Chapter 7.24
Mobile Ontologies:
Concept, Development, Usage, and Business Potential

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ABSTRACT

The number of mobile subscribers in the world is soon reaching the three billion mark. According to the newest estimates, majority of the subscribers are already in the developing countries, whereas the number of subscribers in the industrialized countries is about to stagnate around one billion. Because especially in the developing countries the only access to Internet are mobile devices, developing high quality services based on them grows in importance. Ontologies are an important ingredient towards more complicated mobile services and wider usage of mobile terminals. In this article, we first discuss ontology and epistemology concepts in general. After that, we review ontologies in the computer science field and introduce mobile ontologies as a special category of them. It seems reasonable to distinguish between two orthogonal categories, mobile domain ontologies and flowing ontologies. The domain of the former one is in some sense related with mobility, whereas the latter ones are able to flow from computer to computer in the network. We then discuss the creation issues, business aspects, and intellectual property rights (IPR), including patentability of mobile ontologies. We also discuss some basic requirements for computer systems architectures that would be needed to support the usage of mobile ontologies.

INTRODUCTION

The mobile subscriber base in the world is growing fast. The industry itself estimates that at the end of 2006, the number of subscribers reached 2.7 billion and it is expected that the number of subscribers will grow with 480 million during 2007 (Umsoy, 2007). The biggest growth will be in the developing countries, like India and China. There are over 130 3G WCDMA networks in 60 countries with 100 million subscribers. The latter number will grow to 170 million during 2007.

Low-cost WCDMA terminals (65 € a piece) are coming to the market. High Speed Packet Access (HSPA) with 3.6 Mbps downlink capacity is deployed in 51 countries in 93 networks and there were 128 devices on the market supporting HSDPA in March 2007 (Umsoy, 2007).

Digital convergence is tearing apart the old barriers between entertainment, media, telecom and computer industries, and all these industries are melting together into one huge industry. At the same time, the wireless operators are pondering their position on this market. They want to be more than bit pipes providing access to Internet for wireless terminals. Many operators think that they must provide better and more appealing services to the subscribers. How can appealing services be offered to mobile users both in developed and developing countries? These can be location-based or context-aware in a wider sense, or other services adapted to mobile Internet.

At the same time, the top models of mobile wireless terminals have reached capabilities of a laptop computer a few years ago with gigabytes of memory, programmability, fast processors, GPS receivers, text editors, calendars, e-mail clients, browsers, and so forth. Many have cameras and can record images and video with sound. Thus, users have begun to generate multimedia contents using these devices. Assuming that a user takes, for example, 2,000 digital photographs and some video clips in a year, there will be a substantial number, tens of thousands, even hundred thousand of these kinds of objects after 30-50 years. These are mostly relevant for the person himself or herself and for his friends and family members. Managing reasonably these emerging digital archives requires semantic metadata that cannot be generated fully automatically. Rather, user's help is needed (Sarvas, 2006). Also, storage space (approaching terabyte range for a life-time archive) is a problem and the stability of the formats used. Who guarantees that for example, the currently so popular JPEG-format would be supported in 2060? If the format originally used to store the images or video clips is not any more supported, what kind of automatic means are there to transform the contents into newer formats?

YouTube (Youtube, 2007) is currently one of the most known sites in the world where people can upload their video clips and other users can download them. Many of those videos have been produced by mobile handsets. Flickr (Flickr, 2007) offers sharing of photographs and a simple annotation in the form of tags. Not all material is suitable for distribution all over the world, though, for moral, legal, cultural, or privacy reasons. For instance, Flickr site does not allow sexually-oriented contents beyond a certain limit, although the tags "sex" and "sexy" are in use.

The above needs of individuals while managing and sharing digital contents are rather different from those of the companies offering various kinds of *mobile services*. Both can be satisfied in several ways. Perhaps the most sophisticated approach is to use *ontologies* in all these contexts. Because terminals are becoming more and more powerful over time, they can also be used to run complex computations, for example, inferences, required while using *formal ontologies* for various purposes. This is the main motivation behind this article.

In section 2, we discuss the concept of ontology and epistemology in general and in section 3, we discuss the concept of ontology in computer science field. In section 4, we discuss what should be understood by mobile ontologies. In section 5, we will turn our attention to the ontology creation issues in general and the peculiarities when creating mobile ontologies. In section 6, we discuss so-far largely ignored business and IPR issues related to mobile ontologies. Section 7 concludes the article.

ONTOLOGY AND EPISTEMOLOGY

"What is there? What exists?" This could be understood as the basic question of ontology,

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