Chapter 2
Plugging into the Online Database and Playing Secure Mobile Commerce

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ABSTRACT

Mobile commerce is one of emerging inter-discipline technology which integrates the network protocol, multimodal sensation, storage management, and other research areas. It intends to make paperless applications for both convenience and ecology on the mobile devices -- including those used for ticketing, coupons, loyalty rewards, payments, etc. By the innate limitations of the physical properties, mobile device -- particularly the handheld mobile device -- must make their best tradeoffs among the available hardware resources to reach their dedicated specifications. However, one of the recent progresses in the new technologies of the Internet, cloud computing, is capable of appearing ubiquitously with mobile devices and intends to outstretch its various applications by the devices. The next generation of mobile devices will use wireless broadband access and human-computer interaction technologies which support cloud services and interface designs respectively advances to allow remote plug-and-play with web 2.0 applications that is suitable for mobile commerce in which this chapter emphasizes. Besides, for sustainable development of a mobile commerce solution, workable but not securable is absolutely not enough. Therefore, a secure information retrieval and reveal protocol for mobile commerce based on modified RSA digital signature is also proposed and demonstrated.

INTRODUCTION

Mobile commerce is the ability to conduct e-commerce which consists of services over electronic systems such as the Internet or other networks by using mobile devices. It intends to make paperless applications for both convenience and ecology -- including those used for ticketing, coupons, loyalty rewards, payments, etc. -- through all kinds of mobile technologies and to make them pervasive and ubiquitous. By the innate limitations of the physical properties, mobile device -- particularly

DOI: 10.4018/978-1-61520-761-9.ch002

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the handheld mobile device–must make their best tradeoffs among the available hardware resources to reach the specifications whatever they are general-purpose or special as mobile commerce. Not only the four main sections: the arithmetic and logic unit (ALU), the control unit, the memory, and the input and output devices must be included, but also demanded the overcritical uncluttered, minimalist interfaces to supply the consumer markets. The input and output devices embedded in the handheld device are essentially the typical **multimodal sensations** of haptic, auditory, and visual, such as keypad, microphone, camera for the input sensations, and display, speaker, battery vibration for the output sensations, respectively. Thus, at least four possible combinations of I/O pairs have been yielded (Jeng, Chang & Wang, 2008):

- Voice input, text/image output, which depends on speech recognition (a digital camera is an example of image output)
- Touch input, text/image output, which depends on handwriting recognition for textual data
- Voice input, sound output, which typically involves a digital recorder
- Touch input, sound output, which typically involves an MP3 or other music file player

The sensations described above applying perceptions of human are expected as touch or near-field ranges of sensations, however, the remote sensations (over a distance of 10 meters) such as ZigBee, Bluetooth, and WiFi playing an important role in the sensor networking for the two-way background information exchange, as shown in Fig. 1, benefit the cloud services via **wireless broadband access** (WBA). In other words, the near-field sensing of human-computer **interaction** (HCI) technologies use lots of short-distance sensors to deal with human-computer interactions, and the far-field sensing used by WBA technology maybe applies a few long-distance sensors to accelerate data communications in the viewpoint of multimodal sensation. One of the recent progresses in the new technologies of the Internet is capable to appear ubiquitously with mobile devices and intends to outstretch its various applications by the devices, which is called cloud computing (or cloud services) and explained accurately by a quote from (Hewitt, 2008, p. 96): "In the **cloud computing** paradigm, information is permanently stored in servers on the Internet and cached temporarily on clients that include … handhelds". Cloud computing and mobile devices complement each other for mobile devices usually are lacking of enough storage and computing power but which usually solvable by cloud computing, and mobile devices could be an effective outstretch for cloud services. Also, there exist at least four possible data access forms for the storage:

- Local in-device data, in which the applications such as contact or calendar are the typical
- Local out-device data, in which the medias such as the SD/MMC cards are the most typical for the backup data
- Remote synchronous data, in which the audiovisual streaming maybe the most popular peer-to-peer application
- Remote asynchronous data, in which the digital data stored somewhere on the Internet can be retrieved anytime once connected

It seems that size is the fate of mobile handheld devices and weight is their destiny, but cloud computing appears as a contemporary solution for them to breakthrough their limits. The next generation of mobile devices will use WBA and HCI technologies which support cloud services and interface designs to allow remote plug-and-play with **web 2.0** applications (Jaokar & Fish, 2006) that is suitable for mobile commerce in which this chapter emphasizes. For a demonstration of mobile commerce discussed in this

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