Interface Design Issues for Mobile Commerce

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INTRODUCTION

Effective interface design for mobile handheld devices facilitates user adoption of mobile commerce (m-commerce). Current wireless technology poses many constraints for effective interface design. These constraints include limited connectivity and bandwidth, diverse yet simplistic devices, the dominance of proprietary tools and languages, and the absence of common standards for application development.

The convergence of mobile Internet and wireless communications has not yet resulted in major growth in mobile commerce. Consumer adoption of m-commerce has been slow even in countries such as Finland, which have broadly adopted wireless technology (Anckar & D’Incau, 2002). An international study of mobile handheld devices and services suggests that mobile commerce is at a crossroads (Jarvenpaa, Lang, Takeda & Tuunainen, 2003). The enterprise and business use of wireless technology holds greater promise, but it demands the transformation of business processes and infrastructure. Poor usability of mobile Internet sites and wireless applications for commerce activities stands out as a major obstacle for the adoption of mobile solutions. For example, even with the latest 3G phones in Japan, consumers still find the small screen display and small buttons on these devices difficult to use (Belson, 2002).

BACKGROUND

Mobile Commerce

Mobile commerce broadly refers to the use of wireless technology, particularly handheld mobile devices and mobile Internet, to facilitate transaction, information search, and user task performance in business-to-consumer, business-to-business, and intra-enterprise communications (Chan & Fang, 2003). Researchers have proposed several frameworks for the study of m-commerce. Varshney and Vetter’s framework (2001) presents 12 classes of m-commerce applications, ranging from retail and online shopping, auction, mobile office, and entertainment to mobile inventory emphasizing the potential of mobile B2B and intra-enterprise applications. The framework by Kannan, Chang, and Whinston (2001) groups mobile services into goods, services, content for consumer e-commerce, and activities among trading partners.

Waters (2000) proposes two visions for the potential and opportunities of m-commerce. One perspective argues that the mobile, wireless channel should be viewed as an extension of the current e-commerce channel or as part of a company’s multi-channel strategies for reaching customers, employees, and partners. The second, more radical view suggests that m-commerce can create markets and business models.

Recent development in m-commerce has substantiated the first perspective. Major e-commerce sites have implemented their mobile Internet sites as an extension of wired e-commerce to support existing customers (Chan & Lam, 2004; Chan et al., 2002). Consumers have shown relatively low willingness to use m-commerce, but adopters of e-commerce are more likely to embrace this new technology (Anckar & D’Incau, 2002). Furthermore, perceived difficulty of use can affect consumers’ choice of m-commerce as a distribution channel (Shim, Bekkering & Hall, 2002). These findings suggest that in a multi-channel environment, m-commerce supplements e-commerce instead of becoming a substitute for e-commerce.

Enterprise and business applications of m-commerce technologies seem to hold greater promise, because it is easier for companies to standardize and customize applications and devices to enhance current work processes. An Ernst & Young study (2001) of the largest companies in Sweden shows that, except for the retail industry sector, most industries have viewed m-commerce as being vital for growth and efficiency strategies, but not necessarily for generating new revenue. However, integrating the wireless platform in an enterprise requires significant structural transformation and process redesign.

Research on Wireless Interface Design

Several recent studies have examined interface design for mobile applications using handheld devices. Researchers have found that direct access methods were more effective for retrieval tasks with small displays (Jones, Marsden, Mohd-Nasir, Boone & Buchanan, 1999). Novice WAP phone users perform better when using links instead of action screens for navigation among cards, and when using lists of links instead of selection screens for single-choice lists (Chittaro & Cin,
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MAIN THRUST OF THIS ARTICLE

Five issues are essential to the interface design for mobile commerce applications, including: (a) technology issues, (b) user goals and tasks, (c) content preparation, (d) application development, and (e) the relationship between m- and e-commerce.

Technology Issues

Limitation of Bandwidth

Most mobile communication standards only support data rates that are less than 28.8 kbps. Connections to the wireless service base stations are unstable because signal strength changes from place to place, especially on the move. These constraints limit the amount of information exchanged between device and base station. Indication of the download progress and friendly recovery from broken connections are necessary to help users gain a better sense of control.

Form Factor

Mobile commerce services are accessible through four common platforms: wireless PDA devices using Palm OS, Pocket PCs running Microsoft Windows CE/Pocket PC OS, WAP phone, and two-way pagers. Within the same platform, different form factors may offer different functionalities. A developer should consider the form factor’s unique characteristics when developing m-commerce applications.

User Goals and Tasks

Mobile users can spare only limited time and cognitive resources in performing a task. Services that emphasize mobile values, and time-critical and spontaneous needs, add more value for m-commerce users. These mobile services may include the ability to check flight schedules, check stock prices, and submit bids for auction (Anckar & D’Incau, 2002). In addition, mobile tasks that demonstrate a high level of perceived usefulness, playfulness, and security are the ones most likely to be adopted by users (Fang, Chan, Brzezinski & Xu, 2003).

Content Preparation

Constraints in bandwidth and small screen size demand different design guidelines. Most design guidelines for e-commerce (e.g., Nielsen, Farrell, Snyder & Molich, 2000) support the development of rich product information sets and a complete shopping process. In contrast, wireless Web sites have to simplify their content presentation.