

Designing Agent Architecture for Security Medical System

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Abstract

In the current situation there is a lack of researches on measures of security processing and monitoring patient status information produced from rapid growth of infra within Medical environment. It is thus necessary to conduct such research on the medical care environment where there is a high demand for utilization of status information. This study suggests a solution of using RFID to gather patient information such as inpatient information, location of treatment room, progress of patient, humidity, temperature, and diagnostic status, after which the information are protect and processed using security level method.

Keyword: *Agent, Security, Medical System.*

1. Introduction

The various applications of ubiquitous computing technology, Medical system has been praised as a technology that is more effective in monitoring the health status of a person. From the existing Medical technology where patients and doctors were re-motely connected to conduct medical treatments, the development of sensors and mobile device technology helped rapidly progression into environment where patients can not distinguish the medical procedure. However, in the current situation there is a lack of researches on measures of security processing and monitoring patient status information produced from rapid growth of infra within Medical environment. Here is a lack of researches conducted on how such identified information can be effectively processed and protected[1]. In other words, there is a need to research on effective means of processing and protection information collected from the individual user. If the previous studies were focused mainly on the identification of status information, there is a need to research methods of presenting identified status information. It is thus necessary to conduct such research on the medical care environment where there is a high demand for utilization of status information. This study suggests a solution of using RFID to gather patient information such as inpatient information, location of treatment room, progress of patient, humidity, temperature, and diagnostic status, after which the information are protect and processed using security level method.

2. Related researches

2.1 Context identification

There is a need to include context identification technology in order to obtain status information. As a method to identify context, various sensors are used to collect data, then the information are differentiated and systematized using defined algorism.

Situation information is defined in three types roughly.

1. The information indicating the individual situation of user, place and object. It is required in the interaction between user and applied service [2].

2. The data needed for location information such as the location where access request occurred and accessing object exists, for time information such as the time when access request occurred and intervals, as well as for certain actions [3].

3. The location information such as site and domain for proximity control [4].

Similar to above, situation information is defined in different respects.

There are mainly two ways to classify the situation information. One is RBAC (Role-Based Access Control), which groups according to names, and give role to user according to the individual's responsibility and authority so that controls the use of resources. It develops security policy according to organizations and it is effective for security control [5]. Another is proximity control using the situation information. Its representative method are GRBAC (Generalized Role-Based Access Control) which enables time-based proximity control that could not provided in role based proximity control, and xORBAC, which proposed the restricted matters of role based proximity control that checks the previously defined conditions [6].

2.2 Context identification system technology

Mainly, context identification is a technology that uses understanding on what the current status is, how this information can be used, and the technological composition that can utilize such information, which abstracts the status, differentiates information and combines overall information to obtain accurate information of the status.

2.3 Medical Information

The medical information tries to raise efficiency of introducing medical technologies by combining medicine with the information technology. This can be classified in to, medical information that will systematically manage various information required to provide patient diagnosis, medical education, medical research and medical management, the hospital information that introduces hospital information system to design digital hospitals, e-Health where information system is designed to support decisions of doctors efficiently and rationally during patient diagnosis and personal health management by providing medical knowledge and patient information by utilizing information technology, and u-Health which utilizes ubiquitous technologies for the health management system. In particular, services such as slipless, paperless, chartless and filmless digital hospitals, mobile medical environment extending from within the hospital to living space of patient and at home medical services/remote medical technologies are being provided as the ubiquitous health care infrastructure is actualized[7].

In addition, EHR (Electronic Health Records) such as national personal electronic health record, sharing of information among medical facilities through information standardization, etc. and cooperation between organizations are being extended.

Figure 1 is showing schematic of e-Hospital constructed by combining existing cooperative system as the basis. Aside from the fundamental components such as patients, cooperative hospitals, pharmacies and medical logistic suppliers, we can realize various management systems such as ERM that stores all information related to clinical diagnosis of

patients and supporting memory of clinical doctors by storing clinical records electronically, PACS which collects various clinical images occurred within the medical environment in digital data, saves these in the storage devices of the computer then transmits these information to various other computers connected to the network for utilization, POC used to process clinical information of patients efficiently right at the scene of diagnosis without limitation of time and space, ERP used to enhance hospital management efficiently by combining the diagnosis system and management tasks, Groupware System Electronic Cooperative Systems(Electronic Mail/ Transaction, Office Management System), DW modeling, construction of Data Mart, etc. are being combined.

