

IRMPRESS 701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.irm-press.com

ITB14111

This chapter appears in the book, Web Mobile-Based Applications for Healthcare Management by L. Al-Hakim © 2007, IGI Global

Chapter IX

Integrating Mobile-Based Systems with Healthcare Databases

Yu Jiao, Oak Ridge National Laboratory, USA Ali R. Hurson, Pennsylvania State University, USA Thomas E. Potok, Oak Ridge National Laboratory, USA Barbara G. Beckerman, Oak Ridge National Laboratory, USA

Abstract

In this chapter, we discuss issues related to e-health and focus on two major challenges in distributed healthcare database management: database heterogeneity and user mobility. We designed and prototyped a mobile-agent-based mobile data-access system framework that can address these challenges. It applies a thesaurus-based hierarchical database federation to cope with database heterogeneity and utilizes the mobile-agent technology to respond to the complications introduced by user mobility and wireless networks. The functions provided by this system are described in detail and a performance evaluation is also provided.

Copyright © 2007, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

Introduction

The integration of healthcare management and advances in computer science, especially those in the areas of information-system research, has begotten a new branch of science: e-health. E-health is becoming more and more widely recognized as an essential part for the future of both healthcare management and the health of our children. The 2001 President's Information Technology Advisory Committee, in its report "Transforming Healthcare through Information Technology," noted that information technology "offers the potential to expand access to healthcare significantly, to improve its quality, to reduce its costs, and to transform the conduct of biomedical research"(p. 1). Although much has been done, reality has proven to us that there are still a great number of problems remaining to be taken care of. Health and human-services secretary Mike Leavitt told the Associated Press (2005) in an interview after hurricane Katrina, "There may not have been an experience that demonstrates, for me or the country, more powerfully the need for electronic health records...than Katrina" (p. 1). The article also pointed out that the "federal government's goal is to give most Americans computerized medical records within 10 years"(p. 1).

E-health embraces a broad range of topics, such as telemedicine, medical-record databases, health information systems, genomics, biotechnology, drug-treatment technologies, decision-support systems, and diagnosis aids, just to name a few. In this chapter, we focus on the topic of technologies that deal with integrating mobile-based systems with healthcare databases.

One of the major challenges in healthcare database integration is the fact that the lack of guidance from central authorities has, in many instances, led to incompatible healthcare database systems. Such circumstances have caused problems to arise in the smooth processing of patients between health service units, even within the same health authority (Svensson, 2002). For instance, electronic health record (EHR) systems have been used in practice for many years. However, they are often designed and deployed by different vendors and, thus, patients' information is collected and stored in disparate databases. Due to the lack of uniformity, these systems have very poor interoperability. Even though the wide deployment of networks has enabled us to connect these databases, a large amount of work still needs to be handled manually in order to exchange information between the databases.F

There are two potential solutions to the problems of interoperability and automated information processing: redesigning and reimplementing the existing databases or using a database federation. Redesigning and reimplementing existing databases require large capital investments, and are difficult to achieve. An alternative solution is to build a database federation in which problems caused by database heterogeneity are remedied by the use of a mediator: metadata. This approach is often referred to as the multidatabase solution (Bright, Hurson, & Pakzad, 1994).

Copyright © 2007, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

27 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: <u>www.igi-global.com/chapter/integrating-</u> mobile-based-systems-healthcare/31158

Related Content

Wireless for Managing Health Care: The Wirhe Framework

Esko Alasaarela, Ravi Nemana, Steven DeMello, Nick S. Oliverand Masako Miyazaki (2009). *International Journal of Healthcare Delivery Reform Initiatives (pp. 52-73).* www.irma-international.org/article/wireless-managing-health-care/3975

The Architecture and Early Findings of a Working SMS-Based System for Individuals with Mild to Moderate Depression

Elizabeth M. LaRue, Hassan A. Karimi, Ann M. Mitchelland Joy Y. Zang (2013). Information Systems and Technologies for Enhancing Health and Social Care (pp. 20-32).

www.irma-international.org/chapter/architecture-early-findings-working-sms/75618

A Formal Investigation of Semantic Interoperability of HCLS Systems

Ratnesh Sahay, Antoine Zimmermann, Ronan Fox, Axel Polleresand Manfred Hauswirth (2013). *Interoperability in Healthcare Information Systems: Standards, Management, and Technology (pp. 148-183).*

www.irma-international.org/chapter/a-formal-investigation-of-semantic-interoperability-of-hclssystems/106577

Opportunities and Barriers of Sexual Health and Condom Use among Tea Plantation Workers

Ranabir Pal, Samir Royand Shrayan Pal (2011). *International Journal of User-Driven Healthcare (pp. 30-38).*

www.irma-international.org/article/opportunities-barriers-sexual-health-condom/54020

Guided Interactive Diagnostic Assistance

Giovanni Maria Sacco (2008). Encyclopedia of Healthcare Information Systems (pp. 631-635).

www.irma-international.org/chapter/guided-interactive-diagnostic-assistance/12994