

Chapter 5

mHealth: Software Development and Wireless Technologies Applications

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ABSTRACT

mHealth is a very attractive field for mobile applications developers, but it also involves new challenges that developers of programs intended for standard desktops do not usually face. Hence, the first part of this chapter is devoted to survey the development platforms and languages utilized to develop the associated applications of the mHealth system. mHealth is a communications system that consists of mobile devices for collecting and delivering clinical health data to practitioners, researchers and patients. It is also a tool used in the real-time monitoring of patient vital signs, and direct provision of care. Therefore, the second part of this chapter will focus on the survey of wireless technologies envisioned for use in the mHealth system.

INTRODUCTION

Many applications are presently being applied to mobile wireless ad-hoc networks (MANETs).

These include mobile applications used for public health practice, including mobile health systems (*mHealth*). *mHealth* consists of mobile devices for collecting and delivering clinical health data to practitioners, researchers and patients. It is also a

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system used in the real-time monitoring of patient vital signs, and direct provision of care.

mHealth is a very attractive field for mobile applications developers, but it also involves new challenges that developers of programs intended for standard desktops do not often face. First, mobile devices have generally constrained resources; they tend to be limited in screen size, processor memory, storage capacity and energy. This severely restricts the resources that an application can use. Second, the way users interact with mobile devices is different from standard desktops. Therefore, developers need to create applications with appropriate user interfaces for mobile devices. Another important challenge of the *mHealth* system is the communication medium in its majority is wireless; therefore, nodes tend to be highly mobile. The main challenge, however, is that current mobile devices are very diverse, especially with regards to operating systems and runtimes. This heterogeneity causes problems for developers, because they must fit applications to as many devices as possible, including multiple versions of the same device that are still in use. While desktop application developers have three OS platforms to choose from: Windows, Linux and Mac OS X; mobile developers must choose among different development platforms and languages, each one incompatible with the others. Moreover, choosing a platform or language directly impacts the range of devices in which applications can run. At present, *Symbian* OS has the largest number of users, followed by Microsoft's Windows CE, Windows Mobile, Palm OS and Linux. *Symbian* OS native programming application is C++, but it also supports applications written in Java.

The objective of this section is to describe the main mobile applications development platforms and runtimes available for developers to provide keys for choosing the appropriate one.

MOBILE SOFTWARE DEVELOPMENT PLATFORMS

As mentioned before, *m-health* relies on the development of mobile applications. In this context, an application is *mobile* if it runs on a mobile device and may be either, always or occasionally connected to a network. This definition includes applications that run on personal digital assistants (PDAs) and mobile phones, among other possible mobile devices. *mHealth* applications may include data storage, data processing and viewing or transmitting data to another application. The use of mobile applications, however, is more related to the providing mobile services. A mobile service can be described as an electronic service that consists of three main components: a mobile application as a client, wireless networking and a server implementation to provide the needed functionality or information (*Content*) to the user. In other words, application is a more technical term referring to the solution itself, whereas service is better associated with third parties (e.g. content provider or network based server) who provide value-added service at the end-customer. Applications can be seen either as network applications implementing the service as interfaces to these services, or as stand-alone applications in a handset that requires no network/service connectivity (Verkasalo, 2006).

The key applications and mobile services related with *mHealth* include:

- Remote data collection
- Remote monitoring
- Communication with healthcare workers
- Diagnostic and treatment support

The implementation of such applications requires a programming platform specifically designed to run on mobile devices.

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