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Survey on Patient's Healthcare Monitoring Using IOT

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ABSTRACT: The increased proportion of aging population will demand changes to healthcare systems in developing countries. Most of the elderly people today experiences loneliness and psychological depressions, either as a result of living alone/ abandonment or due to reduced connection with their children and relatives. The increasing demand on the health sector is an inevitable and complicated process. Providing suitable healthcare services is essential for those elderly people, pregnant ladies, physically disabled person. Who may encounter various medical problems and conditions? Early detection and identification of diseases for treatment, and evaluation of the best alternatives can minimize the involved complications of daily activities for the aged people. Introduced an IOT devices are used in many fields which make the user's daily life more comfortable. These smart sensor devices are used to collect data will be regularly transferred to hospital database from which it is upload to hospital's web server continuously, doctor can monitor the patient condition from any place, making exact decision on the data collected and notifying the patient is the challenging task in the IOT. It reduces the headache of patient to visit the doctor every time to check body condition. Doctors and hospitals could make use of real-time data collected on the cloud platform to provide fast and efficient solution. It also could increase accessibility, efficiency, and also lower the health expenses to improve the comfort and safety as well as management of daily routines of an elderly life.

KEYWORDS: Healthcare, IOT, Hospitality, Internet of Things, Early Detection, Patient Monitoring.

I. INTRODUCTION

Recent years have seen a rising in wearable sensors and today several devices are commercially available for personal health care and activity awareness. A recent health care system should give better health care services to people at any time anywhere in an affordable and patient friendly way. Currently, the health care system going to change from a traditional approach to a modernized patients centered approach. In the traditional way the doctors play the major role. For necessary diagnosis and advising they need to visit the doctor. There are two basic problems related to this approach. Firstly, the health care professionals must be in place of the patient all the time, the patient remains admitted in the hospital, wired to bedside biomedical instruments, for a long period. In order to solve these two problems the patient oriented approach has been received. Recent information from United Nations predicted that there will be 2 billion older people by 2050. In addition, research indicates that above 89% of the aged people are likely to live independently. However, medical research found that above 80% of the aged people older than 65% suffers from at least one chronic diseases making them to have difficulty in taking care of themselves. Accordingly, providing a decent quality of life for aged people as become a serious social issue at this moment. The rapid proliferation of information and communication technologies enabling innovative healthcare solutions and tools that promise in addressing the above challenges. Now, Internet Of Things (IOT) has become one of the most powerful communication paradigms of the 21st century. In the IOT environment, all objects in our daily life become part of the internet due to their communication and computing capabilities. Heart rate is one of the fundamental physiological limits, essential for

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monitoring and diagnosis of patients. To keep people effective and healthy, a readily accessible modern health care system is proving to be effective in saving costs, reducing illness and prolonging life. An enhanced healthcare monitoring system is described [1], that is smart phone based and designed to offer wireless approach and social support to participants.

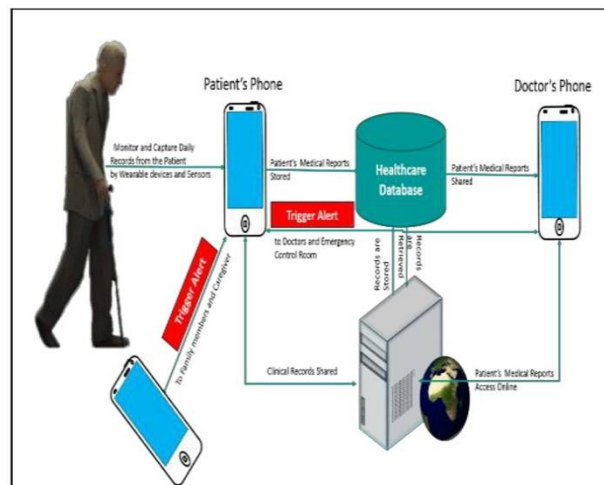


Fig.1 Architecture of Healthcare Monitoring System

IoT based health care is heterogeneous computing system of apps and wearable devices that connect patients and healthcare service providers remotely. The collected clinical data are stored in mobile apps and transmitted to the central database server immediately or periodically through the Internet. In case of emergency the H2U healthcare system can send alarm or can trigger alert to the doctor as well as to their relatives and caregivers for the rapid action of that particular end user. Once the alert message is triggered the physician can be ready for an emergency backup for the patient and in the meantime the physician can also review the patient's clinical reports from the submitted medical information of the patient's database that is already stored in the cloud. Figure 1.1 shows the interconnection platform and services management to support large daily clinical reports like blood pressure (BP), blood sugar, heart rate, body temperature, body weight, etc. that are recorded and saved in the mobile app and central database of elderly healthcare system. The system is composed of many useful functions such as insurance, first aid, emergency support, symptoms checker, assistance, medical report, and medication.

