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Implementation of IOT Based Health Care Solution Based on Cloud Computing

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Abstract

The IoT plays an important role in healthcare applications, from managing chronic diseases at one end of the spectrum to preventing disease at the other. The Internet of Things (IoT) has made it possible for devices around the world to acquire information and store it, in order to be able to use it at a later stage. However, this potential opportunity is often not exploited because of the excessively big interval between the data collection and the capability to process and analyze it. In this paper, an intense research has been carried out to explore the role of IoT healthcare delivery and also analyze the realistic opportunities of it. Finally high-end cloud computing technology based IoT framework is proposed to find the health care solutions in healthcare industry in reliable manner.

Keywords: IoT, Cloud computing , Healthcare,

1. INTRODUCTION

The Internet of Things (IoT) paradigm is based on intelligent and self-configuring nodes (things) interconnected in a dynamic and global network infrastructure. It represents one of the most disruptive technologies which make the ubiquitous and pervasive computing scene. Internet of things is usually refers to the real world and little things limited storage and processing ability, and the important problems about reliability, performance, security and privacy. On the other hand, cloud computing has the almost unlimited capacity of storage and processing power which is a more mature technology at least to a certain extent to solve the problem of most of the Internet of things.

Medical information technology and healthcare service are closely related to the national welfare and the people's livelihood. Cloud computing and Internet of integration in the application of modern medicine would be a great breakthrough. Because in large scale cloud computing has its advantages such as high reliability, virtualization, high efficiency and scalability, the construction of public cloud in hospital and the patients can promote resource sharing, cost savings, build medical monitoring and management system with high efficiency. Internet as an important support to realize the safe, efficient and high quality of the medical monitoring and management, the main technology of RFID and photos and other acoustic electromagnetic sensors which can achieve breakthroughs in medical information transmission, intelligent health monitoring and precise location.

IoT also brings great convenience to hospital, especially in the patient monitoring and tracking management. With the rapid development of Internet, cloud computing and Internet integration of medical monitoring and management platform is to provide new opportunities for the hospital, even in social fields.

2. BACKGROUND

(A) Internet of Things (IoT)

The idea is applied to u-healthcare to improve access and interconnection of devices used in u-healthcare. Embedded technologies will take an important role to deliver u healthcare to people in remote locations and monitoring system that provide a continuous stream of accurate data for better healthcare decisions. As the technology for collecting, analyzing and transmitting data, IoT continue to improve; the IoT-driven healthcare applications and systems emerge.

In the Internet of Things (IoT), devices gather and share information directly with each other and the cloud, making it possible to collect record and analyze new data streams faster and more accurately. That suggests all sorts of interesting possibilities across a range of industries: cars that sense wear and tear and self schedule maintenance or trains that dynamically calculate and report projected arrival times to waiting passengers. Communications are via sorts of long-and short-range wired or wireless devices in different kinds of networking environments such as Intranet, extranet, and Internet that are supported by technologies such as cloud computing, SaaS, and SOA based on regulated data formats and transmission standards.

(B) Cloud Computing

Cloud computing is a new computing paradigm where in computer processing is being performed through internet by a standard browser. Cloud computing builds on established trends for driving the cost out of the delivery of services while increasing the speed and agility with which services are deployed.

Cloud computing offers significant benefits to the healthcare sector: doctor's clinics, hospitals, and health clinics require quick access to computing and large storage facilities which are not provided in the traditional settings. Moreover, healthcare data needs to be shared across various settings and geographies which further burden the healthcare provider and the patient causing significant delay in treatment and loss of time. Cloud caters to all these requirements thus providing the healthcare organizations an incredible opportunity to improve services to their customers, the patients, to share information more easily than ever before, and improve operational efficiency at the same time.

3. RELATED WORK

IOT IN ACTION IN HEALTHCARE

The IoT plays a significant role in a broad range of healthcare applications, from managing chronic diseases at one end of the spectrum to preventing disease at the other.

