# Internet of Things (IoT) for U-healthcare Convergence Application

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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. IoT aims to provide means to access and control all kinds of ubiquitous and uniquely identifiable devices, facilities and assets. In this paper we discussed the background of Internet of Things (IoT) and its application to u-healthcare. This study aims to make mobile device gateway an integrated gateway which supports heterogeneous devices for u-healthcare convergence.

**Keywords:** IoT, u-healthcare, mobile computing, cloud computing

## 1    Introduction

In this paper we have presented the u-healthcare system in the Internet of Things (IoT) environment with the support of the mobile gateway which makes it possible for integration. We have presented here the mobile gateway architecture in which the main purpose is to receive the sensing data and make a local analysis and generate keywords and then will be sent to remote medical server for analysis.

For the satisfactory information transmission of the mobile healthcare, seamless data transfer must be supported. To construct a seamless data flow, the heterogeneous network integration, the disconnected operations and the communication link redundancy are important issues. Sensor mobile gateway should ideally be hosted on a small and portable device, suitable for daily use, such as a smartphone or PDA. The majority of smartphones and PDAs currently do not support typical WSN or Near Field Communication interfaces, but there already are some exceptions which are announcing their comprehensive implementation.
This paper is organized as follows: Section 2 discuss the background of the study, Section 3 discuss about the u-healthcare and the Internet of Things (IoT). Section 4 is the conclusion.

## 2    Background of the Study

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.

## 3    U-healthcare and the Internet of Things (IoT)

The IoT can be used in clinical care where hospitalized patients whose physiological status requires close attention can be constantly monitored using IoT-driven, noninvasive monitoring. This requires the 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. This technique improves the quality of care through constant attention and lower cost of care by eliminating the need for caregiver to actively engage in data collection and analysis.

The internet of things provides the means to access and control two categories of ubiquitous and uniquely identifiable devices- those that have inherent intelligence and those that are externally enabled via all sorts of wired and/or wireless communications in all kinds of networking environments, supported by cloud computing technologies with adequate security measures, to achieve pervasive connectivity and grand integration and to provide services such as monitoring, locating, controlling, reporting, decision support and so on. A revolution in healthcare is quietly brewing. The "Internet of Things" a global system that could eventually comprise billions of devices and applications including sensors, actuators, microcontrollers, mobile-communication devices, nano-pumps and more will make health monitoring, diagnostics and treatment more personalized, timely and convenient, while also lowering costs.

A general mobile gateway structure that suits various sensor networks with homogeneous or heterogeneous nodes from the hardware and software point of view. Such mobile gateway should integrate interfaces to sensor network technologies such as ZigBee, Wireless HART, 6LoWPAN and ANT on one hand and interfaces to other well established data communication technologies including Bluetooth, Wi-Fi and GSM/UMTS on the other. BAN devices may be embedded inside the body, implants, may be surface-mounted on the body in a fixed position Wearable technology or may be accompanied devices which humans can carry in different positions, in clothes pockets, by hand or in various bags. Figure 1 shows the BSN Typical Architecture in the cloud. This is one of the practical applications of Internet of Things in u-
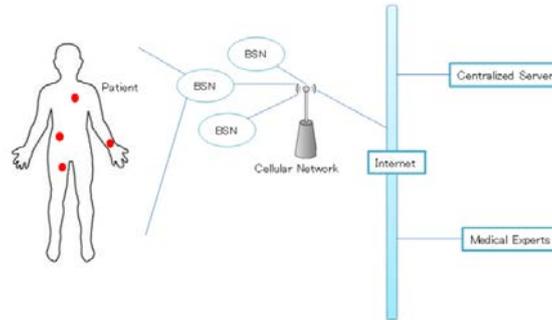
healthcare system.



**Fig. 1.** Body sensor network architecture in the cloud

The Figure 2 shows the tiers of u-healthcare System. First, in the Tier 1, the body sensor senses the data and transmits to the mobile phone. Mobile phone is capable of processing the data received through multi-purpose gateways and compute the received information in Tier 2. The mobile phone will transmit the data to be analyzed in monitoring center in Tier 3. The mobile phone will compute the received sensing information and generate keywords and transmit to the monitoring system through mobile phone. Then the monitoring center received the keywords and give diagnosis as a result. With the Internet of Things (IoT) this u-healthcare system is possible. The data is filtered by using the semantic meanings. Local analysis is performed by program installed in mobile phone. Internet provides interesting u-healthcare information as feedback to the mobile healthcare client layer.
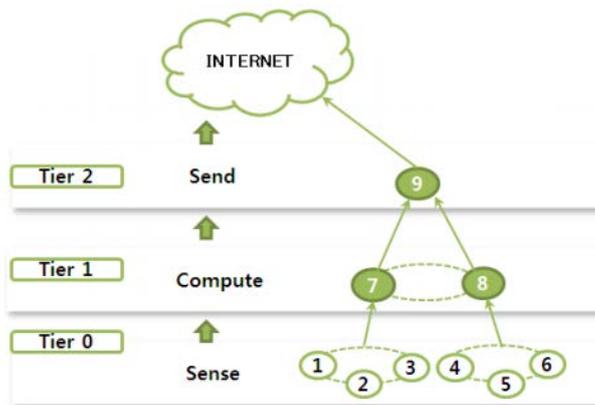


**Fig. 2.** Tiers of u-healthcare System

## 4    Conclusion

The IoT can be used in clinical care where hospitalized patients whose physiological

status requires close attention can be constantly monitored using IoT -driven, noninvasive monitoring. This requires 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. This paper studies the u-healthcare system with respect to the Internet of Things (IoT) perspective. In this paper we discussed the background of Internet of Things (IoT) and its application to u-healthcare. This study aims to make mobile device gateway an integrated gateway which supports heterogeneous devices for u-healthcare convergence.

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