

A Design of Mobile Convergence for U-healthcare System Development

Regin Joy Conejar¹, Jae Un Bae¹, Jun Woo-Jo¹ and Haeng-Kon Kim^{1*}

¹School of Information Technology, Catholic University of Daegu, Korea

{regin, bje0912, jojunwoo, hangkon}@cu.ac.kr

Abstract. Today's healthcare industry emphasizes safety, efficiency, patient-oriented approach, timeliness and balance. u-healthcare makes it possible to safely deliver appropriate services from any location at any time. This study aims to design a convergence u-healthcare system, which is the health management anytime and anywhere, life-care, which leads healthy life by management of daily life, point-of-care and makes on-site diagnostic. This study is expected to help ensure an excellent workforce in the healthcare sector using smart phones, and to help reduce medical expenses by improving the health of citizens.

1 Introduction

With an ICT (Information Communication Technology) paradigm shift toward ubiquitous technology, homes and cities we are living in are transforming into U-Home (Ubiquitous Home) and U-City (Ubiquitous City); and our surroundings and objects including administration, transportation, environment, education, culture, tourism, healthcare, and medicine are evolving with the aid of ubiquitous technology [1, 2]. This ubiquitous paradigm applied to various fields is introduced to the healthcare and medical sector in the name of U-Healthcare as well.

Smart technology creates new business in each industry and will be the role of continuous development. Commonly call the modern society as "digital convergence". This digital convergence combines existing industry with IT to create new values and even industrial structure [3]. Especially, mobile, smart, cloud computing can be called core technologies of the large technological direction of convergence that "smart" is receiving spotlight as convergence is deepening[4].

U-Healthcare is expected to have ripple effects on economy and industry by reducing medical costs and socioeconomic costs as well as on society and policy by expanding public health services and preventive care management.

Today's healthcare industry emphasizes safety, efficiency, patient-oriented approach, timeliness and balance. U-Healthcare makes it possible to safely deliver appropriate services from any location at any time. To explain the emergence of u-healthcare, one must invoke, first of all, progress in IT and medical technology, and then the desire and willingness on the part of health care institutions to adopt the new service concept and increased health care demand. Digitalization of information,

introduction of broadband communication and leaps made in healthcare technology in recent years have provided the technological capacity necessary for the achievement of u-healthcare.

2 Background of the Study

The medical industry will prosper the flower called smart healthcare due to sensing technology and fruits called smart grid will be made by power network and sensing of devices. In recent years, interests in health have been increased according to changes in lifestyle and environment. Also, interest in U-Healthcare, which monitors one's health and provides specialized healthcare services whenever and whatever it is needed, has increased. U-Healthcare services provide medical and healthcare services continuously and generally for healthy life of customers.

2.1. Innovation in Healthcare

Innovation in healthcare continues to be a driving force in the quest to balance cost containment and health care quality. Healthcare innovation can be defined as the introduction of a new concept, idea, service, process, or product aimed at improving treatment, diagnosis, education, outreach, prevention and research, and with the long term goals of improving quality, safety, outcomes, efficiency and costs [4].

The conceptual framework for innovation in healthcare is as shown in Fig. 1. The healthcare organizations serve six distinct purposes – treatment, diagnosis, prevention, education, research and outreach. In serving these purposes, healthcare organizations must manage quality, costs, safety, efficiency and outcomes. At the very core of healthcare innovation are the needs of patients and the healthcare providers who deliver care. Healthcare innovation focuses mainly on three areas– a) how the patient is seen, b) how the patient is heard, and c) how the patient's needs are met.

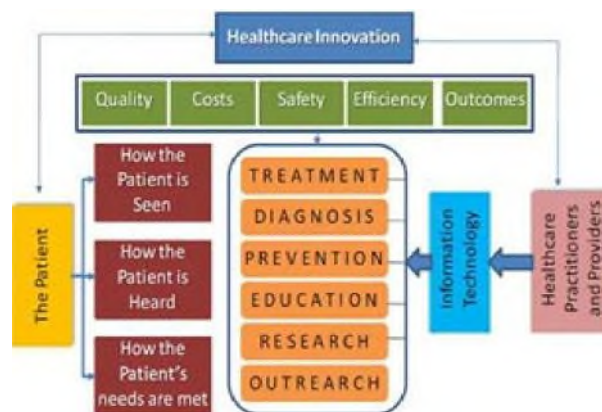


Fig. 1. A Conceptual Framework for Innovation in Healthcare [5]

2.3. Digital Convergence

Digital convergence is a certainty of future. Among hoards of other benefits that it offers one of the striking features of this technology is lower storage cost of digital data. Also, it offers enhanced quality of digital content and an assurance of quality improvements in future along with low cost and high bandwidth transmission of digital content between any two places.