(A) Clinical care

Hospitalized patients whose physiological status requires close attention can be constantly monitored using IoT-driven, noninvasive monitoring. This type of solution employs sensors to collect comprehensive physiological information and uses gateways and the cloud to analyze and store the information and then send the analyzed data wirelessly to caregivers for further analysis and review. It replaces the process of having a health professional come by at regular intervals to check the patient's vital signs, instead providing a continuous automated flow of information. In this way, it simultaneously improves the quality of care through constant attention and lowers the cost of care by eliminating the need for a caregiver to actively engage in data collection and analysis.

(B) Remote monitoring

There are people all over the world whose health may suffer because they don't have ready access to effective health monitoring. But small, powerful wireless solutions connected through the IoT are now making it possible for monitoring to come to these patients instead of vice-versa. These solutions can be used to securely capture patient health data from a variety of sensors, apply complex algorithms to analyze the

data and then share it through wireless connectivity with medical professionals who can make appropriate health recommendations.

(C) IoT in Healthcare

The Time Is Now The long-predicted IoT revolution in healthcare is already underway, as the examples in this paper make clear. And, those are just the tip of the proverbial iceberg, as new use cases continue to emerge to address the urgent need for affordable, accessible care. Meanwhile, we are seeing the IoT building blocks of automation and machine-to-machine communication continue to be established, with the addition of the service layer completing the infrastructure. Free scale is excited to be a part of this revolution by providing end-to-end processing and connectivity solutions for IoT-driven healthcare solutions, working toward establishing standards for these solutions and accelerating innovation for organizations eager to realize the benefits of the IoT in healthcare.

(D) Cloud Computing in Healthcare

The term cloud computing refers to computer resources that are available on demand through which computing infrastructure, applications, and business processes can be delivered to users as a service wherever and whenever they need. With the advent of cloud computing, the long-held dream of computing as a utility has become true. We can equate cloud computing to the source of electricity and gas so customers are only charged based on the usage of the provided services and resources. Everything has rolled up in predictable monthly subscription; thus one only pays for what he uses. With respect to the m-health domain, many previous studies identified the future of cloud computing and offered various frameworks to enhance healthcare service.

(E) The Necessaries of The Integration

The two worlds of Cloud and IoT have seen an independent evolution. However, plenty of common advantage is the result of their integration have been identified in literature, predict the future. On the one hand, the Internet of things can benefit from cloud almost unlimited capacity and resources to make up for the technical constraints. Specifically, cloud computing can provide an effective solution to realize management of Internet services and composition and use of things or data applications. Cloud computing can benefit from the Internet of things, on the other hand, by extending its scope to deal with things in the real world more distributed and dynamic way, and to provide new services on a large number of real life scenarios. The complementary characteristics of cloud computing and Internet of things is attractive because of the different proposals reported in literature and encouraging Cloud-IoT paradigm shown in Table 1.

Table 1: The Complementarity and Integration of Issues

Internet of Things	Cloud Computing
pervasive	ubiquitous
real world	virtual resources
limited computational	unlimited computational
limited storage	unlimited storage
point of convergence	service delivery
big data source	means to manage big data

IoT involves by definition a large amount of information sources. It produces a large amount of unstructured or semi-structured data of the three major characteristics of the data: volume, velocity and variety. Hence this means that the

collection, acquisition, processing and visualization, archive, share, search large amounts of data. Provide almost unlimited and on-demand storage capacity, low cost, cloud is the most convenient and cost effective solutions to deal with the data generated by the Internet of things.