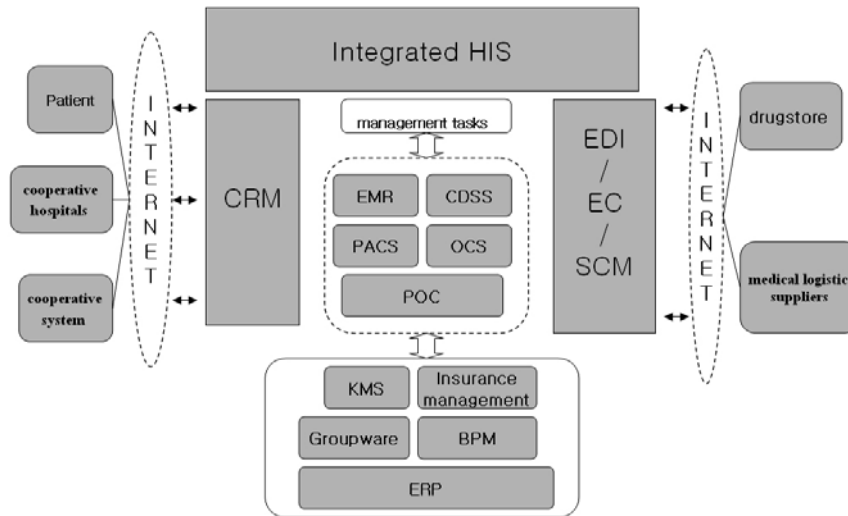


Figure 1. e-Hospital constructed

3. Designing security agent system to provide information from medical environment

3.1 Agent system design

In this chapter, the author will design a community required to introduce systems reliably during the procedure of medical information transition. Various types of medical information system is being introduced as the ubiquitous environment devel-ops, causing various compatibility problems. Therefore, class will be constructed between compatible systems and these classes will be combined to provide stability of medical information system.

Community management module will take role of applying and modifying standards applied by the classification module and will input standards to examine connection between each class. At this time, the basic infrastructure for supporting ubiquitous environment must have been structured and communication between each class will base on the wireless communication.

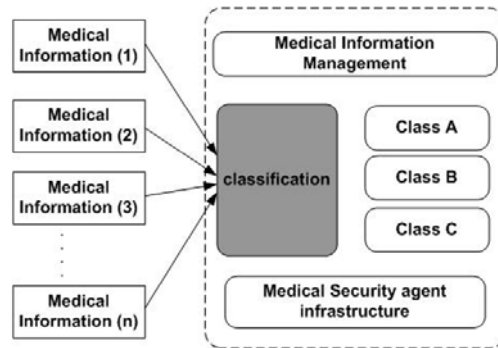


Figure 2. Medical treatment information classification structure

Main design structure for security system to provide information from medical system is as shown in figure 3. Main components include RFID tag installed in diagnosis room, RFID reader that reads information from tag, module connected to the server, module that classifies necessary information from the level, module security apply to the information, database that stores RFID information, module that provides level information for searching of wanted data, wireless mobile unit and electronic record keeping that requests inquiry to level information providing module. All data are provided and stored as XML foundation.

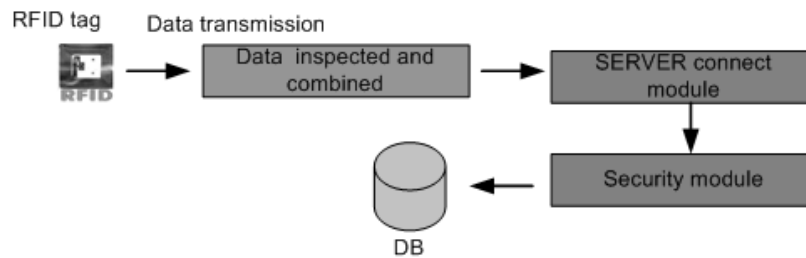


Figure 3. Medical treatment information protection flowchart

3.1 Agent system design

Method of security processing core status information from suggested medical system is presented in figure 4. Information obtained from reader that took RFID tag information is classified as context under 5W1H category, data is extracted, after which key words related to extracted data are matched, then each context data and table are stored in a table.

Applying using security method provides accurate status information when defined information is requested in the future.

Especially in hospital settings where accurate data is not displayed for information requested on specific name of disease and diagnostic status of patients, usage of level can provide saved information.

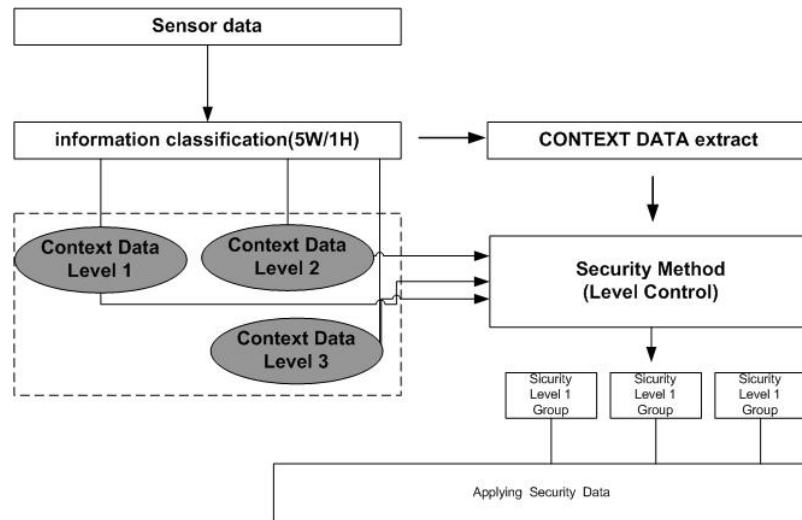


Figure 4. Information protection system which uses a classification

4. Conclusion

This study is information security processing system in order to process patient information in Medical environment more safely. This paper applied the rating standards by medical information's property and security using level classification.

This system will show superior function than the basic method in medical care environment that deals with massive amount of information.

Lastly, further researches on medical information community management module and security protection scheme for classes are required, to clearly define changes in classes following situational changes.

5. References

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