise includes more cardiovascular exercises which keep them fit. Body temperature is essentially the heat experienced by the body, or the amount of heat radiated by the body is biologically determined. A person's body temperature depends on different factors, such as the temperature of the climate, the person's gender and his or her eating habits. For a healthy adult, it can range from 97.8oF (36.5oC) to 99oF (37.2oC). Different factors such as fever, hypothermia (low temperature) or any disease may be responsible for changing body temperature. For almost all diseases, fever is a typical predictor. There are various methods to measure heart rate and body temperature invasively and non-invasively. Noninvasive methods have proved to be accurate and comfortable for the user over a period of time.

In this research, a wearable system is intended to quantify vital values that specifically affect heart health, such as HR, HRV, and CT. The device's pulse sensor and the patient's fingertip data relating to the heart are analyzed with the Arduino Pro Mini controller. The results of this study are transmitted through a Bluetooth link to the patient's mobile phone. Thanks to the "Smart Health" interface created with the Blink application developer, the data transmitted to the mobile phone is displayed on the screen in real time. When the patient's vital parameters reach critical levels, an audible-visual alert is sent to the patient and family members with the Android-based application. Concurrently, this data and the patient's position information are sent to the patient's family members and her/his doctor as e-mail and twitter notification. The main purpose of the device is to increase the chances of survival by providing medical assistance to the patient within the first few hours in case of a possible heart attack [2].

The Internet of Things is the interconnection between devices, software, sensors and network communication that facilitates data collection and sharing by these entities. The distinctive aspect of the Internet of Things in the healthcare system is the continual monitoring of a patient by checking different criteria and a positive outcome from the history of such continuous monitoring as well. There are now many such devices fitted with medical sensors in the ICUs every day. There may be occasions where, in spite of 24 hours of surveillance, the doctor might not be notified in time when there is an emergency. There may also be barriers to exchanging the data and knowledge with the specialist physicians and the family members and friends concerned. In developing countries such as India, the technology that improves these features is already available but is not open and affordable for most people. These solutions to these problems can also only be a basic extension to the existing devices that do not have these facilities [3].

A Raspberry pi-controlled remote health monitoring system. Raspberry Pi is a small single-board microcontroller sized payment card created to boost the basic education in computer science in colleges and developing countries. A device is built in this paper to track critical parameters such as heart rate, blood pressure and body temperature on an ongoing basis. The information is stored on a cloud server database and can be viewed only by approved staff via an online website or mobile application. The principle may not be very modern, but using Raspberry pi, we propose an absolute and inexpensive method for the device. The principle may not be very modern, but using Raspberry pi, we propose an absolute and inexpensive method for the device. The primary aim of this device is to update the data online and give doctors a warning for any anomalies and also predict if the patient has any illness. The former is achieved by connecting Raspberry pi to the database using the MySQL db module, while the latter is accomplished by integrating Raspberry Pi and the GSM module and the web interface. As the data obtained by monitoring is so useful, this system has a great deal of potential scope and can be used by the medical community for any kind of study.

The major aim of the paper can be summarized as following:

1. To obtain the real-time medical information about a patient via IoT.
2. Processing and classification of information gathered about the patient.
3. To interpret and predict any disease or disorder in the preliminary stage itself using the data mining techniques that will also provide the approach advantageous for decision making.
4. To provide Internet of Things based healthcare solutions at anytime and anywhere [4].

II. CONCLUSION & DISCUSSION

As the title says, the result of the Smart Health Monitoring system is of extreme use to patients and doctors as well. From the comfort of their home, the patient can check their health condition at any time and attend hospitals only when they really need to. This can be achieved by our method, the product of which is brought online and can be seen from anywhere in the world. Our system displays the almost real-time values of different health parameters as it is a prototype model and emulates how the same can be applied in the real world. Doctors may also use the patient's body condition record to analyze and assess the impact of medication or other such products.

III. REFERENCES

- [1] H. D. Kotha, M. Gunturi, and S. Potluri, "An Iot based solution for health monitoring using a body-worn sensor enabled device," *J. Adv. Res. Dyn. Control Syst.*, vol. 10, no. 9, pp. 646–651, 2018.
- [2] S. Trivedi and A. N. Cheeran, "Android based health parameter monitoring," *Proc. 2017 Int. Conf. Intell. Comput. Control Syst. ICICCS 2017*, vol. 2018-Janua, pp. 1145–1149, 2017, doi: 10.1109/ICCONS.2017.8250646.
- [3] M. Taştan, "IoT Based Wearable Smart Health Monitoring System," *Celal Bayar Üniversitesi Fen Bilim. Derg.*, no. September, pp. 343–350, 2018, doi: 10.18466/cbayarfbe.451076.
- [4] M. E. Cecchinato, A. L. Cox, and J. Bird, "Smartwatches: The good, the bad and the Ugly?," *Conf. Hum. Factors Comput. Syst. - Proc.*, vol. 18, no. April, pp. 2133–2138, 2015, doi: 10.1145/2702613.2732837.