International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 8 Issue 06, June-2019

Internet of Things (IOT): A Study Analysis of Applications and Benefits in Health Care Sector

Hiteshi Pal
M. Tech. Student,
Department of Computer Science
Devi Ahilya University Indore.

***Abstract*:- A combination of software sensing and communication devices as an event activities, the emergent technology termed as Internet of things (IOT), has attracted the researchers and practitioners to design virtual innovative solutions. This paper is confined to the IOT in healthcare applications, its benefits and overcoming the challenges with adoptation of the latest changes in the technology.**

Keywords:- Internet of things (IOT),Healthcare, Innovative solutions, adoptation of change in technology, cloud computing.

INTRODUCTION :

The day to day innovations in Information Technology has motivated the practioners and researchers to design the innovative solutions in various fields. The application of IOT devices are enormous in healthcare sector with need base software, sensing and communication devices. The IOT enabled the health care system to monitor

several medical parameters using smart sensors, computer networks, remote server
and cloud computing so that the healthcare systems enable to detect the diseases and also provide the basic suggestions for treatment. In addition IOT, enabled research very significant in the areas where different methodologies of computer science and engineering are to be deployed solutions to practical medical issues. Therefore this paper includes the review of literature on IOT enabled application to overcome the challenges also in healthcare sector.

EMERGENCE OF IOT:

The term IOT was first introduced by the Auto ID centre at Massachusetts Institute
of Technology in 2003 to improve applications such as work automation, communication system process, error reduction and fast results. In fact IOT is categorised as a collaboration of computing and sensor base technologies such as sensors, wireless networks, embedded systems, object identifiers and Nono technologies. This combination provides interaction, communication and processing among linked devices.

LITERATURE REVIEW:

Chao Hsi Huang et al. explained the medical nursing system (MNS) based on IOT architecture 2G-3G, RFID Sensor, $w_i f_i$ and blue tooth for data transfer. [1]

Willian D.de. Mattos et al. represented the linkage of m-health domain with m2m (machine to machine) and 5G technologies. [2]

Iuliana Chiuchisan et al. in the literature for parkison's infection test and neurological disorders using IOT concepts presented an intelligent system for decision making which not only support but assist also the physicians in medical treatment prescriptions, diagnosis and monitoring of patients condition improvement progress.[3]

Dr. Salah S. Ali. Majeed et al. in his research has proposed to develop a device which is basically a medical sensing device, low cost and IOT based to monitor patient Physiological conditions. [4]

P. Chavan et al., the key objective in this research to design android application in healthcare area by using concept of IOT and cloud computing. [5]

Harshal Arbat et al. worked to design a new tool due to increasing trend in IOT and its demand. In the domain of m- health practice, focus is given to keep trade of patient health by observing heart rate value. This HR value is obtained by a band called smart health band. On getting the results beyond permissible limit, specific message will be transmitted to his family or friend. [6]

K.M. Chaman Kumar et al. research present a new techinque to monitor such patients who are diseased OSA (Obstructive sleep apnea) and also helpful for similar diseases. [7]

Chetanya Puri et al. researcher has aimed to present a new dimension of Cardio signals. In the first step the cardiac patient a warming will be given. This also include timely detection of the severity of the patient and diagnosis. [8]

Vivek Chandel et al. has found a way to consistently monitor the patient health by means of IMUS (Inertial measurement units). To use this, an accurate and improved Algorithm steps system is provided for sensing the events of patients for correct diagnosis. [9]

IOT APPLICATION IN HEALTH CARE :

With the advancement in the technology, medical devices have undergone drastic changes from traditional wired equipment to wireless programmable devices. The medical IOT system is a sophisticated setup that contains a variety of mechanism such as medical equipment, smart sensors network gateways, cloud computing, big data and clinical information system. In simplest term, the medical IOT is basically a system comprising monitoring devices, through

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 8 Issue 06, June-2019

which patients health parameter are remotely recorded, the system analyse the recorded data and provides to the clinical staff to determine the current health situation of patients to take immediate action in critical cases. Most common examples of IOT services in Health Care are: Glucose level monitoring, Electro cardiogram monitoring, Magnetic resonance imaging (MRI) and heart rate monitoring, CT scanning. Now a days almost all the advanced electronic devices are controlled by smart phones which are currently equipped with a large number of healthcare applications including non contact measuring sensors that work on image analysis algorithms. A typical smart phone is now capable of diagnosing diseases such as asthma, chronic obstructive Pulmonary disease (COPD), problematic system of the respiratory tract, heart rate and oxygen saturation level etc.

