

Chapter XXX

Can M-Commerce Benefit from Pervasive Computing?

Stan Kurkovsky

Central Connecticut State University, USA

ABSTRACT

Mobile commerce is a special area of electronic commerce that utilizes mobile wireless devices to conduct commercial transactions. Unique features of these devices include their mobility, personalization, and location-awareness. These features play a very significant role in enabling a novel class of emerging applications that take advantage of recent advances in pervasive computing. The paradigm of pervasive computing environment was first introduced by Mark Weiser in the early 1990s who postulated the anytime anyplace availability of computing and information services that are enabled by miniature devices and sensors seamlessly and unobtrusively embedded in the surrounding environment. Although this vision has not been realized in its literal sense, today mobile and smart phones are commonly viewed as an enabler of a human interface to the surrounding computing and information environment. As an application area where many principles of pervasive computing have been successfully implemented, mobile commerce has reaped significant benefits from the recent scientific and technological advances. This chapter discusses a number of pervasive computing principles and illustrates how they have been implemented in mobile commerce applications. The chapter also presents some new trends in developing context aware m-commerce services that tap into the power of Web 2.0 services and digital communities.

INTRODUCTION

Electronic commerce, or e-commerce, is the process of buying, selling or promoting goods, information, or services via computer networks. Mobile commerce, or m-commerce, is a special-

ized area of e-commerce, in which mobile devices are used in the process of conducting of a commercial transaction. Unique features of wireless mobile devices have a profound impact on the nature and features of applications designed to run on these devices. Such features include the

device ubiquity (mobile phones are affordable and portable), personalization (a typical mobile phone belongs to and can be associated with a single person), and location awareness (a wireless connection can be used to estimate, and a GPS sensor can precisely determine the physical location of the device) (Kannan et al., 2001). Many current e-commerce applications have been adapted for wireless mobile platforms. There is also an emerging class of m-commerce applications, which is enabled by the unique platform features, such as location-awareness and mobility inherent to such mobile devices as smart phones. Such a trend also exists in many other application areas where mobile devices are used: as existing applications migrate to mobile platforms, the features unique to device mobility and wireless connectivity create a unique category of emerging applications aiming to achieve the anytime, anywhere paradigm of pervasive computing. In particular, new m-commerce applications emerge due to three unique characteristics of mobile devices: they provide a communication channel for remote merchants and providers of services through their anyplace anytime connectivity; they provide unique capabilities to personalize the experience of their users by gathering information about the local context; and they allow service providers to affect the user environments via local communication links and actuators (Gershman, 2002). Many researchers believe that m-commerce will continue to serve as a major driving force behind the development of mobile Internet (Maamar 2003, Tamminen et al., 2004).

BACKGROUND

The paradigm of pervasive computing indicates that as technology advances, computing devices will become smaller but more powerful, which would allow these devices to be ubiquitously and invisibly integrated into our everyday surroundings providing an anyplace anytime access to a

computing environment. In the early 1990s, Mark Weiser (1991, 1993) described an early prototype of such an environment comprised of three classes of devices: tabs, pads and boards, each of which were designed after the corresponding office instruments. Tabs, similar to Post-It notes, were small location-aware devices with a pressure sensitive screen for writing short notes. Much like today's tablet PCs, pads were wireless pen-based notebooks. Boards were large wall-sized interactive surfaces, functionally similar to office whiteboards. Development of these devices did not progress beyond research prototypes at the Xerox PARC labs. However, this project generated much interest in research and industry due to the impact this paradigm could make on the way how humans interact with technology.

Pervasive computing is an emerging research field full of many open problems. One of the most challenging questions is how to ensure that a computing system is invisibly embedded in the surrounding environment and how to minimize the impact of its possible intrusiveness on perception of the users. In general, there are two complementing solutions to this problem: by using miniature devices and embedding the logic into wearable and mobile devices, and the environment; and by incorporating into the system a degree of intelligence capable of anticipating the user's actions within the current environmental context. Mark Weiser described the paradigm of pervasive computing as a "world where each person is continually interacting with hundreds of nearby wirelessly interconnected computers" (Weiser, 1993) that "weave themselves into the fabric of everyday life until they are indistinguishable from it" (Weiser, 1991). Consequently, a pervasive system designed in this fashion will "fade into the background" and its users will be able to focus on everyday tasks at hand rather than on the idiosyncrasies of interacting with the technology. Much progress has been made in the area of pervasive computing that significantly advanced it from tabs, pads and boards, however, the fundamental theoretical

11 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/can-commerce-benefit-pervasive-computing/21683

Related Content

Orphan Node Connected Management in Multi-Hop Clustering-Based Routing Protocols for Wireless Sensor Networks

Wassim Jerbi, Abderrahmen Guermazi and Hafedh Trabelsi (2019). *International Journal of Interdisciplinary Telecommunications and Networking* (pp. 1-16).

www.irma-international.org/article/orphan-node-connected-management-in-multi-hop-clustering-based-routing-protocols-for-wireless-sensor-networks/235466

Wireless Networks Based on WiFi and Related Technologies

Rajendra V. Boppana and Suresh Chalasani (2009). *Selected Readings on Telecommunications and Networking* (pp. 250-265).

www.irma-international.org/chapter/wireless-networks-based-wifi-related/28725

Context-Aware Multimedia Services for Mobile Lecture Streaming

Ulrike Lucke (2012). *Multimedia Services and Streaming for Mobile Devices: Challenges and Innovations* (pp. 202-223).

www.irma-international.org/chapter/context-aware-multimedia-services-mobile/58705

From Fan-Centric Handset Manufacturing to Intense Product Diversification: A Study of the Rapid Transformation of a Telecommunication Giant in China and Beyond

Min Zhang and Katia Passerini (2020). *International Journal of Interdisciplinary Telecommunications and Networking* (pp. 22-33).

www.irma-international.org/article/from-fan-centric-handset-manufacturing-to-intense-product-diversification/247955

Security and Privacy in Next Generation Networks and Services

Panayiotis Kotzanikolaou (2016). *Handbook of Research on Next Generation Mobile Communication Systems* (pp. 361-379).

www.irma-international.org/chapter/security-and-privacy-in-next-generation-networks-and-services/136566