Abstract

This chapter examines Location Based Services (LBS) from a broad perspective involving definitions, characteristics, and application prospects. We present an overview of LBS modeling regarding users, locations, contexts and data. The LBS modeling endeavors are cross-examined with a research agenda of geographic information science. Some core research themes are briefly identified.

1 Location Based Services: definitions, characteristics, and application prospects

With the rapid development and widespread deployment of information and telecommunication technologies integrated with lightweight mobile devices and terminals, pinpointing location on the move has become a common exercise. The technologies involve geographical information systems (GIS), global positioning systems (GPS), radio frequency

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identification, and various other location sensing technologies with varying degrees of accuracy, coverage and cost of installation and maintenance. Some most recent location sensing technology based on ultrawideband radio can even achieve accuracies on the order of centimeters in an indoor environment. Meanwhile, the rapid evolution of cell phone industry from initial simple talk services to multiple functions of multimedia messaging and voice services with the emergence of broadband wireless infrastructure has created tremendous demands for various Location Based services (LBS).

What are LBS? There have been various definitions of LBS from different perspectives. One regards LBS as “any service or application that extends spatial information processing, or GIS capabilities, to end users via the Internet and/or wireless network” (Koeppel 2000), and another says that LBS are “geographically-oriented data and information services to users across mobile telecommunication networks” (Shiode et al. 2004). From a GIS perspective, the former definition concentrates on the GIS capabilities that are available in networked environments. The latter definition, on the other hand, narrows down specifically to geographic data and information services that are available in a mobile-networked environment. Both definitions emphasize that LBS are services targeted to a wide range of users. According to these definitions, both online map services (e.g. mapquest) and the Internet GIS can be considered important LBS applications, as they provide the kind of geographic information services via the Internet or mobile-networked environments to mobile devices. LBS are indeed partially evolved from the online map services and other Internet GIS applications, whereas current LBS mainly rely on lightweight mobile devices such as personal digital assistants (PDA), smart phones and wearable computers for delivering various services so as to provide added value to users. A true LBS application aims to provide personalised services to mobile users whose locations are in change. Location and context are the key players in LBS which are thereby often called location-ware computing or context-aware services.

Any definition of LBS would overlap partially with some key terms in research fields of GIS and geoinformatics. Instead of presenting a new definition, it is important to capture those distinct characteristics of LBS that differentiate them from other GIS applications. We can compare them in regard to five commonly accepted components of GIS, i.e. hardware, software, data, models, and people. In a comparison with conventional GIS, Karimi (2004) elaborated the distinct characteristics of LBS (he used another term “telegeoinformatics” to refer to LBS). From the hardware and software perspective, LBS are based on diverse platforms and packages which involve the use of Internet, GIS, location-aware devices, and