Chapter 12
Development, Integration, and Deployment of Mobile Information Services in Healthcare:
Usability and Security Challenges and Opportunities

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ABSTRACT

The use of mobile and wireless technologies has great potential to improve the efficiency and quality of healthcare delivery. The main goal of this chapter is to describe the current state of the art in the research field of development and integration of mobile services in the healthcare sector by addressing the two main challenges: usability and security. The authors investigate the main requirements and approaches for developing highly usable, user-friendly, and well-accepted mobile healthcare services. In addition, they identify various ways of addressing security and privacy issues in mobile healthcare services and discuss the advantages and shortcomings of each approach. Finally, the chapter presents the CONNECT (Care Online: Novel Networks to Enhance Communication and Treatment) project and describes how security and usability issues can be addressed during the development of mobile access to a multi-modal Internet-based patient support system.

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INTRODUCTION

Mobile devices, such as mobile phones and tablet PCs, are widely popular today, and they are accepted as an important part of people's everyday lives. They allow people seamless access to numerous services and the possibility to stay connected independent of location and time. The use of mobile services has increased in many application areas such as learning, government, and business, and the healthcare sector is also slowly beginning to recognize and leverage the advantages of ubiquitous and seamless information systems.

The use of mobile and wireless technologies in the healthcare sector can result in higher efficiency and quality of healthcare services and decrease healthcare-related spending (Shieh, Tsai, Arash, Wang, & Lin, 2007; Gollol Raju, et al., 2004). All stakeholders in the healthcare sector (e.g., healthcare providers, patients, and healthcare institutions) can benefit from the introduction of mobile access to healthcare information systems (HISs). For example, healthcare providers could access patients' medical information and databases containing medical knowledge and references independent of the their current time and place. Patients could be offered all times available services for consultations with healthcare personnel and experts in various medical fields. Moreover, patients can be offered the possibility of continuous monitoring of their health conditions, being more active participants in the medical decision-making process, and keeping communications channels with healthcare providers open at all times.

However, before mobile devices are ready for wide deployment in healthcare, many challenges and issues must be addressed and resolved. The limited capabilities of wireless and cellular communications networks and mobile devices (e.g., display, processing power, and input characteristics) and the large diversity of mobile devices and their capabilities are only some of the challenges introduced by emerging mobile and wireless technologies. Additionally, the development of new and advanced technologies will introduce new issues and new contexts in the already-identified problem space. In addition to the limitations of mobile devices and networks, numerous issues are still unresolved regarding security, privacy, organization and legislation in healthcare systems and services.

In the literature, there is a large body of research in this area that is addressing various challenges and introducing new knowledge regarding the development, integration and deployment of mobile devices and services in HISs, as showed in (Mirkovic, Bryhni, & Ruland, 2009). The main goal of this chapter is to provide overview of the identified challenges and issues in developing and deploying useful and well-integrated mobile healthcare services with a focus on usability and security. Through overview of these two specific topics we will present different approaches how identified challenges can be addressed and resolved. Finally, we will demonstrate how security and usability are addressed during the development of mobile access to a Internet-based patient support system in the CONNECT (Care Online: Novel Networks to Enhance Communication and Treatment) project.

BACKGROUND

Numerous countries define their healthcare strategies and policies by stressing the importance of using new and emerging technologies. For example, in Norway, the government has defined a National eHealth strategy called "Interaction 2.0," which focuses strongly on the development of network-based services for patients and the general public, patient access to summarized medical information, telemedicine, and the electronic exchange of information and knowledge (Helse- og omsorgsdepartementet, 2008). In addition, the number and popularity of mobile healthcare applications available on online application stores