INTERNET OF THINGS BASED MANAGEMENT ON DIABETES

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ABSTRACT

Everyday new reports and stories started regarding innovations in Artificial Intelligence (AI) that comprise the probable to alter our lives. In this paper, we displayed another eHealth stage fusing humanoid robots to help a developing multidimensional tend to the treatment of diabetes. The engineering of the stage broadens the Internet of Things (IoT) to a web - driven worldview through using existing web benchmarks to access and control objects of the physical layer. This consolidates slender systems, every one of which includes an arrangement of medicinal sensors connected remotely to a "assistant connected (through the Internet) to a web - driven Disease Management Hub (DMH)". This gives an arrangement of administrations to the two patients and their parental figures that help the full continuum of the "multidimensional care approach" of diabetes. The stage's product engineering design empowers the improvement of different applications without knowing low - level points of interest of the stage. This is accomplished through binding together the entrance interface and system of taking care of administration asks for through a layered approach in light of protest virtualization and

programmed benefit conveyance. A completely utilitarian model is created and its end - to - end usefulness and agreeableness are tried effectively through a clinician - drove pilot think about, giving confirmation that the two patients and parental figures are open to the presentation of the proposed stage.

Keywords: Internet of things, disease management hub, diabetes, eHealth.

1. INTRODUCTION

Artificial Intelligence is a branch which aims to develop tools and techniques for solving complex problems that people at good at [1]. Machine learning is a sub division of artificial intelligence, worried about the plan and advancement of calculations that enables the PCs to advance its practices in view of consistent information. The growth of "internet of things (IoT) [2] is based" on the continuous growth that has been witnessed in the last couple of years in the fields of microelectronics, information technology and communications and it is evident this trend will continue. There are four technical communications implementation models for internet of Thing (IoT) as defined by the Internet Architecture Board [3]. These models are: "Device-to-Device (D2D), Device-to-Cloud, Device-to-Gateway/Server (D2S) and Back-End Data Sharing".

Internet of things (IoT) [4]-[7] is one of the significant correspondence progresses as of late that connections the web with regular sensors and working gadgets for an all-IP-based engineering, connecting physical and virtual protests through the abuse of information catch and correspondence capacities. It is a system of pervasive gadgets or things that are fit for calculation and correspondence over the Internet. Web of things design will offer particular protest distinguishing proof, sensor and association capacity as the reason for the advancement of autonomous helpful administrations and applications. Using the energy of remote impromptu [8]-[11] and sensor systems [12] and most recent advances like haze processing [13] brilliant gadgets. IoT is overhauling present day medicinal services with promising innovative, monetary, and social prospects.

Diabetes is a metabolic issue that is portrayed by high blood glucose and either deficient or incapable insulin. Diabetes prompts visual impairment, renal disappointment, removal, heart assaults and stroke. It is the third driving reason for death in numerous created nations. It is “evaluated that in 2010 there were all inclusive 285 million individuals (roughly 6.4% of the grown-up populace) experiencing this illness”. This number is evaluated to increment to “430 million without better control or cure”. A maturing populace and heftiness are two fundamental purposes behind the expansion. Moreover, it has been “demonstrated that right around half of the putative diabetics are not analyzed until 10 years after beginning of the infection; subsequently the genuine pervasiveness of worldwide diabetes must be cosmically high”. Diabetes is extensively grouped in to two: “insulin– subordinate diabetes mellitus (IDDM) or Type I and non-insulin subordinate diabetes (NIDDM) or Type II. Sort I diabetes for the most part happens in youth especially between 12-15 years age”. Sort II diabetes is the most widely recognized bookkeeping to 80 to 90% of the diabetic populace.

Pervasiveness of diabetes is expanding at a disturbing rate around the world. It is evaluated that 415 million individuals have diabetes, like clockwork a man bites the dust from diabetes with the records for 12% of the worldwide medicinal services consumption. Thus, there has been an expanded weight on the accessible social insurance assets, and patients determined to have “diabetes require a more effective and individualized illness administration intend to avoid (or delay) movement and treatment expenses of the short-and long haul intricacies of the malady”.