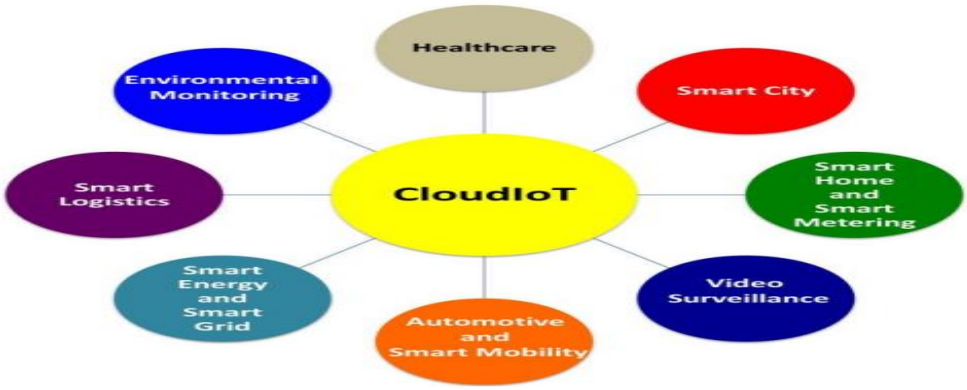

Figure 1: The Applications of the CloudIoT Integration

IoT and multimedia technologies have made their entrance in the healthcare field thanks to ambient-assisted living and telemedicine. The adoption of Cloud in this scenario leads to the abstraction of technical details, eliminating the need for expertise in, or control over, the technology infrastructure. In addition, it makes the implementation of security (cloud) multimedia health services, to overcome the problem, on the device running a large number of multimedia & security algorithm with limited computing power and small batteries.

4. PROPOSED METHODOLOGY

With the increasing population and the growth in IT products, which provide services all over the world via the Internet, monitoring different objects in real time is becoming ever more difficult. Cloud of Internet of Things is a concept combining technologies connected via the Internet to provide services in different places and environments in real-time. Cloud of Internet of Things enables sensor technology as a service in real-time over the Internet and this system is concentrated by Cloud Computing, modern data communication and industry process data sensor technologies.

The services provided include monitoring systems used in the field of healthcare, transportation, agriculture, public places, border control and drug control etc. The system depends on the data being collected from the sensor and transmitted to a MIS for action to be taken. ZigBee and Wi-Fi technology is used to communicate between sensor devices, data collection, transmitting equipment, and the MIS system which is responsible for the deep data analysis.

Cloud of Internet of Things can be used in database design, integrating the Cloud and the Smart Hospital Information System, which will use real-time sensor technologies to collect information from many sensor devices connected to the hospital system in different locations and business process areas via Internet services to provide a healthcare service available in real time. Using a Cloud of Internet of Things system, hospitals could electronically store all patients' records including documents, videos, and images enabling authorized users to access patient data and provide a patient focused service. Also, service providers could use Cloud of Internet of Things to exchange data between hospitals and themselves in real time quickly, and at low cost.

A. Proposed system

The proposed system is a real-time data collection service which aims to provide the best real-time decisions. The components of the proposed system area Data Processing layer, a Data Integration layer, a Cloud Computing layer, a

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Network structure, a Knowledge Reasoning layer and a Visualization layer, as shown in Figure 1

