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<u>Literatures Review article</u>

The impact of Internet of Things in healthcare

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Abstract

Introduction:

This paper is an overview of some of the concept of Internet of things (IoT) on the healthcare field.

IoT is a fast growing, a user-friendly technology which allows everything to connected. One of the most attractive applications fields for IoT is the Healthcare, giving to us the possibility of many medical applications such as remote health monitoring, fitness programs, chronic diseases, and elderly care.

This paper categorizes the discussion in two aspects, services and applications.

The Internet of Things changed the healthcare industry, increasing efficiency, lowering costs and putting the focus back on better patient care.

Objective

The Effectiveness of IoT on Health Care

Method

The study began by searching the extant literature by a specific keywords and search items, in order to obtain as many relevant papers as possible. The collected papers are used to identify .and develop a paper based on the research questions

Conclusion

Internet of Things has been widely used to link existing medical resources and provide reliable, effective and intelligent health care for the elderly and patients with severe illness.

Keywords: Medical Services, Medical,   Internet of Things, Healthcare

Introduction:

The IoT is the internetworking of physical devices embedded with electronics, software, sensors and exchange data. IoT transforms physical objects into smart devices to collect communicate, monitor and interpret information from their surroundings in real time (WCO, 2019).

IOT can break geographic barriers, providing rapid clinical responses, medical consultation and communication links of medical images and video Data, a unique ontology for all things among IoT-based healthcare (Carnaz, G 2016).

By seeing the many lives affected due to lack of proper treatment on time and failed to maintain continuous observation, we are intended to change the traditional approach to smart health care system. In Afghanstain, Doctors play a key role in the health care system , Health care professionals must always be at the patient's place and the patient will be hospitalized for a long time (Dinesh, K. et al. 2018). Doctors should also be physically present in critical cases to check heart beat, temperature, pulse rate etc.

In a study by(Yin et al, 2016) show that IoT-based system makes it possible to provide services to all residents even in remote areas. Unlike local hospitalization services, all relevant resources are shared with the community through smart development in order to provide flexible and convenient services to patients.

As stated by Kumar, Ramkumar, & Rubini, (2019) by using the IOT Health care monitoring system, the healthcare professionals can monitor, diagnose, and advice their patients all the time. The healthcare professional can monitor their patients from a remote location at any time.

Studies also show that the Internet of Things provides more than just healthcare, currently the Internet of Things is used to improve access to care, increase the quality of care and most importantly reduce the cost of care(Niewolny,2013).

Similarly, Research) Carnaz, G .2016) also found That the Internet of Things is changing health care initiatives and increasing efficiency, lowering costs and refocusing on better patient care.

Objective

The Effectiveness of IoT on Health Care

Questions

How IoT can be used to increase healthcare?

Is the Internet of Things providing low-cost, high-quality healthcare support?

Inclusion Criteria:

Articles published from 2013 to 2020 included in this research.

Exclusion Criteria:

Articles published before 2013 do not included in this research.

METHOD

The study methods used in writing this paper is systematic literature review. The objectives of the study are to provide an overview of the impact of Internet of Things in healthcare. The study began by searching the extant literature by a specific keywords and search items, in order to obtain as many relevant papers as possible. To ensure the quality of the results, the papers accessed were book chapters in online academic libraries selected journals. Around thirty papers were collected according to the keywords for further research and paper writing. The collected papers are used to identify and develop a paper based on the research questions.

What is IoT ?

The IoT connects devices through the Internet, where each device has a unique IP address, enabling remote monitoring and control through many technologies.

With Internet of Things system and equipment, It is much easier to monitor and retrieve patient health information. This results in the provision of medical services required to the user or patient without any delay. IoT devices can collect health care data including blood pressure, blood sugar, oxygen and weight. The data is stored online and is accessible at any time through treatment.

IoT Healthcare Services and Applications

Healthcare Services

M-Health Things: m-Health is an abbreviation for mobile health, it is used for the practice of medicine and public health supported by mobile devices. The term is most commonly used in reference to using mobile communication devices, such as mobile phones, tablet computers and personal digital assistants (PDAs), and wearable devices such as smart watches,

for health services, information, and data collection (Islam, S. et al. 2015).

Community Healthcare: A service that may be provided by IoT is a network covering an area around a local community, a municipal hospital, a residential area, or a rural community, being a cooperative network structure. A cooperative IoT platform for rural healthcare monitoring has been proposed and found to be energy-eficient (Islam, S. et al. 2015).