2. RELATED WORK

Diabetes [14] is currently an incurable disease which requires long term treatment and care from patient and his caretakers. This new system provides a two-way communication between patient and the health professionals using Internet of Things technology. This system lets patient upload their blood-glucose readings to the system

database and the abnormalities in these readings are monitored by both health professionals and caretakers. System consists of a “glucometer General Packet Radio Service (GPRS), Blood-Glucose Monitor (BGM) which is used to get the readings from patient, a telecare android and iOS application for caretakers for communication between patient, health professional and caretaker and a cloud server through which all these readings are monitored”. The cloud server is the center of the framework as it stores patient's information and consents from approved overseers. It additionally incorporates “Abnormal Blood-glucose Level Detection (ABLD) and a Proactive Notification Engine” (PNE). “GPRS BGM is an android based two-way specialized gadget”. Blood-glucose readings are collected via GPRS BGM in different timings (before/after meals, at morning and so on) and these readings are uploaded to the cloud server using GPRS protocol and XML format. Telecare application offers remote assistance to patients by providing the data of patient’s blood-glucose readings to caretakers. This helps caretakers to keep track of patient’s condition and if any abnormality is found then caretaker can take necessary actions as per the advice of the health professionals.

Al-Taee et.al, [15] introduced another e-Health stage fusing humanoid robots to help a developing multidimensional administer to the treatment of diabetes. The design of this innovation expands the Internet of Things (IoT) to a web-driven worldview by using existing web measures to access and control objects of the physical layer.

3. SYSTEM ARCHITECTURE

The System architecture is given in the figure 1. It consists of the following phases: DMH (Disease Management Hub), Interactive Humanoid like Response System, Creation and Allocation of Virtual Objects and Monitoring the child status.

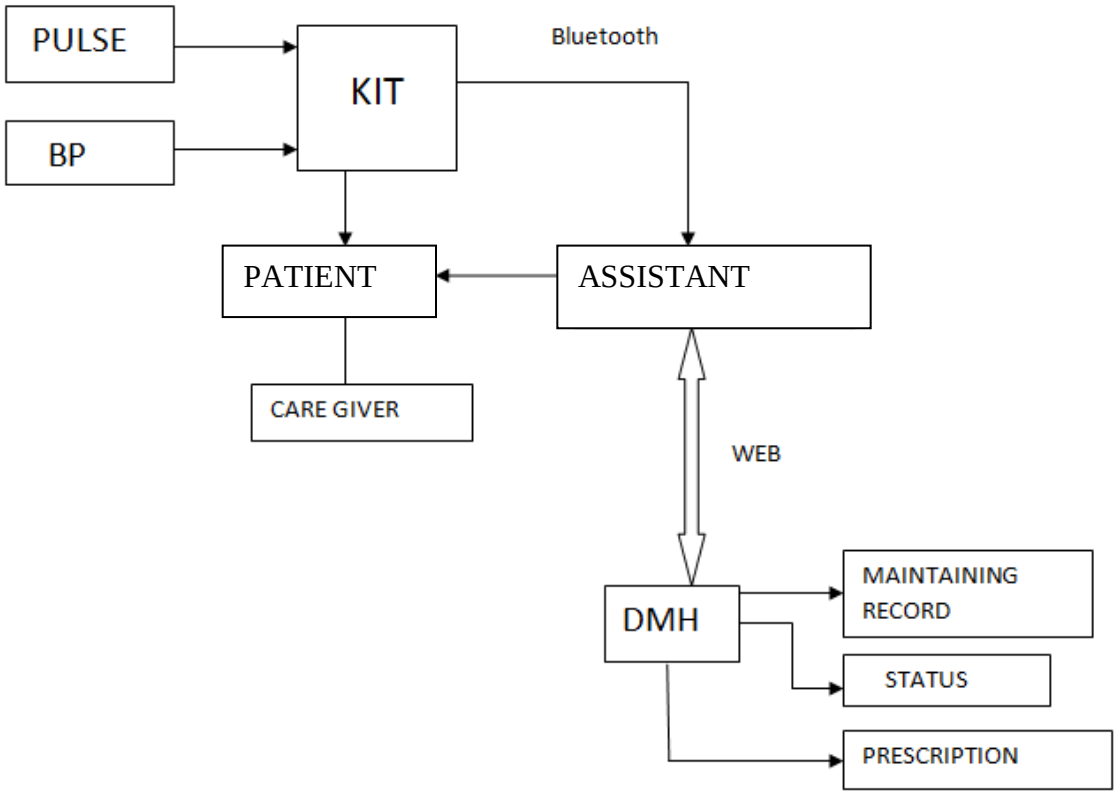


Fig.1. System Architecture

DMH (Disease Management Hub)

The Patient profile creation is utilized to add the patient data to a server and after that include the separate pack id. The server keeps up the patient data and updates the status of a patient. The unit is utilized to detect the patient's heartbeat and circulatory strain.

