Chapter XV
Semantic Location Modeling for Mobile Enterprises

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ABSTRACT

A location model represents the inclusive objects and their relationships in a space and helps engender the values of location based services (LBS). Nevertheless, LBS for enterprise decision support are rare due to the common use of static location models. This chapter presents for enterprises a framework of dynamic semantic location modeling that is novel in three ways: (1) It profoundly brings location models into enterprise business models; (2) with a novel method of dynamic semantic location modeling, enterprises effectively recognize the needs of the clients and the partners scattered in different locations, advancing existing business relationships by exerting appropriate service strategies through their mobile workforces; (3) through the location model platform of information sharing, enterprises are empowered to discover potential business partners and predict the values of their cooperation, gaining competitive advantages when appropriate partnership deals are made by enterprise mobile workforces. This proposed framework has been implemented with the J2EE technology and attained the positive evidences of its claimed values.

INTRODUCTION

With the advent of wireless communication technologies, the era of mobile enterprises unfolds. Many international enterprises like IBM, Sun, HP, and Microsoft are vying to develop mobile enterprise servers and solution architectures. According to a Cutter report, 57% of the employees in the enterprises worldwide were regarded as the "mobile workforce" in 2005 (Ericsson Enterprise,

2002). Accordingly, following the e-business trend, competitive advantages built on wireless technologies in dynamic mobile environments are now widely recognized by enterprises.

The conventional perception of mobile enterprises is that enterprise users are able to have personalized, seamless access to enterprise applications and services from anyplace and at anytime, regardless of the devices employed, in order to facilitate the tasks at hand (Bouwman et al., 2005; Ericsson Enterprise, 2002).

Subsequently, location is an inherent feature of many mobile services. Location-based services (LBS) are information services that exploit knowledge about where an information device user is located. According to Ovum, an analyst and consulting company, the market for LBS will grow to $12 billion by 2006. Existing LBS primarily rest on four categories of services (Varshney, 2000): (1) safety (e.g., emergency services, roadside assistance); (2) navigation and tracking (e.g., vehicle navigation, asset tracking, people tracking); (3) transactions (e.g., location-sensitive billing, zone-based traffic calming); and (4) information (e.g., yellow pages, location-based advertising). The main idea behind the former three categories is locating targeted objects for provision/consumption of certain external resources. The last category then focuses on targeted advertising, linking nearby consumers/buyers and providers/sellers to facilitate additional revenue generation (Polyzos, 2002; Ververidis & Yuan & Peng, 2004; Yuan & Tsao, 2003). LBS has been a hot area of research because mobility of information device users leads to the generation of user location information that subsequently drives a slew of new services.

Moreover, enterprise decision support (Bolloju, 2003) is often regarded as: (1) use of corporate data to derive and create higher level information and knowledge, (2) integration of organizational information to support all departments and end users, and (3) provision of tools to transform scattered data into meaningful business information. Enterprises utilizing geometrical data are often the likes of logistic companies of which LBS mainly rests on the provision of support on navigation and the tracking of their employees (shipping vehicles) or clients. For instance, logistic delivery planning locates shipping vehicles based on geometric models: static location models (MapInfo, http://www.mapinfo.com/products/Features.cfm; RITI Technology Inc., http://www.elocation.com.tw) to know all inventories in transit and enable efficient logistic deliveries (Varshney, 2000). Nevertheless, it is rare to perceive LBS as enterprise decision support in attaining higher level information and knowledge. *It naturally comes to a question of how to marry enterprise decision support with LBS so as to deeply utilize the business data together with the geometric data.* In searching for the answer to the question, there is a need to identify the reasons behind the limited extent of this marriage. (Afterwards, this sort of marriage is named *enterprise-based LBS*.)

In this research, we believe the possibilities behind this limitation are (1) the integration of enterprise business models and existing location models is difficult; and (2) the limitation of existing location models hinders additional development on enterprise-based LBS.

With the aforementioned suppositions, *this chapter aims to present a framework of dynamic semantic location modeling (DSLM) that shows certain integration of enterprise business models and the proposed location model (that surmounts the problems encountered in static location models), realizing enterprise-based LBS* (e.g., the location-sensitive decisions of potential strategic partners required in the expansion of enterprise alliance networks). The DSLM framework is believed to encourage the development of myriad research on enterprise-based LBS in the future. This chapter will first discuss the limitations of existing location models and then present the DSLM framework, followed by some evaluation results and conclusion.