IOT Based Health Monitoring System

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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 proposed system here consists of various medical devices such as sensors and application based which communicate via network connected devices and helps to monitor and record patients health data and medical information.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.IOT Monitoring proves really helpful when we need to monitor and record and keep track of changes in the health parameters of the patient over the period of time.So with the IOT health monitoring, we can have the database of these changes in the health parameters. Doctors can take the reference of these changes or the history of the patient while suggesting the treatment or the medicines to the patient.The proposed outcome of the project is to give proper and efficient medical services to patients by connecting and collecting data information through health status monitors which would include patient's Heart rate, Temperature, Blood pressure and sends an emergency alert to patient's doctor with his current status and full medical information.

Index Terms—IOT,healthcare,monitoring,sensors,application, treatment

I. INTRODUCTION

In IOT there are many devices are connected to each other for communication purpose it shares the data, information and able to produce new information and record it for future purpose. Everyday people require new devices, new technology for make his life easy. The research is always trying to think on new devices for make his life easy. In our day to day life we are facing many problems related to our health because we are not caring about our self. So, to reduce these problems we are introduced a IOT Based health monitoring system . Nowadays IoT plays an important role not only in communication, but also in monitoring, recording, storage and display. Hence the latest trend in Healthcare communication method using IoT is adapted and monitored on a continual basis, aggregated and effectively analyzed-such information can bring about a massive positive transformation in the field

of healthcare.Health is a fundamental element of people's need for a better life. Unfortunately, the global health problem has created a dilemma because of certain factors, such as poor health services, the presence of large gaps between rural and urban areas, physicians, and nurses unavailability during the hardest time.

II. LITERATURE SURVEY

The main objective of the survey is to find already existing system, compare their functionalities, discuss their pros and cons, and find solutions to existing problems

A. Smart Healthcare Monitoring using IoT[2]

This paper demonstrates a Remote Health Monitoring System controlled by Raspberry pi. Raspberry Pi is a small payment card-sized single-board micro-controller made to enhance the basic computer science education in colleges and developing nations.The major aim of this paper is to obtain the real-time medical information about a patient via Iot. Processing and classification of information gathered about the patient.To interpret and predict any disease or disorder in preliminary stage itself using the data mining techniques that will also provide the approach advantageous for decision making.To provide Internet of Things based healthcare solutions at anytime and anywhere.

B. Development of Smart Healthcare Monitoring System in IoT Environment[6]

This paper proposes a smart healthcare system in IoT environment that can monitor a patient's basic health signs as well as the room condition where the patients are now in real-time. In this system, five sensors are used to capture the data from hospital environment named heart beat sensor, body temperature sensor, room temperature sensor, CO sensor,and CO_2 sensor. The error percentage of the developed scheme is within a certain limit (less than 5 per) for each case. The condition of the patients is conveyed via a portal to medical staff, where they can process and analyze the current situation

of the patients. The developed prototype is well suited for healthcare monitoring that is proved by the effectiveness of the system.

C. Internet of Things for Smart Healthcare: Technologies, Challenges, and Opportunities[1]

This paper therefore makes a unique contribution in that it identifies all key components of an end-to-end Internet of Things healthcare system, and proposes a generic model that could be applied to all IoT-based healthcare systems. This is vital as there are still no known end-to-end systems for remote monitoring of health in the literature.This paper further provides a comprehensive survey of the state-of-the-art technologies that fall within the proposed model. Focus is placed on sensors for monitoring various health parameters, short- and long-range communications standards, and cloud technologies. This paper distinguishes itself from the previous major survey contributions by considering every essential component of an IoT-based healthcare system both separately and as a system.—Internet of Things (IoT) technology has attracted much attention in recent years for its potential to alleviate the strain on healthcare systems caused by an aging population and a rise in chronic illness. Standardization is a key issue limiting progress in this area, and thus this paper proposes a standard model for application in future Internet of Things healthcare systems. This survey paper then presents the state-of-the-art research relating to each area of the model, evaluating their strengths, weaknesses, and overall suitability for a wearable IoT healthcare system. Challenges that healthcare IoT faces including security, privacy, wearability and low-power operation are presented, and recommendations are made for future research directions.

