

IoT based Smart Health Care Kit: A Review

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Abstract— Internet of Things (IoT) can be defined as the wireless network of devices which are connected to each other to share information and data in order to communicate and produce new information so as to record and analyze it for future use. In this paper, a review of IoT-based health monitoring system has been presented. It is observed that using IoT (Internet of Things) the health monitoring system is controlled, which indicates a reliable system. This system will enable users to improve health related issues and reduce healthcare costs. It will also save the time of patient to visit to doctor every time need to check Heart beat rate, temperature, Blood pressure, ECG.

Key words: Health Care, Health Monitoring, Internet of Thing (IoT), Medical Services, Raspberry PI

I. INTRODUCTION

The internet of things (IoT) is the network of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society." The IoT allows objects to be sensed and/or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure.

In the proposed system we will design and implementation of an IOT-based health monitoring system for emergency medical services and for household patients which can demonstrate collection, integration, and interoperation of IoT data flexibly using a Raspberry pi third generation microcomputer development board. The proposed model enables users to improve health related risks and reduce healthcare costs by collecting, recording, analyzing and sharing large data streams in real time and efficiently. The idea of this project came to reduce the headache of patient to visit to doctor every time he need to check his blood pressure, heart beat rate, temperature etc. With the help of this proposal the time of both patients and doctors are saved and doctors can also help in emergency scenario as much as possible. 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, blood pressure and ECG and sends an

emergency alert to patient's doctor with his current status and full medical information.

At present, due to busy life style health negligence on is increased which causes in large number of diseases among people. And every time visiting a doctor is not an easy option for patients so this system will keep track of patient's activity and his vitals. And send them to remote servers from where it can be accessed by doctors as well as patient himself.

II. LITERATURE REVIEW

Nitin P. Jain, et. al, presents An Embedded, GSM based, Multiparameter, Realtime Patient Monitoring System and Control – An Implementation for ICU Patients. In the implemented system a reliable and efficient real time remote patient monitoring system that can play a vital role improvising better patient care is developed. This system enables expert doctors to monitor vital parameters viz body temperature, blood pressure and heart rate of patients in remote areas of hospital as well as he can monitor the patient when he is out of the premises. The system in addition also provides a feedback to control the dosage of medicine to the patient as guided by the doctor remotely, in response to the health condition message received by the doctor. Mobile phones transfer measured parameters via SMS to clinicians for further analysis or diagnosis. The timely manner of conveying the real time monitored parameter to the doctor and control action taken by him is given high priority which is very much needed and which is the uniqueness of the developed system. The system even facilitates the doctor to monitor the patient's previous history from the data in memory inbuilt in the monitoring device. Also data can be sent to several doctors in case a doctor fails to respond urgently. The system was tested rigorously in the presence of a physician on many patients as well as healthy people, the results found to be same as the one's measured by the physician and with the implemented system. A validity report was thus prepared. During the execution of the system snapshots of the display were taken. The system being a complete hardware design the data available on cell phone and LCD display have been captured. The system's prototype is successfully implemented and can be demonstrated. A few test results of the system are put down below, which show successful implementation of the system. [1].

Hasmah Mansor, et.al proposed an Body Temperature Measurement for Remote Health Monitoring System. Remote health monitoring system has been an interesting topic recently among medical practitioners, engineers as well as IT professionals. However, the application of remote health monitoring system where doctor's can monitor patients' vital signs via web is practically new in Malaysia and other countries. Remote health monitoring system is beneficial to the patients and society where the implementation of such system will save

hospital bill, waiting time and reduce traffics in the hospital. The objective of this project is to design and develop body temperature measurement device that can be observe by the doctor in real time as well as history data via internet with an alarm/indication in case of abnormalities. In the proposed health monitoring system, heart rate and body temperature wireless sensors were developed, however this paper only focus on body temperature wireless monitoring system. The temperature sensors will send the readings to a microcontroller using Xbee wireless communication. To send the real-time data to health monitoring database, wireless local area network (WLAN) has been used. Arduino with Ethernet shield based on IEEE 802.11 standard has been used for this purpose. Test results from a group of voluntary shows the real-time temperature reading successfully monitored locally (at home) and remotely (at doctor's computer) and the readings are comparable to commercial thermometer. The objective of this project has been successfully achieved. Body temperature measurement for remote health monitoring has been designed and developed. The system provides the reliable measurements and very user friendly. The device and the system can be improved in terms of sizing and integration between more measurement devices, for example electrocardiography (ECG). [2]

