Advanced Science and Technology Letters
Vol.95 (CIA 2015), pp.111-114
http://dx.doi.org/10.14257/astl.2015.95.19

Designing a Mobile Multi-Agent Based for U-healthcare

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Abstract. To deal with the increasing amount of data/resources in U-health monitoring scenarios, and the large number of tasks which have to be performed to manipulate the data/resources, mobile agent technology offers the possibility of executing these tasks in an automated way, with minimal human intervention. This allows medical staff to concentrate attention on other activities and subsequently save valuable medical resources. Mobile agent technology provides basic functions such as creation, migration, execution of the mobile agents, as well as specialized functions that involve agent security and management.

1 Introduction

Being a part of modern telemedicine- which generally offers higher diagnosis and treatment quality standards, reduces medical costs, and provides possibilities to handle problems of the aging human society [1]. Mobile phones have significant impact on consumers and their life style because the phones can works as small computers. Therefore, lots of applications and services have been developed and provided on mobile phones. One area of those applications is healthcare applications.

In the past decade or so, mobile phones were merely seen and classified as portable communication tools, with the sole capability of making calls, without any physical connection to a landline. Today, certain advancements have been achieved in mobile computing industry through the inclusion of GPS systems, accelerometers, and even touch screens. Different kinds of mobile operating systems have been introduced in response to the goal of designing increasingly powerful software to take advantage of the number of processors packaged in computing hardware. Some of these operating systems are the Symbian OS, the Apple Ios Windows Mobile and Android. Due to the advanced nature of computer architectures for embedded systems computing, mobile computing has become well integrated into the very fabric of our modern way of living. It is a very useful tool for personal health monitoring and many devices such as iPhone, iPad, Google Nexus and other mobile computing devices have applications developed for health monitoring and targets specific needs of individuals. Our developed application which runs on the android platform is customizable and user friendly.

ISSN: 2287-1233 ASTL

2 Background of the Study

2.1. Evolution of mobile Devices

The convergence of technologies provides many advantages to consumers. Due to the combination between advanced mobile phone technology and computer technology at present, mobile phones are not just telephones, they have become smart phones. Particularly, after the 3rd Generation International Mobile Telecommunications or 3G mobile networks were officially launched in Thailand in May 2013, smart phones and other mobile devices can be used efficiently because the transmission speed of data increases significantly.

2.2. Mobile Health

Mobile Health can combine health and mobile device technology, especially smart phones. It can be defined as "medical and public health practice supported by mobile devices (*e.g.*, mobile phones, patient monitoring device and wireless devices)", whereas, 10 years ago, it has been defined as wireless telemedicine involving the use of mobile telecommunications and multimedia technologies and their integration with mobile healthcare delivery systems [2].

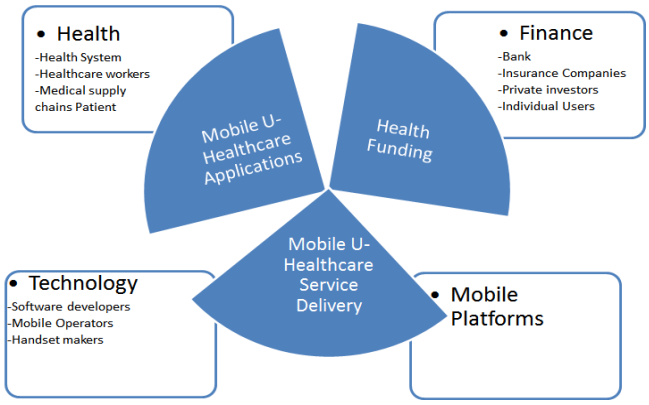

Fig. 1. The Ecosystem for Mobile Health

2.3. Smart Technology

Smart technology does not mean that the technology itself is smart, but can be said that individuals and industry has become smarter. Smart technology providing individualized products and service to quickly correspond, sensitively analyze, predict occurring situations have the five features of sensing, intelligence, mobility, elasticity, and integration.

2.4. Smart healthcare

Using smart healthcare, simple medical service can be possible without visiting the hospital in the future. Through bio sensors attached to our bodies, our heart rate and ECG is monitored by real-time throughout our everyday life. Through this monitoring process, strange symptoms in our body will immediately be detected to send necessary messages.

2.5. A Smart Device

Any instrument, apparatus, appliance, material or other article (whether used alone or in combination, and including the software necessary for its proper application) intended, by the person under whose name it is or is to be supplied, to be used for human beings for the purpose of one or more of the following:

1. diagnosis, prevention, monitoring, treatment or alleviation of disease;
2. diagnosis, monitoring, treatment, alleviation of or compensation for an injury or disability;
3. investigation, replacement or modification of the anatomy or of a physiological process;
4. control of conception;
5. and that does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means, but that may be assisted in its function by such means.

3 Mobile Multi-Agent Based

On the basis of the preceding literature of the study, the input/output diagram of the project was conceptualized.

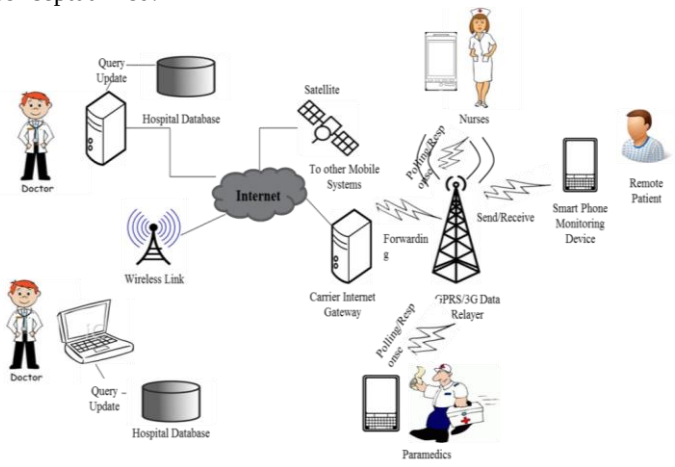

Fig. 2. Multi-Agent Based Approach

Shown in Figure 2 is the conceptual model of the study. It graphically represents the information to be entered, the process they have undertaken and the output which is the Online Diagnosis and Information System. The system will show the probable ailment if the selected symptoms matches with the ailment present in the database.

4 Conclusion

From the viewpoint of the system, multi-agent based approach provides a patient monitoring environment that is simple and efficient. Furthermore, it provides a ready exchange of information. It also provides new opportunity to integrate and analyze the immense amount of data encountered in patient monitoring. It clearly presents an innovation technique to assist healthcare practitioners, in collecting, filtering, and examining the relevant information for a patient, providing basic diagnosis and suggestions actions in an efficient manner.

Acknowledgement. This research was Supported by the MSIP (Ministry of Science, ICT and Future Planning), Korea, under the C-ITRC (Convergence Information Technology Research Center) support program (IITP-2015-H8601-15-1007) supervised by the IITP (Institute for Information & communication Technology Promotion).

This research was also supported by the International Research & Development Pro-gram of the National Research Foundation of Korea (NRF) funded by the Ministry of Scinece, ICT & Future Planning (Grant number: K 2013079410).

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