BENEFITS OF IOT IN MEDICAL DOMIAN

Sr.	Benefit	Ref.
1.	Make life more convenient Outcome of patient is improved Management of diseases is real - time Life quality is Improved Care for patient is increased together with cost reduction. Ultimate benefit is healthier and longer lives, Maximum diseases preventive. Major change in health of patient will make an automatic alert which will save lives with timely care.	14
2.	Medication is on time. Patient care will be intimated to family members.	1
3.	Advancement in treatment Cost affordability	8
4.	Doctors can manage patients records easily.	12
5.	Patients remote monitoring using cloud computing.	5
6.	Big data and IOT for chronic patients monitoring.	15

We have discussed only those benefits which are most recent, emerging and expanding very quickly in the field of medical IOT healthcare

CHALLENGES OF IOT:

1. Intelligence in Medical care [1]
2. Data Integration [1]
3. System Predictability [5]
4. Interoperability Technical Challenges [5]
5. Measurement and diseases scability software implementation of medical analytic schemes [13]
6. Security challenges [13]

CONCLUSION AND FUTURE WORK:

There is an emerging trend of using smart healthcare systems to keep track of patient's medical information with small sensing devices to collect data over a network on real time basis. there is a need for continuous interaction and communication among various devices and liveware for better outcome. Quite a number of research challenges have been identified which are expected to become major research trends in near future. It is expected that this study will be useful for researchers and practitioners in the field helping them to understand the huge potential of IOT in medical domain and identification of major challenges in internet of medical things.

REFERENCES:

[1] C.H. Huang and K.W. Cheng,"RFID technology combined with IOT application in medical nursing system". Bulletin of Networking, Computing Systems and Software, vol.3, no.1, pp.20-24, January 2014.
[2] W.D. de Mattos and P.R.L. Gondim, M- Health Solutions Using 5G Networks and M2M Communications, Published IEEE Computer Society, 2016.
[3] I. Chiuchisan and O. Geman, "An approach of a decision support and home monitoring system for patients with neurological disorders using internet of things concepts." Wseas Transactions on Systems, vol. 13,2014.
[4] S.S.Ali Majeed, I.S. Al- Mejibli and J. Karam. "Home Telehealth by internet of things (IOT)," in Proc Canadian Conference on Electrical and Computer EngineeringHalifax,Canada,May 3-6,2015.
[5] P. Chavan, P. More, N. Thorat, S. Yewale, and p. Dhade, "ECG - Remote patient monitoring using cloud computing," Imperial Journal of Interdisciplinary Research, vol.2, no.2,2016.
[6] H. Arbat, S. Choudhary, and K. Bala, "IOT smart health band" Imperial Journal of Interdisciplinary Research, vol.2, no.5,2016.
[7] K.M.C. Kumar,"A new methodology for monitoring OSA patients based on IoT," International Journal of Innovative Research and Development, vol.5, no. 2, 2016.
[8] Chetan Puri, A. Ukil, and S. Bandyopadhyay, "iCarma: Inexpensive cardiac arrhythmia management - an IoT healthcare analytics solution." in Proc. First Workshop on IoT - enabled Healthcare and wellness Technologies and Systems, June 30, 2016.
[9] V. Chandel, A. Sinharay, and N. Ahmed, "Exploiting IMU sensors for IOT enabled health monitoring. " in Proc. First Workshop on IoT - enabled Healthcare and Wellness Technologies and Systems, June 30, 2016.
[10] K.D. Krishna V. Akkala, R. Bharath, P. Rajalakshmi and A.M. Mohammed, Computer Aided Abnormality Detection for Kidney on FRGA Based IoT Enabled Portable Ultrasound Imaging System, AGBM, Published by Elseviers Masson SAS, 2016.
[11] G.Matar, J. Lina, G. Kaddoum, and A. Riley, "Internet of things in sleep monitoring: An application for posture recognition using supervised learning," in Proc. International Confrence on IEEE Healthcom, 2016.
[12] A. Ghose, P. Sinha, C. Bhaumik, A. Sinha, A. Agrawal, and A.D. Choudhary, " Ubiquitous healthcare monitoring system for elderly and chronic patients," in Proc. ACM Conference on Pervasive and Ubiquitous Computing Adjunct Publication, Zurich, Switzerland, September 8-12, 2013.
[13] H.J.La, H.T. Jun, S.D. Kim, "Extensible disease diagnosis cloud platform with medical sensors and Iot Devices," in Proc. 3rd International Conference on Future Internet of Things and Cloud, 2015.
[14] Digital Strategies for Big Picture Results. [Online] Available: http://www.tcs.com/resources/white_papers/pages/internet-of-Things-Medical-Devices.aspx
[15] D.G. Paez, F. Aparicio, M. de Buenaga,and J.R. Ascaniol, R. Hervas, et al., "Big data and IoT for chronic patients monitoring in lecture notes in computer science, 2014,pp.416-423