Purnima, et. al, presents an Zigbee and GSM Based Patient Health Monitoring System Care of critically ill patient, requires spontaneous & accurate decisions so that life-protecting & lifesaving therapy can be properly applied. Statistics reveal that every minute a human is losing his/her life across the globe. More close in India, everyday many lives are affected by heart attacks and more importantly because the patients did not get timely and proper help. This paper is based on monitoring of patients. We have designed and developed a reliable, energy efficient patient monitoring system. It is able to send parameters of patient in real time. It enables the doctors to monitor patient's health parameters (temp, heartbeat, ECG, position) in real time. Here the parameters of patient are measured continuously (temp,heartbeat, ECG) and wirelessly transmitted using Zigbee. This project provides a solution for enhancing the reliability and flexibility by improving the performance and power management of the patient monitoring system. In the current proposed system the patient health is continuously monitored and the acquired data is analyzed at a centralized ARM microcontroller. If a particular patient's health parameter falls below the threshold value, an automated SMS is sent to the pre-configured Doctor's mobile number using a standard GSM module interfaced to the ARM microcontroller. Here, we are using Zigbee for wireless transmission. The Doctor can get a record of a particular patient's information by just accessing the database of the patient on his PC which is continuously updated through Zigbee receiver module. Using GPS, the location of remote patient can be detected so that help can be provided in case of emergency from nearest hospital. [3]

Punit Gupta, et. al, proposed an IoT based Smart HealthCare Kit. The paper presents the design and implementation of an IOT-based health monitoring system for emergency medical services which can demonstrate collection, integration, and interoperation of IoT data flexibly which can provide support to emergency medical

services like Intensive Care Units(ICU), using a INTEL GALILEO 2ND generation development board. The proposed model enables users to improve health related risks and reduce healthcare costs by collecting, recording, analyzing and sharing large data streams in real time and efficiently. The idea of this project came so to reduce the headache of patient to visit to doctor every time he need to check his blood pressure, heart beat rate, temperature etc. With the help of this proposal the time of both patients and doctors are saved and doctors can also help in emergency scenario as much as possible. 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, blood pressure and ECG and sends an emergency alert to patient's doctor with his current status and full medical information. The main idea of the proposed system is to provide better and efficient health services to the patients by implementing a networked information cloud so that the experts and doctors could make use of this data and provide a fast and an efficient solution. The final model will be well equipped with the features where doctor can examine his patient from anywhere and anytime. Emergency scenario to send an emergency mail or message to the doctor with patient's current status and full medical information can also be worked on. The proposed model can also be deployed as a mobile app so that the model becomes more mobile and easy to access anywhere across the globe. [4]

Overall work based on developing IOT based health care system on raspberry pi based microcomputer equipped with various sensor like Heartbeat, ECG, body Temperature which is connected directly to internet through on board Wi-Fi and analysis can be done.

III. OVERALL ANALYSIS

Overall work related to development of IOT based health care monitoring system using raspberry pi which consist of microcomputer equipped with various sensors like Heart beat sensor, ECG sensor, body Temperature sensor, blood pressure sensor which is connected directly to internet through on board Wi-Fi and health related monitoring can be done.

IV. CONCLUSION & FUTURE SCOPE

At present, no portable healthcare system is available. The main disadvantage to design health monitoring system is large size. For designing of Health care monitoring system using Intel Galileo and database stored on local server using XAMPP server gives higher delay with larger hardware required. So, as to reduce the delay and to minimize the power consumption we can use Raspberry PI with database stored on internet. Hence, designing of IOT based health monitoring system using Raspberry PI version 3 with high speed and less area will be the probable outcome of this proposed work.

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