Healthcare Information Management System in Home Environment

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Abstract. In this paper, we suggested a healthcare information management system for supporting healthcare home services. Our researching focus in this paper is how to design system and how to use constructed database on the framework for supporting healthcare home services. The healthcare database constructed by using this information for the purpose of healthcare home services is divided into the base information with real schemes and the context based information with view schemes. Finally, for verifying the practical use of healthcare information constructed in this paper, we show an example of healthcare home monitoring service using information, emergency call, home appliance control, and we describes the results of the experimental evaluation between the base and context based information in terms of execution service time for healthcare home applications.

Keywords: Healthcare information system, healthcare home service, distributed object Group Framework.

1 Introduction

Current research in ubiquitous computing focuses on building infrastructures for managing active spaces, connecting new devices, or building useful applications to improve functionality[1]. But, in these researches, integrated management of information is a very important application of healthcare information technology, especially for a u-healthcare home environment. Since existing healthcare information system was constructed independently, there is no interconnection to support total business area such as doctor, nurse, patient and environments. Also, there are a large number of healthcare related applications that effectively support specific needs but are isolated or incompatible. And interfaces are expensive and time-consuming because systems use different platforms, programming languages and data formats[2]

Our system based on the distributed object group framework (DOGF) which enables to easily integrate distributed objects to healthcare home applications[3]. And, we used TMO scheme and TMOSM for interactions between distributed applications. Finally, for verifying the practical use of healthcare database constructed in this paper, via interconnecting this database to framework, we show an example of healthcare home monitoring service, emergency call, appliance control, and so on needed from living activity area for elderly living alone. Also, we show the results of the experimental evaluation between the base and context based information in terms of execution time for healthcare applications.

2 Healthcare Information Management System

Our system used to component of supporting object group management for domain grouping in DOGF, we consider home environments and related services such as location tracking service, healthcare information and titrating environment supporting service. Also, information collection and share in this environment, we adopted the TMO scheme and TMOSM into the development environment of system that we implemented. The architecture of the system is shown in figure 1 and is organized in five layers. The physical layer contains hardware infrastructures such as various sensors, devices, machines etc. Also, healthcare database consists of classification of sensor node, collected sensor data by sensors and user profile included the health, service information and access right information for security and view information for supporting service applications. The framework layer contains a components of DOGF which is supports a logical single view system environment by grouping them. That is, the group manager API supports the execution of application of appropriate healthcare home services on upper layer by using the input information obtained from the individual or grouped physical devices thought sensor manger on the lower layer. The tool layer consists of distributed programming developing-tool(DPD-Tool)and healthcare database management tool(HDM-Tool).

Fig. 1. The architecture for Healthcare Information Management System

We defined the interaction of components which is interacts with the distributed application, database, sensors and components of framework. The process of grouping about distributed object by group manager object. Also, it provides the interaction of distributed application by APIs and service object reference which support collecting real time information from the sensor manager. Also it is support the security service which is security object that is access right information for client through healthcare database. When service object replicated, dynamic

binder object provide the reference of service object by binding algorithm. Distributed application obtains real time information of sensor node through service object reference which enable connect to healthcare database. And, the interaction of objects in distributed application returned the result of service by framework components.

3 Healthcare Database Based Healthcare Home Services

The healthcare database constructed by using this information for the purpose of healthcare home services is divided into the two classes. The base information includes low data obtained from physical sensors relevant to locations, personal health, environments, and the user profiles. And, the context based information that is produced and fused by using the based information. This context based information might be got via various view schemes according to healthcare application services. The context based information constructed by materialized view and save to service schema repository which is manages the view scheme. While programming by using this information, server or client program developers can develop the healthcare application. Figure 2 show, to management of healthcare information, we developed the healthcare database management tool(HDMT) which provides user interface for interaction of healthcare database. The functions of HDMT has a general function for constructed database management such as show the DB List and table data, the query execution by SQL and search of plan by user write SQL, dictionary information management. In addition, it provides the creating function of context based information which is materialization view tables.

Fig. 2. GUI for Healthcare Database Management Tool

Figure 3 shows the physical environments for healthcare home Services reflecting real world. From these environments, we verify the executability of the healthcare home services we constructed. The healthcare home services are home monitoring which provides location tracking, health and environment information for home resident, emergency call as SMS using cell phone and home appliance control based on health, location, standard information specified by user for environments of home such as fan, light, air-conditioner etc.

Fig. 3. The physical environment for healthcare Home services

We analyzed the service time for the base information and the context based information considering applying for the healthcare home services. As a result, we obtained from this experiment. In case of location service is 37.4ms, the health information service is 49.5ms and home auto control service is 20.3ms difference respectively. From above evaluation results, we verified that the context based information could provide the effectively to the healthcare home services.

4 Conclusions

In this paper, our researching focus in this paper is how to design healthcare information management system and how to use constructed database on the Framework for Supporting Healthcare Home Service. And we verified that healthcare related information supporting healthcare home services and the context based information could better impact than base information at healthcare home services.

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