The web application speaks to a solitary page rundown for the patient and the parental figures. It likewise gives get to connections to all key stage applications, for example, treatment design, BG designs, and different applications. For the patient, “it condenses the wellbeing profile through observing patient's vitals and patterns of bio-information, pediatric rundown and medicinal synopsis”. For the parental figures, it

shows “patient's symbols that are hyperlinked to the relating persistent dashboard”. These symbols are shaded red, yellow and green to reflect great, satisfactory and poor illness administration execution. This spares time and helps the parental figures organizing their endeavors as needs be.

Creation and Allocation of Virtual Objects

“Virtual Objects (VOs) of the DMH” are fit for deciphering occasions and exercises regarding predefined social insurance arrangements/rules as far as mindfulness, portrayal and cooperation. For example, “these items comprehend to what degree the patient's exercises consent to the treatment design/rules, apply manages on patient's information streams to extricate valuable synopses, and utilize amassed information to make suitable cautioning messages and advices to the relating objects at the physical layer”.

Interactive Intelligent Humanoid like Response System

This framework plays out a wide range of verbal assistant tolerant co-operations. It considers gathering of verbal data concerning the patient's eating regimen and physical exercise and additionally recording patient's sound messages to his/her parental figures. It likewise oversees introduction of different discoursed relegated to the patient by his/her doctor to advance the connection by making it more normal. It enables new clients to enroll their assistants medicinal “gadgets utilizing extraordinary identifiers (e.g. serial numbers) and in addition a security token that is haphazardly produced by the assistant upon its first utilize”. The “gadget identifier and security token number are utilized to encode and decode information traded between the assistant and DMH”. The patient, as fundamental, would then be able to look after his/her profile. Once enlisted, the patient will at that point be allotted to an expert guardian, contingent upon his/her wellbeing status.

Monitoring the child status

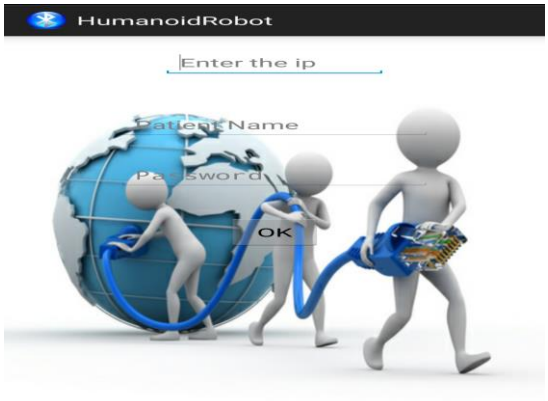
The therapeutic sensors are connected to the assistant (Smartphone in our application) through an individual region arrange in which the assistant goes about as an ace Bluetooth gadget, as outlined. The "assistant at every slender system likewise goes about as a conductor between the patient and his/her restorative sensors from one side and the DMH and guardians from the opposite side". The DMH gives an arrangement of administrations that cover the full continuum of diabetes administration for the patients and their parental figures.

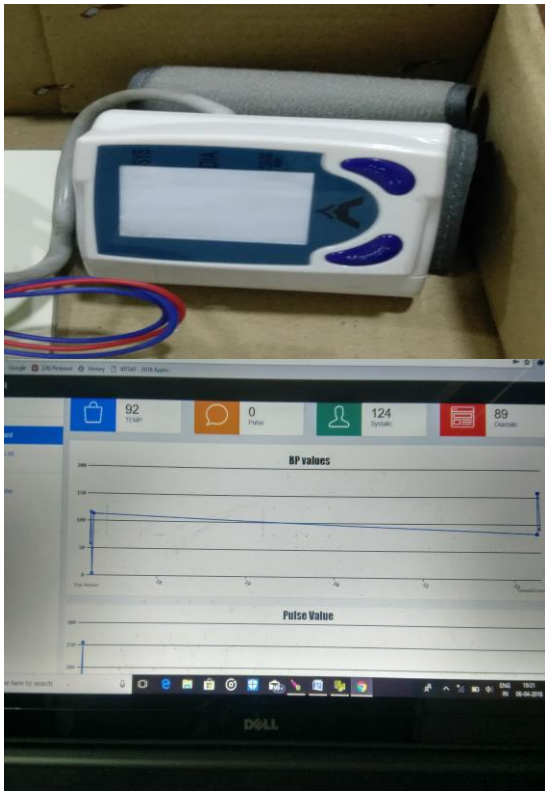
The long-run availability between these parts is performed through a remote neighborhood (Wi-Fi) connected to a current system foundation (the Internet). Every slim system includes an arrangement of restorative sensors (circulatory strain and heartbeat rate screen), and a current assistant.

4. EXPERIMENTAL RESULTS

The main and fruitful result of this experiment is that it reduces the burden of paying regular visits to hospitals. The system we developed uses the diastalic, systalic, pulse and B.P to evaluate the status of the patient. If they are unusual as per the values mentioned by the doctor then messages to the patient as well as caretaker will be sent to pay a visit to the hospital. Diabetes is one such disease of which children are very little aware and it is a good way to solve the issue among them.