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Fig.2 Healthcare Application

II. INTERNET OF THINGS (IOT)

Internet of Things (IOT) driven health and wellness monitoring system enables remote and continuous monitoring of people, with applications in chronic conditions, such as obesity, hypertension, diabetes, heart failure, stress, preventive care and wellness. Medical care and healthcare represents one of the most attractive application areas for the IOT. Digitization and the increasing connectivity between devices, citizens and their meaningful way. Smart manufacturing becomes the norm in industry 4.0, where intelligent machines are network so they can exchange and respond to data to independently manage industrial production. The internet of things is a transformational concept. In 1999, Kevin Ashton, co-founder of the Auto-ID Center at the Science Institute of Technology, envisioned an Internet of Things based on RIFD chips that could enable “things” to communicate with each other.

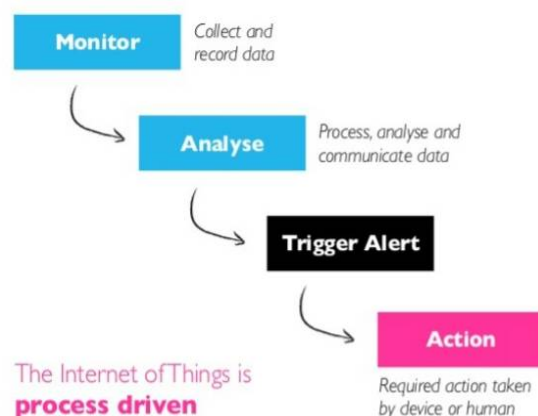


Fig.3 IOT Process Flow



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IOT breaks the confines of traditional computer networks and establishes connections directly with objects in the physical world. The core concept of this phenomenon is that IOT allows for “things” to connect to the Internet, ranging from the significant –airplanes, elevators, solar panels, medical equipment-to the mandate-toys, soap dispensers and porch lights. The IOT paradigms can play a significant role in improving the health and wellness of subjects by increasing the availability and quality of care, and grammatically lowering the treatment costs and frequent travel. The IOT driven healthcare system employs networked by biosensors to simultaneously collect multiple physiological signals and wireless to share or send gathered signals directly to the cloud diagnostic server and the caregivers for further analysis and clinical review.

Further, the IOT enabled remote monitoring applications can significantly reduce travel, cost and time in long term monitoring applications. In the health and wellness monitoring environment, the IOT has emerged as one of the most powerful information gathering and sharing paradigms for personalized healthcare systems, ambient assisted living, uses posture detection, and activity recognition. Compliance with treatment and medication at home and healthcare providers is another important potential application. In this paper, the core concept is based on IOT, the information sensed from the sensors are gathered and transmitted to the smart phone through IOT. Patients better understand their health problems, predict the type of diseases and guide the patients as to when and where to consult doctors under which departments of the hospital.

III. DATA COLLECTION

The following table, Table-1 illustrates the data collection model of the healthcare system.

TABLE-1 Data Collection about Healthcare

Special interest group	Gsma,argre
Professional society	IoT club
Journals	IARAS-international journal for IoT for web services Inter-science publishers-international journal for IoT and cyper assurance
Conferences	EpyIoT conferences Iml-internal conferences on IoT and ml
Thesis title	Establishing a service composition framework for smart healthcare system
Forum	India m2m IoT forum Iot.next IEE.world forum
Mailing list	Info[ml]ece.it.ac.ir a.griew@poliba.it biljanastojkosta@yahoo.com
New sites	www.gms.module.ie www.iottechnews.com www.iotjournal.com
3 authors	Bahar farhni Alfedo griew Bilijana risteka
Call for papers	IEEE world forum on IoT



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IV. LITERATURE SURVEY

Vandana Milind Rohokale et al[17] proposed a cooperative IoT approach for the better health monitoring and control of rural and poor human being's health parameters like blood pressure (BP), hemoglobin (HB), bloodsugar, abnormal cellular growth in any part of the The main component of the IoT is the RFID system. RFID can automatically identify the still or moving entities. The main aim of IoT is to monitor and control objects via Internet. Merit of this paper is amplify and forward technique but the energy savings achieved at the low threshold value. Demerit of this paper is authentication and authorization is needed for IoT systems.

