Human Health Monitoring System using IOT

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Abstract: The Internet of Things (IoT) provides an efficient and new life to the healthcare field. It also has a rapid development of many fields. But the more important are real in the field of Medical. One of the better way the doctors are capable to certainly and quickly right to use the relevant patient information’s and including the patient medical history. Through the Internet of Things, tremendously improves the quality of information and the patient care in the Medical field. So, Internet of Things offers an actual platform to interconnect the all the resources. Ontology based automating design methodology for smart medicine and physical health system using IoT. Ontology aids computers in additionally understanding the symptoms and medical resources. So, Ontology helps to create a rehabilitation strategy and reconfigure medical resources according to patient’s specific requirements rapidly and repeatedly.

Among the panoply of applications enabled by the Internet of Things (IoT), smart and connected health care is a particularly important one. Networked sensors, either worn on the body or embedded in our living environments, make possible the gathering of rich information indicative of our physical and mental health.

Keywords— Ontology, Internet of Things (IoT), smart recovery, Resources optimizations.

I. INTRODUCTION

Internet of Things (IoT) devices can be mostly used to facilitate distant health monitoring and emergency healthcare systems. At the present we are facing many challenges in the real world, which have to deal realistically. By the use of IoT challenges are rehabilitate, which consumes more time, resources and manpower. In the recent years the rehabilitation of Internet resources has become popular and also development of the smart applications like smart home [1]. Compared to the traditional system, the smart rehabilitation is aiming at providing an effective treatment, sufficient interaction and quick reconfiguration to making the determined use of the medical resources according to the patient’s particular requirements probable. Internet of Things is the primary technology for interconnecting all the medical resources of the rehabilitation systems. Also to combine the Networking technologies that enables a wide range of applications, devices or things to interact and communicate, among themselves [2].

Internet of Things (IoT) has many forms of applications including healthcare and industrial systems. So, healthcare systems mainly using the interconnected devices to create an IoT network enthusiastic to assessment, automatically detecting the situation and monitors the patients, where the medical
interferences are mandatory. So, IoT alone can form an information network that interconnects hospitals, peoples, healthcare, and device [3].

II. IMPLEMENTATION AND RELATED WORKS:
Implementation of the Internet of Things is flexible and accessible results to allowing the healthcare applications to serve patients with better treatment, also done with the remote patient monitoring and effective medical data handling. There are some of different characteristics are needed to implement the healthcare service in the Environment.

1) Ontology Evaluation:
In this part inputs are converted into function in which patients symptoms are analyzed, diseases are located, and all the information’s are put into the remote database. When the patient first enters the hospitals, the physical characteristics of the diseases will be primarily determined by the doctor.

The determined functions are divided into the classes and sub classes. Classes are represents the patients basic information and subclasses are represents detailed diseases information.

2) Global Ontology Comparison:
In this evaluated ontology compared to the globally stored diseases ontology on the base of the knowledge base system. Global ontology contains the two forms of ontology; these are disease ontology and resource ontology. Disease ontology contains the patient basic and medical information and resource ontology covers medical resources such that doctors, medical devices, etc [4].

3) Similarity Calculations:
Input the inquiry content of the symptom manually. Compare the input symptom with all the global disease ontology in the knowledge base. Perform similarity matching of the symptoms automatically for similarity matching. Automate the selection of the most similar case in the knowledge base. It is easy to find out what kinds of devices are needed for the corresponding symptoms and rehabilitation strategies through the ontology [5].

4) Design Optimization:
The final phase of smart design process in which the procedure, methods, scopes, and duration of all of the separate actions. Parameter optimization is essential to make assured that the particulars come across the requirements from structure. Automatic designs help to build a system where a new patient could be quickly diagnosed, corresponding help strategy can soon be worked out, and associated medical properties can be distributed in a short time. With ontology ensuring the well-ordered knowledge, structure [6].

