Chapter 36
New Trends in Semantic-Based Location and Context-Aware Adaptation for Mobile Web Applications Development

Miguel Jiménez
Universidad Politécnica de Madrid, Spain

Javier Soriano
Universidad Politécnica de Madrid, Spain

José Manuel Cantera
Telefonica Research & Development, Spain

Ignacio Marín
Fundación CTIC de Asturias, Spain

Diego Berrueta
Fundación CTIC de Asturias, Spain

ABSTRACT

This chapter depicts, from a comprehensive perspective, the state of the art of the mobile Web application development, ranging from the traditional transcoding techniques used to enable mobile browsing from early Web-enabled devices to innovative and ambitious proposals based on detecting an extensively described context and adapting to it. The chapter discusses the main solutions being adopted for adapting mobile Web applications and contexts to multiple devices and contexts, and outlines the newest trends on full-fledged context-aware adaptation that give a step forward on device-based adaptation and pursue the creation of applications that satisfy the emerging user needs about context- and location-based information and services. As a case of success, the MyMobileWeb project is studied in depth.

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MOBILE WEB OVERVIEW

The mobile Web is the term used to define access to Web contents from mobile devices considering their restricted interface features. Mobile devices are not confined to mobile phones, but also stretch to other mobile devices such as PDAs or newer mobile Internet devices, known as MIDs. The mobility of such devices constrains their ability to properly access and display high resource-demanding websites designed for PCs. As a result, mobile devices, even the newer smartphones with advanced capabilities, require specifically adapted versions that fit their capabilities.

The interest of the mobile Web lies in the possibility of accessing all the information and services deployed over the Internet ubiquitously, that is, anytime and anywhere. In the last decade the number of mobile devices has increased amazingly. There were an estimated four billion mobile lines at the end of 2008. This figure triples the number of fixed lines and accounts for 61% of the world population (*Measuring the Information Society*, 2009). Following this trend, and motivated by improved technology, the number of Web-enabled mobile devices has also grown at such a rate that nowadays the vast majority of mobile phones feature at least a micro-browser able to surf the mobile Web.

The mobile Web has been out for years. But, despite the high number of Web-enabled devices that are on the street, it has not taken off yet. Even so, it has great potential and is expected to grow enormously in the following years for a number of reasons: the improvement of wireless network technologies, the cut in data plan prices, the improved features of mobile devices, the spread of intensive-connected and highly capable devices and the ever-increasing connected life of people. The demand for on-line services is growing, and the mobile Web is the ideal and most widespread platform for ubiquitous applications.

Low mobile Web adoption rates are attributed, among other things, to the poor user experience with traditional transcoding and adaptation techniques, even though newer devices overcome some of the constraints of earlier generations. In this regard context-awareness is considered a leveraging factor to improve the user experience and interest of the services. The objective behind the use of context definitions in mobile Web applications is not only to overcome the constraints imposed by mobile devices and mobile Web environments, but also to exploit all the new possibilities that context-aware adaptations offer in a context-rich environment such as the mobile Web. These new possibilities include personalization, location awareness, accessibility, content enrichment and prioritization by relevance. This turns what were considered to be mobility constraints into added value.

However, the development of applications that take advantage of such new possibilities related to the surrounding context is a complex task. Besides, few context-aware mobile Web applications have been released. They focus on just a small part of the context such as the location. This is due to the lack of models and standards that ease the adoption of these new trends in rich user experience mobile application developments and help developers to access and rely on contextual information inside the mobile Web application.

DEVELOPING A MOBILE WEB APPLICATION

The development of mobile Web contents or applications has been marked by the existence of a mesh of protocols, markup languages and formats. This posed a challenge to mobile Web developers who had to tackle a wide range of technologies. Additionally, they were obliged by the reduced set of technologies supported by individual device models, and the big differences from one device to another to deliver a tailored version of the Web contents or application for each model.