Chapter 10
Design and Deployment of a Mobile-Based Medical Alert System

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ABSTRACT

The use of wireless technology for health care delivery is having great impacts in the health care sector on a global scale. However, alert systems in medical institutions are rare. As a result of this, patients find it hard to keep track of scheduled meetings with medical personnel; they also find it difficult to keep track of prescribed medications. These could have adverse impacts on patients' health, especially for those with chronic diseases. This chapter therefore, presents the design, deployment and evaluation of a mobile-based medical alert system (MAS) for managing diseases where adherence or compliance is paramount for effective treatment. The system alerts the patients and medical practitioners about information and emergencies via text messaging on handheld devices such as mobile phones and PDAs. It also allows users to receive scheduled appointment and medication updates that will facilitate their treatment processes. The prototype application is developed by the incremental software process model and runs on a GSM network.

INTRODUCTION

At the end of this chapter, readers will understand:

*   The meaning and importance of mobile HealthCare
*   The meaning of medical alert systems
*   Describe the components of medical alert systems
*   The benefits of using Short Message System (SMS) in health care services
*   How to implement and deploy medical alert systems
*   How to evaluate mobile health care based systems

BACKGROUND

Ubiquitous health systems which focus on automated applications that can provide HealthCare to citizen anywhere/anytime using wired and wireless mobile technologies is becoming increasingly important. Consequently, hand-held devices especially PDAs and smart phones have been reported to become increasingly prevalent for health care delivery (Trevor et al., 2004; Wickramasinghe et al., 2004; Baldwin, 2005). Research efforts and the use of wireless communications technologies to extend the reach, range and maneuverability of health care applications are covered in (Kyriacou et al., 2003; Voskarides et al., 2002; Mobile, n. d; James, 1996; MobilePoint, 2004); Kugean, 2002; Qureshi, 2005; Robert, 2005; Aura, 2006; Kim, 2005; Tang, 2004). Other research work that demonstrate the feasibility, convenience, and efficiency of using handheld devices in enhancing care delivering in areas such as transferring clinical data (Kim, 2005; Tang, 2004), electronic messaging systems (Wojceichowski et al., 2006; Wojciech et al., 2008; ng, 2007) have also been widely reported. The increasing adoption of mobile technology devices such as PDAs, cell phones, and laptops, for HealthCare (mobile health care) delivery is due to the flexibility and portability they offer to the physicians than some more computational desktop computers. In addition, hand-held devices and the applications bundled within them are significantly cheaper and require very little training unlike most PC-based alternatives. Furthermore, mobile devices support features that allow remote users to synchronize personal databases and provide access to network services such as wireless e-mail, Web browsing, and Internet access, thus meeting the mobility needs of patients or medical practitioners who are always on the move.

All across the world, the shortage of health care personnel continues to present great concerns for health care systems. However, in the developing world, the explosive growth and adoption of mobile communications over the last decade has provided new opportunities for the promotion of quality HealthCare. Mobile devices no doubt are having great impacts on the way we do things. Mobile health care systems allow the delivery of accurate medical information anytime anywhere by means of mobile devices (Rifat et al., 2009). In recent times, there have been a number of mHealth initiatives in public health being piloted and used from one country to another. Among these initiatives, Short Message Services (SMS) stands out as being the most promising in terms of its cost-effectiveness, scalability, convenience, broad reach, and widespread popularity in the developing world (Greifinger, 2009). SMS alerts have proven particularly effective in targeting hard-to-reach rural dwellers where the absence of HealthCare amenities, lack of HealthCare workers, and limited access to health-related information of major concerns. On a general note, mHealth initiatives promise to close the information gap that currently exists for patient data in the developing world, enabling health workers to measure the effectiveness of HealthCare programs, allocate resources more efficiently, and adjust programs and policies accordingly (Ramswaroop et al., 2010).

In spite of the advances in mobile HealthCare delivery, there are often situations where patients with certain medical conditions are unwilling or unable to reliably go to a physician. Obesity, high blood pressure, irregular heartbeat, or diabetes, HIV/AIDS are examples of such common health problems. AIDS (acquired immunodeficiency syndrome) is a disease caused by a virus called HIV (human immunodeficiency virus). Anyone of any age, race, sex or sexual orientation can be infected with HIV. In these cases, people are usually advised to periodically visit their doctors for routine medical checkups and regularly take some prescribed drugs. The provision of smarter and more personalized means through which patients are able to get medical feedback would certainly lead to life, time and cost savings (Rifat et al., 2009).

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