Wearable Device Access: Various non-intrusive sensors have been developed for a diverse range of medical applications. Such sensors are prospective enough to deliver the same services through the IoT. On the other hand, wearable devices can come with a set of desirable features appropriate for the IoT architecture.

Semantic Medical Access: The use of semantics and ontologies to share large amounts of medical information and knowledge has been widely considered. The wide potential of medical semantics and ontologies has received close attention from designers of IoT-based healthcare applications.

Indirect Emergency Healthcare: There are some indirect emergency situations where healthcare issues are involved, including: adverse weather conditions, transport (aviation, ship, train, and vehicle) accidents, earthen sites collapse, among others. Therefore, a service called indirect emergency health care (IEH) can be offer a bundle of solutions such as information availability (Rahmani A. et al. 2015).

Embedded Gateway Configuration : A configured gateway service, by the name embedded gateway configuration (EGC) service, that connects networks nodes, where patients are connected, with the Internet, and all the medical equipment, requires some common integration features depending on the specific purpose of the deployed gateway (Rahmani A. et al. 2015).

Embedded Context Prediction: Through IoT-based sensing, context-aware computing connects a variety of information found in the real world to ambient intelligence. A variety of IoT devices, such as smartphones, tablet PCs, wearable devices, smart bands, smart sensors, cameras, microphones, and GPS devices, can be connected with each other to collect context-aware data of the user's surroundings in real time (Manaligod, H. Et al. 2019).

Early intervention/prevention: Monitoring of human activities and wellbeing, like monitoring everyday activity and report it to hospital or family members. IoT may provide the way to monitoring all that activities with devices embedded (Manaligod, H. Et al. 2019).

IoT Healthcare Applications

An effective care model demands IoT applications to be applied to various diseases in different healthcare settings. By implementing IoT in healthcare solutions, healthcare providers get invaluable data, which provide insight into the symptoms and pattern of the disease, while enabling remote care.

Diabetes Prevention: Diabetes is a set of metabolic diseases in which there are high glucose (sugar) levels over a protracted period. Blood glucose level recording unveil individual patterns of blood glucose changes and helps in the planning of meals, activities, and medication times. An m-IoT method for noninvasive glucose level sensing on a real-time basis(Carnaz, G 2016).

Electrocardiogram Monitoring: The monitoring of the electrocardiogram (ECG), that is, the electrical activity of the heart recorded by electrocardiography, includes the measurement of the simple heart rate and therefore the determination of the essential rhythm as well as the diagnosis of multifaceted arrhythmias, myocardial ischemia, and protracted QT intervals. IoT-based applications for ECG monitoring have the potential to give maximum information and deliver information to medical staff (Carnaz, G 2016).

Blood Pressure Monitoring: Blood Pressure Monitoring is a part of the prevention of circulatory systems problems; therefore, IoT-based applications can control remotely the communication between a health post and the health centre (Islam, S. et al. 2015).

Body Temperature Monitoring: Homeostasis is how human body manages a multitude of highly complex interactions to maintain balance or return systems. Using a body temperature sensor that is embedded in a TelosB device allows retrieving body temperature variations and reporting to a temperature measurement system based on a home gateway over the IoT(Islam, S. et al. 2015).

Oxygen Saturation Monitoring Blood: Blood oxygen saturation can be measure with a pulse oximetry, a non-invasive and non-stop monitoring system. The integration of a pulse oximetry in a IoT-based application can support the oxygen saturation monitoring (Khattak, H. et al. 2014).

Rehabilitation System: Because physical drugs and rehabilitation can enhance and restore the functional ability and quality of life of those with some physical disability. The IoT has

the potential to boost rehabilitation systems in terms of mitigating issues coupled to aging populations and therefore the shortage of health specialists(Khattak, H. et al. 2014).

Medication Management: One of the main problems in public health and cause of huge financial burden is the medication poses. IoT ensure a new tool to resolve this issue (Islam, S. et al. 2015).

Wheelchair Management: Smart wheelchairs with full automation for disabled people is a response from IoT, like the acceleration in pace of work (Islam, S. et al. 2015).

Conclusion

This paper surveys diverse aspects of IoT-based healthcare technologies. To increase access to care, increase quality of care, and most importantly reduce the cost of care, trust in health care is increasing day by day.

The main goal is to have a trusted patient control system so that healthcare professionals can monitor patients who are hospitalized with their daily activities. Internet of Things has been widely used to link existing medical resources and provide reliable, effective and intelligent health care for the elderly and patients with severe illness.

By seeing the many lives affected due to lack of proper treatment on time and failed to maintain continuous observation, we are intended to change the traditional approach to smart health care system.

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