

Proposed Architecture for U-Healthcare Systems

Jong-Yong Lee¹ and Kye-Dong Jung^{1*}

¹*Ingenium college of liberal arts, KwangWoon University, Seoul 01897, Korea*
¹*jyonglee@kw.ac.kr, *¹gdchung@kw.ac.kr*

Abstract

Modernization of the medical healthcare system, through the use of technology, has become an important field of study today. The healthcare system is intended to efficiently deliver care and services to consumers. It is such that the healthcare system is defined as an industry which provides health services (health activities) so as to meet the health needs and demands of individuals, the family and the community. In this study, transforming healthcare so as to better meet the needs of patients will require changes in the strength of delivering care for patients who already have good access to services, while also improving the care for patients who find it harder to get the care they need.

Keywords: *U-Healthcare, Wireless Body Area Network*

1. Introduction

In recent years, healthcare systems around the globe have undergone an increasing pressure to improve healthcare services, for chronic-disease patient as well as the general population, through effective prevention and post-operative care. With advancement in technology, healthcare organizations are now moving towards U-Healthcare. The field of healthcare became more sophisticated, and the purpose of U-Healthcare technologies is to provide convenient healthcare service to both patients and doctors. In addition, computer technology also has gone through very drastic changes and the changes have also influenced many fields and revolutionized the way they function. One of the major fields which have been revolutionized by computer technology is medicine and healthcare field. It has brought many changes to this field ranging from the organization of patient's data to the management of operating theatres. Access to healthcare varies across countries, groups, and individuals, largely influenced by social and economic conditions as well as the health policies in place. Countries and jurisdictions have different policies and plans in relation to the personal and population-based health care goals within their societies. Healthcare systems are organizations established to meet the health needs of target populations. Their exact configuration varies between national and sub-national entities. In some countries and jurisdictions, health care planning is

distributed among market participants, whereas in others, planning occurs more centrally among governments or other coordinating bodies. In all cases, according to the World Health Organization (WHO), a well-functioning health care system requires a robust financing mechanism; a well-trained and adequately paid workforce; reliable information on which to base decisions and policies; and well maintained health facilities and logistics to deliver quality medicines and technologies [1]. This study aims to provide a pervasive architecture for u-Healthcare by optimizing the advantages of diagnosis system to perform continuous monitoring of patients under their natural physiological states. Thus, U-Healthcare diagnosis system architecture was designed to improve the reliability and efficiency of U-Healthcare Systems. The goals and objectives were based on the issues that focused on u-Healthcare systems in hospitals, homes, offices, and for travelling patients.

2. Related Works

The widespread use and availability of wireless systems and the Internet brought new opportunities for public and healthcare providers to efficiently access the medical services and information with enhanced technological tools.

2.1. Wireless Sensor Networks for U-Healthcare

The WSN in u-healthcare make patient monitoring and healthcare easy and more effective as shown in Figure 1. It conglomerate transducers for detecting electrical, thermal, optical, chemical, genetic, and other signals with physiological origin with signal processing algorithms to estimate features indicative of a person's health status.

2.2. Online Medical Diagnosis System

These points are particularly important since the aim is to make re-usable service components which could be used in many applications (not all of them necessarily medical). The aim of the multi-agent system is to provide access to the basic health-care services in a given city to the users. The basic architecture of the MAS which has been developed in this work is shown in Figure 1.

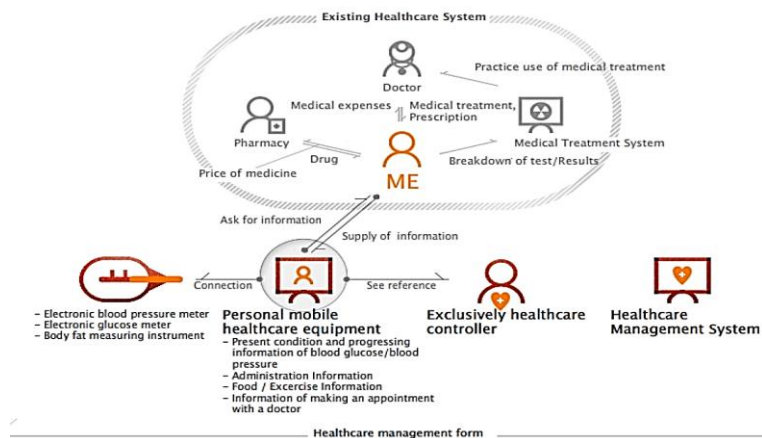


Figure 1. Online Medical Diagnosis Architecture

2.3. Wearable Health Monitoring System

Recent advances in sensor technology allow continuous, real-time ambulatory monitoring of multiple

physiological signals, including ECG, body temperature, respiration rate, blood pressure and acceleration.