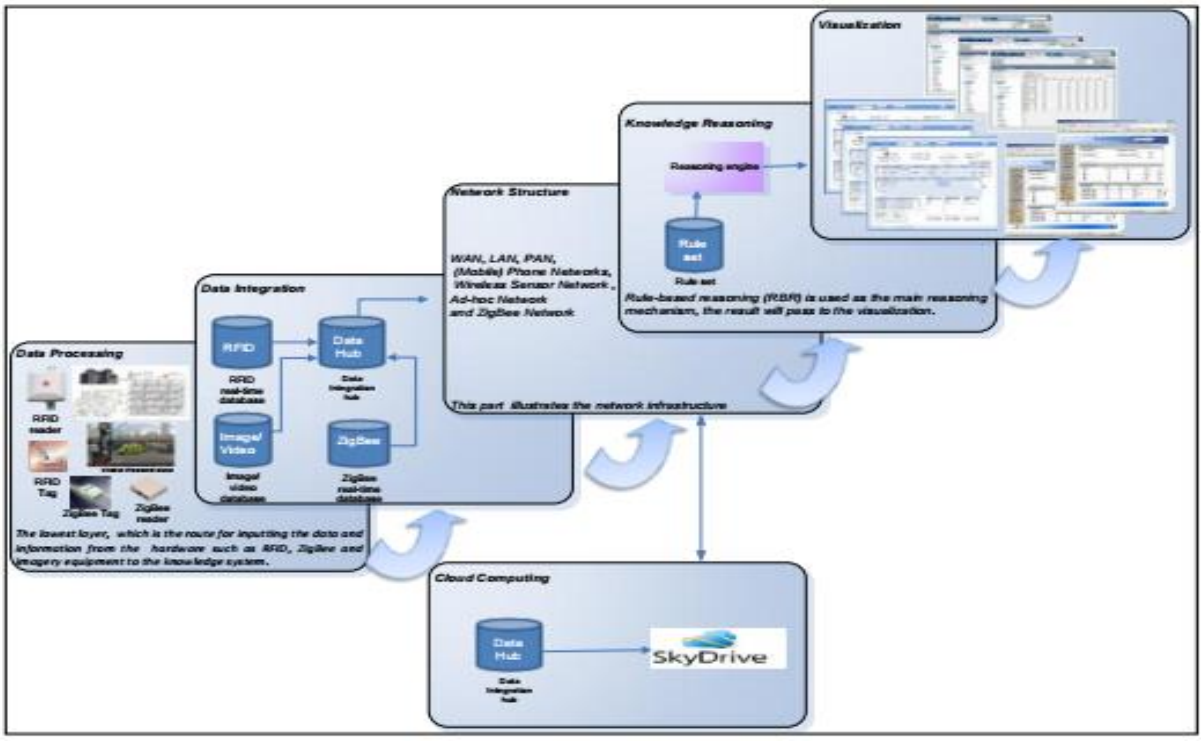

Figure 2: Layered Conceptual Model to provide Decision Support System for Smart Healthcare

B. Data Processing layer

The first layer, the Data Collection Layer, is sensor-based technology responsible for collecting real time data from different sources. The data will be captured from physical world devices which have the ability to receive and transmit data wirelessly. In this layer there are three feature blocks: the Identification, Location, Video records and Other Data Acquisition. The technologies used for the purpose of identification and locating technologies in this layer are listed as RFID, ZigBee, NFC, barcode technologies and digital cameras and most of these are used in proven commercial/ security industry applications. These technologies are used in object/item identification and location; the object is required to have 'tag(s)' and a 'receiver' as the two main components to track and identify the location of objects.

C. Data Integration Layer

The second layer is the Data Integration layer, which is responsible for the organization, translation, rationalization, copying and storage ofraw data from the Data Collection Layer. Data from multiple sources will be processed and integrated into the Data Integration hub. The process of integration includes three types of technologies: RFID databases, ZigBee databases and Digital Images/videos.

D. Cloud Computing Layer

The third layer is based on Cloud Computing technology which is used to increase the capacity of shared resources provided by data collection in a rapid and secure way through the Internet. This layer greatly reduces the cost and time of storing data compared with conventional methods, as there is no need for a large server to keep user information secure.

E. Network Structure Layer

The fourth layer is the Network Layer which provides the functional and procedural means of transferring multiple length data structures from different sources on one or multiple networks to a destination hub. The Network layer contains several technologies which provide the functionality of a structured data exchange using a computer network.

F. Knowledge Management Layer

The fifth layer is the 'Knowledge Management' layer, which is responsible for processing the huge amount of data and information using knowledge to achieve the objectives of companies. This layer provides logistical support, guidance for operational staff support and collection arrangements, and incident solutions. It is based on information and data gathered from the lower layer, and adopts a knowledge-based technology with rule-based reasoning.