D. Wearable IoT enabled real-time health monitoring system[7]

The main contribution of this paper include the following: firstly, this paper presents a novel system, the WISE (Wearable IoT-cloud-based health monitoring system), for real-time personal health monitoring. WISE adopts the BASN (body area sensor network) framework in the support of real-time health monitoring. Several wearable sensors have been embedded, including the heartbeat, body temperature, and the blood pressure sensors. Secondly, the majority of existing wearable health monitoring systems requisite a smart phone as data processing, visualisation, and transmission gateway, which will indeed impact the normal daily use of the smart phone. Whilst in WISE, data gathered from the BASN are directly transmitted to the cloud, and a lightweight wearable LCD can be embedded as an alternative solution for quick view of the real-time data

III. EXISTING SYSTEM

A. Smart Healthcare Monitoring using IoT[2]

In this system, They propose an automatic system to monitor patient's body temperature, heart rate, body movements and blood pressure.The unprocessed data from various IoT devices is obtained and stored on the server. These devices include various sensors such as temperature sensor, vibration sensor,BP sensor and pulse sensor. Then using the raspberry pi on which Linux OS is installed, they write the code in python that reads the values from the sensors and update them into the database at regular intervals.After that the relevant information is obtained as a result from the data stored by filtering, classifying and categorizing it.This information is nothing but the patient's real-time health data and symptoms that the patient has. This information will be further used in the next level to predict if the patient is suffering from any kind of disease. In the next level they analysis/predication phase, they use data mining techniques to predict the type and nature of the disease or the disorders for which the system was designed.Health Monitoring Section module comprises of the hardware components of the system that makes it IoT enabled and is used to record the health parameters of the patient using various sensors. Emergency Alert Section module in particularly deals with the steps to be taken after an abnormality is detected in the health of patient such as notifying his/her family member and Health Status Prediction System module use to patients health data as recorded

B. Development of Smart Healthcare Monitoring System in IoT Environment[6]

Continuous online patient and patient's room condition monitoring is the main idea of the existing system. Therefore,the healthcare monitoring system utilizes the three-stage architectural features, namely (1) Sensor Module (2) Data Processing Module (3) Web User Interface.The sensors are wired which are used to collect data from the patient's body and the environment by gathering physiological signs. The collected data are then processed via an ESP32 module and send to the gateway server. For the web user interface, Thing Speak is used for the graphical interpretation, and display of collected results. Thing Speak shows the current status and process of transactions.The HTTP protocol provides easy connectivity for the correspondence between a WI-FI module and the web server.The HTML user interface is updated every 15 s, allowing patients to be tracked in real-time.

C. Microsoft Lync

Microsoft Lync is used by Doctor's to offer medical services to patients in rural areas. Samsung has a 50 million dollar investment in digital health through their Digital Health Initiative which is a collaboration of smart sensors, algorithms and data processing techniques through open source hardware and software platforms.

D. Amazon healthcare platform

Amazon offers a unified healthcare platform where the users can access healthcare information, availability of latest products, health insurance and "on-demand" services. Wearable, especially in the form of smart watches or bands, have been revolutionizing the market. Notable products include Fit bit, moov, Proteus, Pebble Time, Waiting's Alive Cor Health

monitor, Beddit and so on. Significant amongst the healthcare products are smart watches.The projected annualized rate is expected to reach 70 million units at a growth of 18 percent annualized rate by 2021.

Barger et al made a smart house facility using a sensor network to monitor and track the movements of the patient in hoke and a prototype of the same is also being tested. The primary objective of their work is to check if their system is capable to outsmart the behavioral patterns and have discussed about the same in their work.

E. RFID Technology

In this field, among the several research activities already presented in the literature, those related on the use of the UHF RFID technology are mainly focused on tracking patients in hospitals and nursing institutes.RFID tags can operate only under the reader coverage region, hence the use of UHF RFID technology is limited to patient/devices monitoring and tracking in small environments.