III. PROPOSED SYSTEM
In Proposed system Ontology based automating design methodology for smart medicine and physical health system using IoT. Additionally to understand the symptoms and the medical assets by the use of an Ontology. And also Ontology supports to create a rehabilitation strategy and also to reconfigure the medical assets based on the specific requirements of the patients habitually and rapidly. So, based on the objectives IoT aims to interconnect all the resources and easily provide an immediate information interaction.major role in this system is to applying the Ontology for the creation of rehabilitation strategy and to build the subsystem analysis for collaboration of the patient’s information or identity [7]. The basic idea of IoT is the pervasive presence of things and objects that are interconnected and are able to cooperate with each other to reach common goal. IoT extents a set of technologies that supports a extensive range of things to interact and interconnect among themselves using networking technologies. Two important features, including the quick construction of rehabilitation system and the easy sharing of domain knowledge, make the system
unique and perform excellent, as IoT.ontology have played a significant role in the process[8]. It aims to interconnect all the resources and provide immediate information interaction.

For the implementation of the proposed system must be have some of the different form of the sections shown in Fig.2. First one is the Human machine interaction and second one is multidisciplinary optimization which is formed in the many operations on the system architecture. And third one is managing the applications by the database and class mapping in the knowledge base. The Human machine interaction can be achieved by the base of the resources and human, like doctors, nurse and patients are the human related resources and devices such the RFID, ambulance, medical resources are the interact to the human resources. Second, Multidisciplinary optimizations which is used to perform the design of the automated design methodology and the major role in the system architecture, because it creates the all strategy of the system and also to provide the prescription to patient automatically[9]. Third, managing applications is used to manage all the resources and the patients records also, the patients records also maintained by classes and sub classes as explained in implementation. In application management also performs the design collaboration, information and application integration based on the database and the knowledge base in the system [10].

IV. PROTOCOLS IN IOT

4.1 Constrained Application Protocol (CoAP)

The IETF Constrained Restful Environments (CoRE) working group created CoAP, which is an application layer protocol for IoT applications. The CoAP defines a web transfer protocol based on Representational State Transfer (REST) on top of HTTP functionalities. REST represents a simpler way to exchange data between clients and servers over HTTP. REST can be seen as a cacheable connection protocol that relies on stateless client-server architecture. It is used within mobile and social network applications and it eliminates ambiguity by using HTTP get, post, put, and delete methods. REST enables clients and servers to expose and consume web services like the Simple Object Access Protocol (SOAP) but in an easier way using Uniform Resource Identifiers (URIs) as nouns and HTTP get, post, put, and delete methods as verbs.
4.2 Message Queue Telemetry Transport (MQTT):
MQTT is a messaging protocol that was introduced by Andy Stanford-Clark of IBM and Arlen Nipper of Arcom (now Eurotech) in 1999 and was standardized in 2013 at OASIS [70]. MQTT aims at connecting embedded devices and networks with applications and middleware. The connection operation uses a routing mechanism (one-to-one, one-to-many, many-to-many) and enables MQTT as an optimal connection protocol for the IoT and M2M[11].

4.3 Extensible Messaging and Presence Protocol (XMPP)
XMPP is an IETF instant messaging (IM) standard that is used for multi-party chatting, voice and video calling and telepresence. XMPP was developed by the Jabber open source community to support an open, secure, spam free and decentralized messaging protocol. XMPP allows users to communicate with each other by sending instant messages on the Internet no matter which operating system they are using. XMPP allows IM applications to achieve authentication [12].

4.4 Advanced Message Queuing Protocol (AMQP)
AMQP [13] Is an open standard application layer protocol for the IoT focusing on message-oriented environments? It supports reliable communication via message delivery guarantee primitives including at-most-once, at-least-once and exactly once delivery. AMQP requires a reliable transport protocol like TCP to exchange messages.

