Chapter 4


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ABSTRACT

Mobile devices are continuously improving, adding integrated sensors, which are of value to the healthcare industry. Sensor-enabled mobile phones collect data from patients, which is useful for doctors in providing immediate care and treatment. As smartphones become ubiquitous, their use as health monitors should become commonplace. This chapter surveys mobile computing devices and sensors in healthcare applications.

INTRODUCTION

The mobile devices (Kay, Santos, & Takane, 2011; Stankevich, E., Paramonov, I., & Timofeev, 2012) including personal digital assistant (PDA), smartphone, tablet computer, ultra-mobile PC, and wearable computers (Nosrati, Karimi, & Hasanvand, 2012; Ozkil, Fan, Dawids, Aanes, Kristensen, & Christensen, 2012; (Rajan, Spanias, Ranganath, Banavar, & Spanias) are useful for many

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applications. They all work with different operating systems such as Symbian, Windows, Palm OS, BlackBerry, iOS, Android, and Bada. The cell phone is the combination of hardware and software. The following are few hardware devices. The Processor or microcontroller with different families, the key switches, LED, LCD, alarm or speaker, camera, microphone, battery or power supply and many sensors (Manjulal; Moorthi, & Vaideeswaran; Narayana Moorthi, & Manjula). Each family of microcontrollers has its own architecture and list of registers, memory management, addressing modes or methods, its own instruction set and assembly language.

The processor families include AVR, PIC, ARM and Intel 8051.

The 8051 is an 8-bit processor. The AVRs are also 8 bit, but some are 32 bit and ARMs are 32 bit, and are more powerful than 8 bit processors.

PIC is a family of Harvard architecture single chip microcontrollers made by Microchip Technology. The name PIC initially referred as Programmable Interface Controller. The 8051 is the very basic controller used for the simple applications, AVR and PIC are used to interface more advanced peripherals such as microSD card and RFID scanner etc and ARM is the most advanced controller family generally used for Real Time Applications.

The software includes the operating system modules from various vendors.

Introduction to Sensors: Sensor is a device which measures a physical quantity like temperature, pressure or force and converts it into an electrical signal which can be read by an instrument. These voltage or electrical signal is normally an Analog signal which can be converted to digital using ADC-Analog to digital converters.

Sensors on Android Phones: Access to the sensors on an Android phone is available through the class in the package of the android SDK (http://developer.android.com/sdk/). Not all sensors are present in all phones. Here the Table 1 is the list of sensors on the smartphone.

Figure 1. Patient Care
Mobile Speech Recognition
[www.igi-global.com/chapter/mobile-speech-recognition/26736?camid=4v1a](www.igi-global.com/chapter/mobile-speech-recognition/26736?camid=4v1a)

Consumer Perceptions and Attitudes Towards Mobile Marketing
[www.igi-global.com/chapter/consumer-perceptions-attitudes-towards-mobile/26628?camid=4v1a](www.igi-global.com/chapter/consumer-perceptions-attitudes-towards-mobile/26628?camid=4v1a)