F. Wireless sensor network

Another set of related work proposes the use of WSN [Wireless sensor network] technology to implement solutions able to meet the specific requirements of pervasive healthcare applications.In a WSN providing patient localization, tracking, and monitoring services within hospital is presented.

IV. ISSUES IN EXISTING SYSTEM

A. No reports are generated in existing system

Though the existing system fetches data and stores it but there is no report generated with tables.

B. Patients are not allowed to access the data which is collected as it is only available for hospital staff and caretakers.

Patients cannot view their data whenever they want to which may lead to fear of not knowing their reports and also they can't send it to the doctors.

C. No app or website as such to record the data obtained from the sensors and hardware devices

An app is important as many people can install the app and view their reports and do their health checkups at home

D. Patients have to visit the hospital for checkups

Sometimes the patients may not be able to visit hospitals due to traffic or severe problems. This may be fatal in urgent circumstances.

E. Existing system are usually used only by people who are suffering from any diseases

Healthy people avoid health checkups as they think their immune system is too good to be penetrated. But they maybe developing a symptom of a fatal disease and they may not even know about it as some diseases take time to cause some damage.

F. Data collected is simply stored in databases and accessed when required, No analysis is done on the collected data

Doctor analysis is necessary so that major diseases can be recognised and cured as soon as possible.

G. Can only be used within hospitals

Some of the existing system are only use within the hospitals only.

V. PROPOSED SYSTEM

To overcome the issues of the existing health monitoring system we can provide following features:

A. Developing an Application

We will develop an application which will solve the problem of transferring the data in real time and also using this application patient can view their own data and reports and maintain the records of their health checkups.

B. Patient-Generated Health Data (PGHD)

Patient-generated health data is any piece of health-related information generated or documented by patients or caretakers. PGHD includes data pertaining to a patient's health or treatment history, lifestyle choices and symptoms among other things that are either reported by the patients or collected using wearables as well as various medical sensors devices.

C. Home-based care

Assisted living facilities may not be able to accommodate every senior citizen who lives alone. Hence, medical care providers can identify the ones who are healthy enough to stay at their own homes and help them use IoT-based devices to track their health. By monitoring their condition in real-time using the data collected by those devices, they can instantly attend to the ones who require it.

D. Short-term care

Short-term care can be provided to people who have been discharged from the hospital after a surgery or after receiving treatment for an acute illness. This type of care eliminates the need for visiting the hospital during the recovery phase, allowing patients to receive quality healthcare within the comforts.

E. Preventive care

Application of the Internet of Things in the healthcare industry can also be useful for healthy people who are not suffering from diseases and wish to prevent problems in the future. Health-related data can be captured by anyone on a daily basis which can be shared with medical professionals. This can help in the detection of even a minor problem and prevent illnesses in the long run.
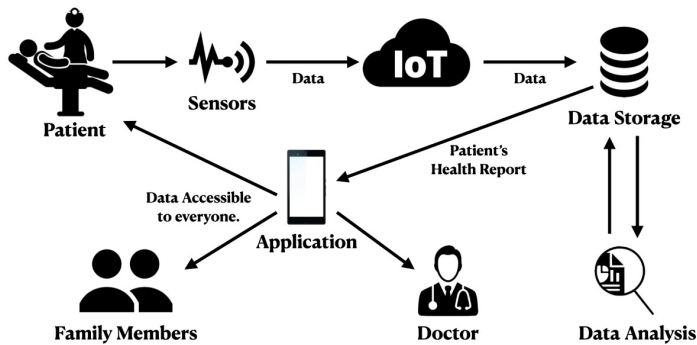
Fig. 1. Flow of System

CONCLUSION

The system can be further improved further by adding artificial intelligence system components to facilitate the doctors and the patients. The data, consisting medical history of many patients' parameters and corresponding results, can be explored using data mining, in search of consistent patterns and systematic relationships in the disease. For instance, if a patient's health parameters are changing in the same pattern as those of a previous patient in the database, the consequences can also be estimated. If the similar patterns are found repeatedly, it would be easier for the doctors and medical researchers to find a remedy for the problem .

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