R.S .H. Istepanian et al[8] discussed the potential benefits of using m-IoT in non-invasive glucose level sensing and the potential m-IoT based architecture for diabetes management. Expect to achieve intelligent identification and management in a heterogeneous connectivity environment from the mobile healthcare perspective. These non-invasive glucose monitoring sensors are mainly attached onto the skin, which, as the largest and outermost organ of the body, accounts for 10–15% of the body mass and has one of the lowest metabolic rates, thus having relatively low nutritive requirements. Merit of this paper emerging integrated technique will be explored and investigated towards generating a better performance in the physiological signal capture of the non-invasive glucose monitoring sensor. Demerits of this paper low reliability of the non-invasive glucose monitoring.

Antonio J. Jara, Miguel et al [10] this work presents an interconnection framework for mobile Health (mHealth) based on the Internet of Things. It makes continuous and remote vital sign monitoring feasible and introduces technological innovations for empowering health monitors and patient devices with Internet capabilities. It also allows patient monitoring and supervision by remote centers, and personal platforms such as tablets. In terms of software, this interconnection framework presents a novel protocol, called YOAPY, for an efficient, secure, and scalable integration of the sensors deployed in the patient's personal environment. Merits of this system it makes continuous monitoring, feasible and secure. Demerits of this system is it cannot be extended as a generic algorithm for different platforms; this requires an ad-hoc version of YOAPY for each vital sign. A physician and an ancillary set of evaluations is always required, to determine the specific cause of the anomalies.

Lei Clifton, David et al [2] suggested an remote health monitoring systems based on wearable sensors, partitioning the system into for main components acquisition, analytics, and visualization. Merits of this paper is those equipped with IoT intelligence, offer attractive options for enabling observation and recording of data in home and work environments. Several challenges in sensing, analytics, and visualization that need to be addressed before systems can be designed for seamless integration into clinical practice.

Vikas Vipplapalli et al[19] discussed A BSN (Body Sensor Network) is a special purpose network designed to operate autonomously to connect to various medical sensors and implants located inside and outside of the human body. Advantage is most useful in disaster management, but triage tagging would take time in a mass casualty disaster. Disadvantage is no ECG sensors was used. This work is done based on single person's data collection.

Thirumalasetty Sivakanth et al[15] comprehensive overview of reconfigurable sensor network for structural health monitoring. Real-time and periodic structural health monitoring can reduce the probability of collapse and the consequences of potential life-threatening conditions. Merits of this paper is NFC technology to fetch patient complete information automatically when doctor approaches patient. Merits low-cost portable health sensing device, comprising of several sensors, capable of measuring the vital attributes of a human body, Disadvantages is NFC and internet of things, the medical services should be improved significantly by continuously monitoring the patients, consolidating reports and alerting concerned doctors in case of emergencies.

Haobijam Basanta et al [1] 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. Advantage is elderly patients can easily wear the health sensing component all the time thereby allowing constant. Disadvantage is, the consumers, patients and other health experts need to think of some innovative and more reliable methods.

M. Minni Pamela Janet et al [9] proposes a secured Mobile Health care System using Wireless Body Sensor Network (WBSN). The nodes of WBSNs include ECG sensors, EEG sensors, EMG sensors, BP sensors, Motion sensors, Thermometer sensors etc. Advantage is consolidation of the intelligent low cost sensor nodes kept in or on or



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around the human body to monitor the body functions. Demerit is secured health care system using wireless body sensor network has not been proposed.

N.Vigna Vinod Kumar et al [4] discussed the major security requirements in BSN based modern healthcare system. Subsequently, we propose a secure IoT based healthcare system using BSN, called BSN-Care, which can efficiently accomplish those requirements. Advantage In this paper is security and the privacy issues in healthcare applications using body sensor network (BSN). Disadvantages is fail to embed strong security services that could be preserve patient privacy.

Yo-Ping Huang et al [7] proposed an pre-dict certain variations of diseases based on the symptoms that a patient reported. This recommended solution combines conceptual design and technique of multi criteria decision making (MCDM) analytic hierarchy process (AHP) with fuzzy triangular priority weights to deal with the uncertainty of imprecision and ambiguity that resulted from the relative priority scales of various factors of diseases advantage is analyzed and determined complex problems, and evaluated the best feasible solution from diverse conflicting goals.

V. CONCLUSION

In this survey, various mechanisms and algorithms were discussed for healthcare monitoring using IOT. Multi criteria decision making (MCDM) analytic hierarchy process (AHP) overcomes the disadvantages of other mechanism by making it a more efficient method to monitor the health parameters of patients. This system has the advantage of less cost, less analysis, time, and low power consumption. By this, the accurate and effective monitoring of patients is possible. Wireless sensors data will be sent to server using IOT with secure.

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