In the age of digital convergence, integrated media will be useful to engage consumers with sufficient opportunities to strengthen their know-how of healthcare and create awareness about risk, cost and benefits of specific procedures.

3 A Conceptual Model for Smart IT Convergence for U-Healthcare

One of the key benefits of smart medical tools is fostering a sense of patient efficacy. For medical professionals, more data is useful when helping a patient make informed health care decisions. Using smart phone medical application that checks other symptoms provides physicians with a wealth of clinically useful information. This is why medical monitoring application is one of the most important technological tools to promote 'self-care' and prevention of disease.

Smart mobile can perform actions such as communicating with other devices, storing information, and retrieving online documents shown in Fig 2. If we consider a typical mobile user for example, an agent might operate on their smart phone or PDA, monitor the user's behavior in an autonomous fashion, react to any perceived changes in the user's status, and proactively anticipate what the user's future behavior will be.

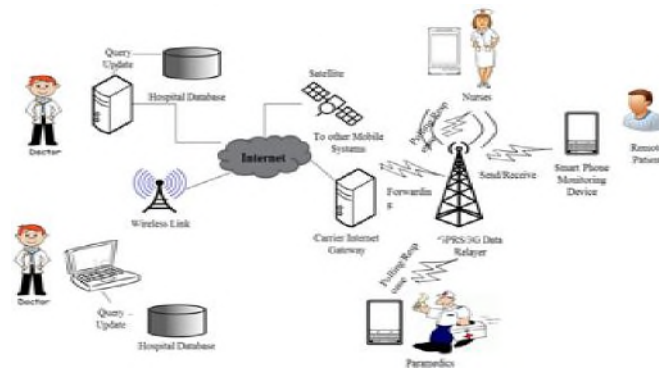


Fig. 2. IT Convergence for U-Healthcare

4 Software Framework

Medical data of patients will continuously be accumulated and managed. Based on this collected data, the condition of patients will comprehensively analyze with medical records from the past until today.

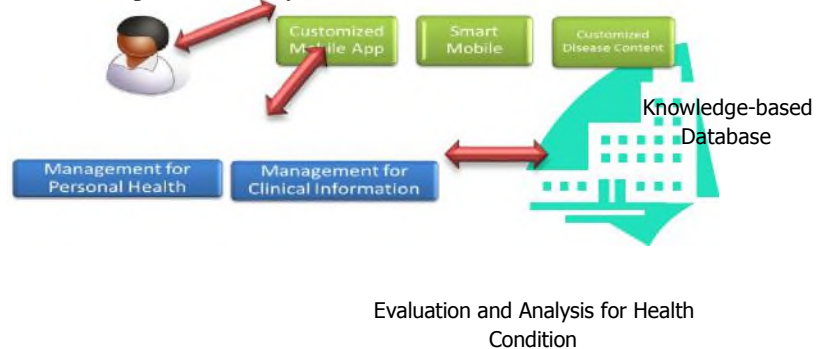


Fig. 3. Development of the Patient-Specific Healthcare Platform

5 Conclusion

Advancements in ubiquitous technology ushers us into a new world. This study is expected to help ensure an excellent workforce and new technologies in the healthcare sector using smart phones, and to help reduce medical expenses by improving the health of citizens. With the advancement of communication and computing technologies, the smart devices are evolving toward the convergence with other industry sector. In the future, U-Healthcare will be further integrated into our daily lives such that we will not perceive its presence consciously, and it will allow us to monitor our health status naturally and continuously.

Acknowledgement. This research was Supported by the MSIP (Ministry of Science, ICT and Future Planning), Korea, under the CITRC (Convergence Information Technology Research Center) support program (NIPA-2014-H0401-14-1008) supervised by the NIPA (National IT Industry Promotion Agency).

References

1. M.-W. Pyeon, T.-W. Jung and N.-G. Kim, "Facility Management in Ubiquitous Construction Process", Journal of The Institute of Electronics Engineers of Korea, vol. 35, no. 5, (2008), pp. 455-462.
2. T.-W. Jung and J.-H. Koo, "A Study on U-City Carbon Footprint Calculation Method for Carbon Emission Trading System", International Journal of Information Processing and Management, vol. 3, no. 4, pp. 48-57, (2012).

3. S.-H. Lee and D.-W. Lee, "Smart Convergence-The Future of Green City", The Journal of Digital Policy & Management, The Society of Digital Policy & Management, vol. 10, no. 8, (2012), pp. 233-237.
4. B.-M. Choi, "A Study on Setting up the Concept of Smart City through Analysis on the Term 'Smart'", JKCA, Korea Contents Association, vol. 11, no. 12, (2011).
5. H.-K. Kim, "Convergence-agent model for developing U-healthcare Systems", Future Generation Computer Systems 35 (2014) 39-48.