Mobile Multimedia for Commerce

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INTRODUCTION

The ready availability of mobile multimedia computing and communication devices is driving their use in commercial transactions. Mobile devices are lightweight and wireless so users can carry them and move about freely. Such devices include cell phones, PDAs and PCs equipped with cellular modems.

In the history of man, mobile commerce was the conventional form of commerce but during the twentieth century, it was superseded by fixed locations as a result of non-mobile infrastructure (stores and offices) and the ability of customers to travel. With modern mobile infrastructure, commerce can be conducted wherever the customer is located, and the sales activity can occur wherever and whenever it is convenient for the customer.

BACKGROUND

Mobile computing and communication devices, based on cellular communication, are a relatively recent innovation. Multimedia computing and communication, including video, audio, and text, are available for mobile devices but are limited by small screens, low bandwidth, and high transmission costs. These limitations distinguish mobile multimedia computing and communication from desktop multimedia computing and communication over the Internet, including WiFi, and dictate a somewhat different approach.

Mobile commercial processes are still largely experimental and are not yet well established in practice. Some researchers (Varshney, 2000) have projected that the use of mobile devices in consumer-to-business transactions will increase as much as 40%. Cautious consumers, inadequate mobile devices, security concerns, and undeveloped business models and procedures currently limit the use of mobile multimedia devices for commercial transactions.

Because mobile multimedia commerce using mobile devices is a new and developing field, there is relatively little available information, and that information is scattered. Early discussions of mobile commerce can be found in Senn (2000) and Varshney (2000). The i-mode service (Kinoshita, 2002; Lane, 2002) for mobile commerce has achieved some commercial success, within the limitations of existing devices and protocols.

LIMITATIONS OF THE MOBILE DEVICE

Cellular communication is wireless communication between mobile devices (e.g., cell phones, PDAs, and PCs) and fixed base stations. A base station serves mobile devices within a relatively small area of a few square miles (called a cell). The base stations are interconnected by fixed telecommunication infrastructure that provides connection with other telecommunication systems. When a mobile device passes from the cell of one base station to that of another, the first base station hands off communication with the device to the other, without disrupting communication.

Mobile devices are inherently more limited than fixed devices, but these limitations, appropriately recognized and accommodated, do not preclude their use in commerce (Buranatrived, 2002; Lee & Benbasat, 2003). Mobile devices have restricted display, input, print, and communication capabilities. The impact of these limitations depends on the user. A professional mobile sales representative needs better display, input, and print capabilities than many other kinds of users.

Mobile devices, such as cell phones and PDAs, have very small displays (less than 15 cm) that are likely to remain small, a limitation imposed by the need to insert the device into a pocket or purse, or to carry the device on a belt, and also by battery consumption. Such displays are inadequate for viewing detailed textual or graphical material. In an environment that is saturated with television, video, animated Web pages, and so forth, impressive multimedia sales presentations are even more important. Therefore, a mobile sales representative most likely will carry a notebook computer with a high-resolution display of 30 cm to 50 cm, and might even carry a projection display, which imposes little limitation on the material to be displayed.

The input capabilities of current mobile devices, such as cell phones and PDAs, are currently primitive and difficult to use for commercial activities. When natural language voice input is improved, the input of more complex requests, responses, and textual material will be possible. Substantial advances in speech recognition and natural language processing are necessary, and substantial increases in processing power and battery capacity are required before this promise can be realized.

Mobile devices are unlikely to provide printed output, but a mobile sales representative will likely carry a portable printer with which to create documents for the customer. Alternatively, such documents might be transferred directly between the mobile sales representative's device and the customer's device, using a cellular, infrared, bluetooth, or other wireless connection, without a physical paper record.

Storage capacity is not really a limitation for mobile commerce; hard disk capacities of many Gbytes are available for mobile devices. Similarly, the bandwidth of cellular communication links is sufficient for commercial interactions; however, the cost of transmitting detailed graphics over a cellular link is relatively high. Therefore, a mobile commercial sales representative will likely carry, on hard disk or CD, presentations and catalogs that contain detailed graphics or video, so that they do not need to be downloaded over an expensive wireless connection.

Typical mobile devices operate with low bandwidth, too low to allow effective display of video or Web pages. Remarkable efforts have been made with i-mode services (Kinoshita, 2002; Lane, 2002) to achieve effective mobile commerce, despite bandwidth limitations. The 3G networks currently being deployed provide sufficient bandwidth for display of video and Web pages. However, the high cost of cellular communication remains a significant limitation on activities that require large amounts of information to be transmitted. Mobile commercial activities need to operate with minimal or intermittent connections and with activities conducted while disconnected.

Currently, battery power and life are also significant limitations on mobile multimedia devices, restricting the availability of processing, display, and communication. However, small, light, mobile, alcohol-based fuel cells are in prototype and demonstration. When substantial demand develops for more powerful mobile multimedia devices, more powerful batteries will become available.

NEEDS OF USERS

It is important to distinguish between the needs of sellers and buyers and, in particular, the needs of:

- Professional mobile sellers;
- Professional mobile buyers;
- Convenience purchasers.

The popular concept of mobile commerce focuses on the buyer, but buyers are motivated by convenience, and attractive, effective capabilities are required to achieve significant adoption by buyers. In contrast, sellers are motivated by need, and they are more likely to be early adopters of novel technology.

Needs of Mobile Sellers

Professional mobile sellers include insurance agents, contractors, and other sales people who make presentations on the customers' premises. In the Internet era, with customers who do not need to visit a seller to make a purchase, sellers no longer need to wait for customers but need to become mobile to find customers wherever they can be found. Mobile sellers require support for contact information, appointments, scheduling, and reminders. PC-based tools provide such services, although their human interfaces are not appropriate for mobile devices. Mobile sales people might also use Customer Relationship Management