The user can also login using an app via his android smartphone. This device acts as a device of interaction between for both audio and video between the patient and doctor.





5. CONCLUSION

It is surely understand that diabetes is a noteworthy constant malady issue worldwide with major financial and social effect. Profiting from innovation headways and cost decrease in remote systems and web advancements, various electronic/portable wellbeing (e/mHealth) applications have been proposed over these years. Lately, more

refined eHealth applications have been proposed and effectively actualized, profiting by late progressions and cost lessening in remote systems and web advances. We displayed the working and hidden design of the most recent medicinal services applications in view of Internet of Things utilized as a part of diabetes administration.

REFERENCES

[1] Dr.S.Balakrishnan, Dr. A.Jebaraj Ratnakumar, J. Elumalai. **"**A Machine Learning Based Regression Techniques for E-Mail Prioritization", Taga Journal of Graphic Technology, Vol. 14, pp. 710-717, 2018.

[2] Steven Uatuaromuinjo Tjiraso, S. Balakrishnan "Designing A Peer-To-Peer Central-Registry Based Internet Of Things (IoT) Protocol". 2016 International Conference on Engineering and Technology (ICET), Dec, 2016. Volume-2, pp. 164- 168. ISBN 978-1-5090-3212-9.

[3] S. Balakrishnan. "Peer-To-Peer Central Registry Based Internet of Everything (IoE) Protocol", CSI Communications magazine, Vol. 41, issue 4, pp. 26-29, 2017.

[4] G. Kortuem, F. Kawsar, V. Sundramoorthy and D. Fitton, "Smart objects as building blocks for the Internet of things," in IEEE Internet Computing, vol. 14, no. 1, pp. 44-51, Jan. - Feb. 2010.

[5] A. Zanella, N. Bui, A. Castellani, L. Vangelista and M. Zorzi, "Internet of Things for Smart Cities," in IEEE Internet of Things Journal , vol. 1, no. 1, pp. 22-32, Feb. 2014.

[6] A. Kamilaris and A. Pitsillides, "Mobile Phone Computing and the Internet of Things: A Survey," in IEEE Internet of Things Journal , vol. 3, no. 6, pp. 885 - 898, Dec. 2016.

[7] P. A. Laplante and N. Laplante, "The Internet of Things in Healthcare: Potential Applications and Challenges," in IT Professional , vol. 18, no. 3, pp. 2-4, May-June 2016.

[8] Varun G Menon and Joe Prathap P.M, "Analysing the Behaviour and Performance of Opportunistic Routing Protocols in Highly Mobile Wireless Ad Hoc Networks", International Journal of Engineering and Technology, vol. 8, no. 5, pp. 1916-1924, 2016.

[9] Varun G Menon, Joe Prathap P M and Vijay A, “Eliminating Redundant Relaying of Data Packets for Efficient Opportunistic Routing in Dynamic Wireless Ad Hoc Networks”, Asian Journal of Information Technology, vol. 12, no.18, 2016.

[10] Varun G. Menon and Joe Prathap P. M., “Performance of various Routing Protocols in Mobile A Hoc Networks-A Survey”, Research Journal of Applied Sciences, Engineering and Technology, 6(22), pp. 4181-4185, December 2013.

[11] Varun G Menon and Joe Prathap P M, “Routing in Highly Dynamic Ad Hoc Networks: Issues and Challenges”, International Journal of Computer Science and Engineering ”, vol.8, no. 4, pp.112-116, 2016.

[12] Varun G Menon and Joe Prathap P M, “Survey on Latest Energy Based Routing Protocols for Underwater Wireless Sensor Networks”, International Journal of Computer Networks and Wireless Communications , vol.6, no.6, pp.52-55.

[13] Varun G Menon and Joe Prathap P M, “Moving From Vehicular Cloud Computing to Vehicular Fog Computing: Issues and Challenges”, International Journal of Computer Science and Engineering, vol. 9, no. 2, 2017.

[14] S. H. Chang, R. D. Chiang, S. J. Wu and W. T. Chang, "A Context-Aware, Interactive M-Health System for Diabetics," in IT Professional, vol. 18, no. 3, pp. 14-22, May-June 2016.

[15] M. A. Al-Taee; W. Al-Nuaimy; Z. J. Muhsin; A. Al-Ataby, "Robot Assistant in Management of Diabetes in Children Based on the Internet of Things," in IEEE Internet of Things Journal, vol.PP, no.99, pp.1-1.