4.5 6LowPAN
Low power Wireless Personal Area Networks (WPANs) which many IoT communications may rely on have some special characteristics different from former link layer technologies like limited packet size (e.g., maximum 127 bytes for IEEE 802.15.4), various address lengths, and low bandwidth [14]–[15]. So, there was a need to make an adaptation layer that fits IPv6 packets to the IEEE 802.15.4 specifications. The IETF 6LoWPAN working group developed such a standard in 2007. 6LoWPAN is the specification of mapping services required by the IPv6 over Low power WPANs to maintain an IPv6 network [16]-[18]. The standard provides header compression to reduce the transmission overhead, fragmentation to meet the IPv6 Maximum Transmission Unit (MTU) requirement, and forwarding to link-layer to support multi-hop delivery.

V. ARCHITECTURE
Smart healthcare plays a significant role in healthcare applications through embedding sensors and actuators in patients and their medicine for monitoring and tracking purposes. The IoT is used by clinical care to monitor physiological statuses of patients through sensors by collecting and analyzing their information and then sending analyzed patient’s data remotely to processing centers to make suitable actions. For example, Masimo Radical-7 monitors the patient’s status remotely and reports that to a clinical staff. Recently, IBM utilized RFID technology of OhioHealth’s hospitals to track hand washing after checking each patient. That operation could be used to avoid infections that cause about 90 000 deaths and losing about $30 billion annually [19]-[21]. Generally in the case of accidents someone has must intimate to the hospital for getting ambulance, but in the case of IoT whenever accidents are takes place, the wearable devices automatically gives signal to nearest Wi-Fi router and then hospital to get the ambulance, based upon her health conditions like heartbeats.

IoT can be used to supplement patient treatment through remote monitoring and communication, and to keep track of patients as they move through a healthcare facility. Read on to discover the specifics of these IoT deployments.
The proposed architecture of IoT based physical health system that can be integrated to the some rehabilitation strategy by collecting the patient basic information’s and symptoms and also manages the medical history. System determines that proper reconfiguration of the Medical resources can develop the performance of the system and also surely opportuneness to the patients [22].

The utilization of the medical resources must be used properly. Based on the design of system is effective and can help to the smart medicine system by generating the prescription. By invoking the RFID to interconnection of the all the resources and interact with the server during the reconfiguration of the patients medical resources and to provide solutions quickly[23]. The performance of this can be increased to more efficient when compare to the existing system shown in fig.5.
By evaluating the performance of the smart system has been evaluating the reconfiguration and the effectiveness of producing the patient treatment prescription[24].

Smart sensors, which combine a sensor and a microcontroller, make it possible to harness the power of the IoT for healthcare by accurately measuring, monitoring and analyzing a variety of health status indicators[20].

**VI. CONCLUSION**

We realized IoT is the universal occurrence of things and objects that are intersected and are capable to work together with each other to extent a common goal. IoT extents a set of technologies that enable a wide range of things to act together and communicate among themselves using networking knowledge. A rehabilitation system is developed using IoT-based technologies, SOA methods, and multidisciplinary optimization methods. Ontology places the base for disease diagnosis.
and resource distribution. In proposed, an ontology-based automating design methodology for smart medicine and physical health system using IoT technology. This system must be both effective and efficient for the information sharing. Two important features, including the quick construction of restoration system and the easy allotment of domain knowledge, which should make the system as distinctive and perform admirable, as IoT and ontology have played a important role in the method. one vision of the future is that IoT becomes a utility with increased sophistication in sensing, actuation, communications, control, and in creating knowledge from vast amounts of data. This will result in qualitatively different lifestyles from today. What the lifestyles would be is anyone’s guess. It would be fair to say that we cannot predict how lives will change. We did not predict the Internet, the Web, social networking, Face book, Twitter, millions of apps for Smartphone, etc., and these have all qualitatively changed societies’ lifestyle. Especially for healthcare system, it is most useful to every human. So health problems are easily predicted at the beginning stage based on IoT healthcare system.

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