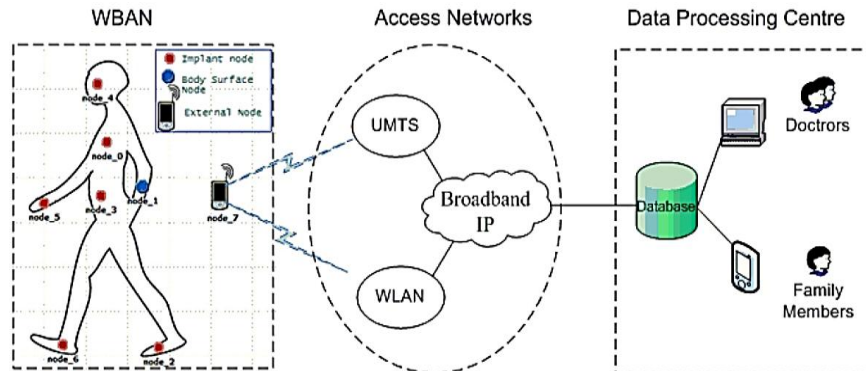


Figure 2. Wearable Healthcare Monitoring System Architecture

3. The Proposed Framework

Following a detailed study, a frame work has been designed to implement the intelligent system for diagnosis of diseases. There have been many approaches in implementing an expert system for diagnosis of various diseases. The first and foremost one is using the rule-based reasoning technique. This is based on the rules and facts stored in the database. The problem with this approach was that the rate of diagnosis was quite low. The disease could be diagnosed only if the rules could be fired. Adaptation to the change in the course of diagnosis according to the cases already reported was not there.

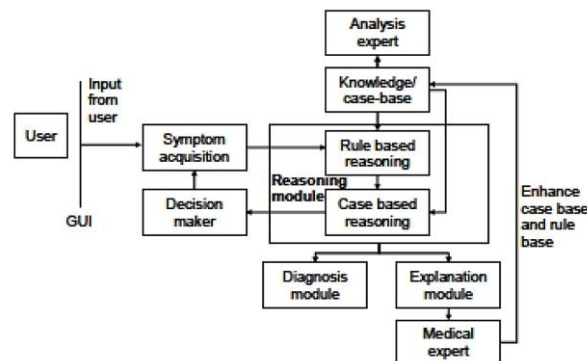


Figure 3. Proposed Framework for U-Healthcare

4. Proposed Architecture for U-Healthcare

The system consists of three major spaces or areas: the Wireless Body Area Network Space or WBAN Space, the Wireless Local Area Network Space or WLAN Space, and the Central Server Space. The whole u-healthcare system consists of ubiquitous sensor nodes and subsystems for patient health monitoring, a workstation serving as a local or proxy server, a central server, and application interface for terminal PC or PDA for users and healthcare personnel. The system is designed containing several features and functionalities that are present in already existing u-healthcare systems. However, unlike other healthcare systems, the proposed system was developed mainly for elderly persons or high risk patients and aimed as a preventive ubiquitous healthcare system.

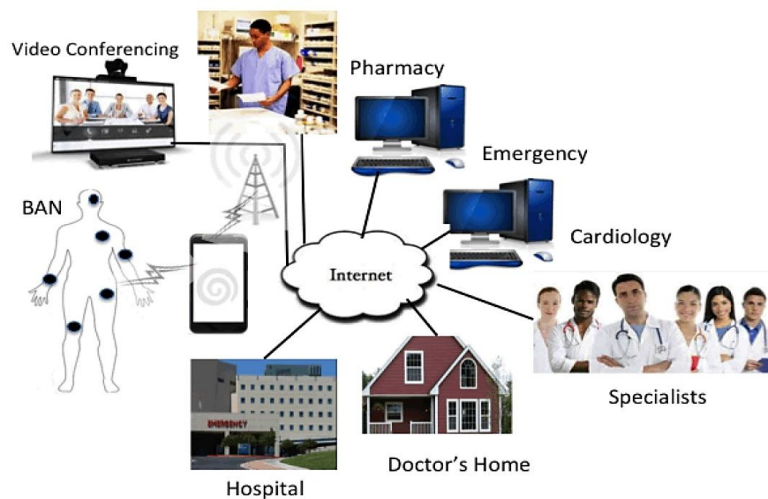


Figure 4. System Architecture for Home and Mobile U-healthcare

5. Conclusion

Many developing countries are facing the shortage of medical experts in medical field. Due to shortage of medical expert they are getting a huge queue of patients in hospitals. Especially in rural areas we have young medical expert or don't have medical expert. This Architecture for U-Healthcare Diagnosis System can be substitute of the above problem. This is very useful to diagnose patient diseases and prescribe the good prescription to the patients as a human medical expert. From the above study, it is concluded that this Architecture for U-Healthcare Diagnosis System can be applied any hospitals any country for improving medical services. Also this system can be applied anytime, anyplace, any hospital to provides medical prescription for general diseases. The system adopts userfriendly control interface and the usage of easy words makes the user to operate the system without doubts and difficulties.

References

- [1] "Health topics: Health systems". <http://www.who.int>. WHO World Health Organisation.
- [2] O. Chipara, C. Lu, T. C. Bailey, and G.-C. Roman, BReliable patient monitoring: A clinical study in a step-down hospital unit, Dept. Comput. Sci. Eng., Washington Univ. St. Louis, St. Louis, MO, Tech. Rep. WUCSE-2009-82, Dec. 2009.
- [3] Ndenechi Emmanuel Neba, "Traditional Health Care System and Challenges in Developing Ethnopharmacology in Africa: Example of Oku, Cameroon", *Ethno Med*, 5, (2): 133-139 (2011)
- [4] O. Chipara, C. Lu, T. C. Bailey, and G.-C. Roman, BReliable patient monitoring: A clinical study in a step-down hospital unit, Dept. Comput. Sci. Eng., Washington Univ. St. Louis, St. Louis, MO, Tech. Rep. WUCSE-2009-82, Dec. 2009.
- [5] G. Virone, A. Wood, L. Selavo, Q. Cao, L. Fang, T. Doan, Z. He, and J. A. Stankovic, BAn advanced wireless sensor network for health monitoring, [in Proc. Transdisciplinary Conf. Distrib. Diagnosis Home Healthcare, Apr. 2006, pp. 95–100.