International Journal of Big Data and Analytics in Healthcare
Volume 6 • Issue 1 • January-June 2021

A Novel Framework of Health Monitoring Systems

Sonam Gupta, Ajay Kumar Garg Engineering College, Ghaziabad, India
Lipika Goel, Ajay Kumar Garg Engineering College, Ghaziabad, India
Abhay Kumar Agarwal, Kamla Nehru Institute of Technology, Ratan Pur, India

ABSTRACT

IoT plays an important role in the healthcare domain for improving the quality of patient care. To analyze the patients' healthcare data, a real-time health-monitoring system is required. The proposed framework in this work is cable of such monitoring and sending alerts on critical circumstances. In this framework, the use of IoT devices makes it possible. This is very helpful in taking care of especially old wards and children in the absence or their caretakers. The function of alerting the caretakers and to inform hospital in critical condition makes this system one of its kind. Readings of patient pulse rates are taken from the pulse rate sensor and the body temperature is measured by MAX30205, a temperature sensor. The data is collected through sensors and sent over the cloud servers. Linear regression is used for further analysis and prediction of pulse and temperature trend lines. Corresponding health repots will be sent to the nearby hospitals and registered mobile numbers. The framework is validated with real-time patient data, and prediction is made regarding the trends.

KEYWORDS

Cloud System, Diagnosis, Health Monitoring, Internet of Things, Machine Learning

1. INTRODUCTION

Healthcare is an important domain and there is a need for it to be updated with the recent and upcoming technology. Internet of Things or IoT has been developed by an amalgamation of Radio Frequency Identification (RFID)] and Wireless Sensor Network (WSN) technologies and an advanced integration with cloud computing. Thus it enables customers over the internet to communicate with the data, collect, store and interchange it. With the help of the IOT system one can track patient's health conditions and collect it on cloud.

This IoT based project intends to serve the patients as well as to aid the doctors with their diagnosis, thereby saving time. Since the system will be powered by commands and will capture the patient's data by using medical sensors, it makes the patient's data accessible to the doctor for review thereby reducing the doctor's labour time by about 15 hours. Moreover it helps reducing emergency room wait time because patient's medical history will be available to the doctor in prior for review.

It makes use of technologies like Machine Learning which uses diagnostic algorithms to derive some major conclusions about a patient's health from the data provided like pulse rate and body temperature. Cloud Computing is a technology used to store large amount of data over the internet. In this project, it is used to store the patient's diagnostic data into a large database. The readings from pulse rate sensor or temperature sensor are all put up on a cloud and made available to doctor,

DOI: 10.4018/IJBDAH.20210101.oa1

patient or can be provided to machine learning algorithms to perform diagnosis. With IOT, doctors and other medical associates may be able to know about the status of patient, and can save it on their database for further accessing and analysis.

2. STATE OF ART

In this era of Technology Internet of Things or popularly also known as IoT along with Cloud Computing play a very important role in monitoring the health condition of a person using various kinds of data collected using body sensors fitted in different types of wearable devices. It mainly uses Raspberry Pi board for this purpose. The collected data is processed using various machine learning algorithms and hence processed data is used to detect diseases and preventions that need to be taken. This data is then sent to the patients as well as concerned people and doctors to take recommended actions for precautionary purposes. As this data is kept on the cloud it can also be accessed anywhere and anytime around the world. It is very suitable in areas where medical facilities are not easily available, areas like villages or rough terrains. Body wireless sensor Network (BWSN) is used to transmit the patients' health parameters collected through Raspberry Pi microcontroller to the physicians and caretaker wirelessly. As we know that these devices are long ranged due to high bandwidths it is really easy and efficient to detect the patient's location in case of any emergency and timely intervention of responsible people, the server also rings alarm to nearby ambulance while itself performing various basic health care check-ups by continuously monitoring various body parameters and reporting the respective data. Use of smart devices increases the data accuracy and data protection on various parameters. The historical data uploaded on the cloud can also be used to perform various tests and at times infer data from family history's data or the health history of the patient himself.

Universal Health care concern and its solution has become crucial nowadays as it is necessary to pay attention to awareness on Healthcare. Mobile devices are available to us nowadays very easily. These devices help to collect data from the wearables and analyse it under a wireless sensor network. This reduces complications regarding location problems etc. We can also make use of Barcode Reader to verify and aid our patients.

With the increased advancement of the sensors and wearables, it makes the health control and management system more powerful in remote areas. Now this needs to be secure. Our system designs are planted upon the WSN which is Wireless Sensor Networks. These systems have reduced the cost as the doctors can analyse the patient's health without actually visiting them for small health issues by collecting his data and sending the instructions to get cured.

An android app has been created for healthcare authority called ECG App, which provides the client with the Electro Cardiogram Waves and his/her data. This data gets uploaded to the cloud of the client which can be further analysed by the patients and doctors. This system is helpful for all whether they are at the hospital or at their home.

Gomez et al. (2016) showed that the Universal Health care concern and its solution has become crucial nowadays as it is necessary to pay attention to awareness on Healthcare. Mobile devices are available to us nowadays very easily. These devices help to collect data from the wearables and analyse it under a wireless sensor network. This reduces complications regarding location problems etc. We can also make use of Barcode Reader to verify and aid our patients.

With the increased advancement of the sensors and wearables, it makes the health control and management system more powerful in remote areas. Now this needs to be secure. Our system designs are planted upon the WSN which is Wireless Sensor Networks. These systems have reduced the cost as the doctors can analyse the patient's health without actually visiting them for small health issues by collecting his data and sending the instructions to get cured.

An android app has been created for healthcare authority called ECG App, which provides the client with the Electro Cardiogram Waves and his/her data. This data gets uploaded to the cloud of