G. Visualization Layer

The visualization layer provides the visual representation and organization of data once it has been translated to make it accessible to the user community, for example through creation of text, tables, pictures and diagrams to provide a Management Information System for healthcare. This layer presents automatic identification and collection of healthcare information systems and user best-solutions for real-time remote sensor data access, processing, visualization, or for a different application for the same purpose.

H. Possible Applications of Cloud of Internet of Things

In this system, the upper two layers can be changed or modified for use with different application and domain areas,but the lower two layers have to be redesigned based on the application requirements

Hospital

ZigBee/RFID tags are attached toidentify, detect and locatepatients, staff and equipment to providecontinuous monitoring inside and outside of the hospital.

6. CONCLUSION

With the fast development of cloud computing and computer science technology, the combination of the IOT and clod computing in the medical-assisted environment is urgently needed. The prior research focus more on individual development of the single technique, quite a less research on the field of medical monitoring and managing service application have been conducted. A cloud computation IoT framework is analyzed in equipped manner to find accurate solutions to health care problems in reliable manner.

REFERENCES

[1] C. O. Rolim, F. L. Koch, C. B. Westphall, J. Werner, A. Fracalossi, and G. S. Salvador, "A Cloud Computing Solution for Patient's Data Collection in Health Care Institutions," 2010 Second Int. Conf. eHealth, Telemedicine, Soc. Med., no. ii, pp. 95–99, Feb. 2010.

[2] J. Infanta and M. Hemalatha, "Enhancing Building Security with RFID and ZigBee," Vol. 5, No. 1, pp. 265–272, 2013.

[3] H. Yelin, X. Guo, and J. Zhu, "Research on RFIDbased Monitoring Platform for Wireless Sensor Networks," vol. 1, no. 8051, pp. 1909–1912, 2011.

[4] K. Ahmed and M. Gregory, "Integrating Wireless Sensor Networks with Cloud Computing," 2011 Seventh Int. Conf. Mob. Ad-hoc Sens. Networks, pp. 364–366, Dec. 2011.

[5] Z. T. Ayoub, S. Ouni, and F. Kamoun, "Global versus local re-association approach to extend Wireless Sensor Networks," 2012.

[6] A. Riddle, "RFID for All [review of 'RFID Technology and Applications' by S.B. Miles, S.E. Sarma, and J.R. Williams; 2008]," IEEE Microw. Mag., vol. 9, no. 6, pp. 176–176, Dec. 2008.

[7] Z. Specification, "Zigbee Specification," 2008.

[8] S. K. Dash, S. Mohapatra, and P. K. Pattnaik, "A Survey on Applications of Wireless Sensor Network Using Cloud Computing," vol. 1, no. 4, pp. 50–55, 2010.

[9] J. Cubo, A. Brogi, and E. Pimentel, "Behaviour-Aware Compositions of Things," 2012 IEEE Int. Conf. Green Comput. Commun., pp. 1–8, Nov. 2012.

[10] A. Dohr, R. Modre-Opsrian, M. Drobics, D. Hayn, and G. Schreier, "The Internet of Things for Ambient Assisted Living," 2010 Seventh Int. Conf. Inf. Technol. New Gener., pp. 804–809, 2010.

[11] Proteus, Digital Medicine, http://www.proteus.com/future-products/digitalmedicines/

[12] D. Christin, A. Reinhardt, P. Mogre and R. Steinmed, "Wireless Sensor Networks and the Internet of Things: Selected Challenges," in Proceedings of the 8th GI/ITG KuVS Fachgespräch "Drahtlose Sensornede, pp. 31-33, 2009 [13] C. Li, A. Raghunathan, and N. Jha, "Hijacking an Insulin Pump: Security A\acks and Defenses for a Diabetes Therapy System" in IEEE 13th International Conference on eHealth Networking, Applications and Services, Columbia, MO, 2011, pp. 150-156.

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