

Chapter 13

Technologies and Systems for Web Content Adaptation

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ABSTRACT

The world has witnessed the blossom of mobile commerce in the past few years. Traditional Web pages are mainly designed for desktop or notebook computers. They usually do not suit the devices well because the pages, especially the large files, cannot be properly, speedily displayed on the microbrowsers due to the limitations of mobile handheld devices: (i) small screen size, (ii) narrow network bandwidth, (iii) low memory capacity, and (iv) limited computing power and resources. Therefore, loading and visualizing large documents on handheld devices become an arduous task. Various methods are created for browsing the mobile Web efficiently and effectively. This chapter investigates some of the methods: (i) page segmentation, (ii) component ranking, and (iii) other ad hoc methods. Though each method employs a different strategy, their goals are the same: conveying the meaning of Web pages by using minimum space. The major problem of the current methods is that it is not easy to find the clear-cut components in a Web page. Other related issues such as mobile handheld devices and microbrowsers will also be discussed in this chapter.

INTRODUCTION

Mobile commerce has drawn great attention these days and people start using mobile handheld de-

vices such as smart cellular phones to perform all kinds of activities such as mobile Web browsing and instant messaging. According to Gartner, Inc., a market research company, the number of units of PCs, smartphones, and cellular phones shipped in 2008 are

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- 302.2 million PCs including desk-based PCs, mobile PCs, and X86 servers (Gartner, Inc., 2009a)
- 139.3 million smartphones, which are mobile phones with advanced functions such as PC-like functions (Gartner, Inc., 2009b)
- 1.22 billion mobile phones (Gartner, Inc., 2009c)

The number of smartphones shipped is increased fast in recent years and it is a little less than half of the number of PCs shipped. It is expected the number of smartphones shipped will surpass the number of PC shipped in the near future. When people started using handheld devices to browse the mobile Internet about ten years ago, Webmasters usually created two versions of their Web pages. One version using HTML is for desktop browsers and the other one using WML, cHTML, or other languages is for microbrowsers. However, this approach has been proved futile and time-consuming and most Web sites have only one version in HTML for both desktop browsers and microbrowsers today. Most Web pages are mainly designed for desktop or notebook computers. They usually do not suit the devices well because the pages, especially the large files, can not be properly, speedily displayed on the microbrowsers due to the limitations of mobile handheld devices: (i) small screen size, (ii) narrow network bandwidth, (iii) low memory capacity, and (iv) limited computing power and resources. Therefore, loading and visualizing large documents on handheld devices become an arduous task.

A wide variety of methods have been used for Web content adaptation for mobile handheld devices. This chapter gives the challenges faced by these methods. It includes three themes:

- **Internet-enabled mobile handheld devices:** Mobile users browse the mobile Internet by using mobile handheld devices, which include six major components:
 - (i) mobile operating systems, (ii) mobile central processing units, (iii) microbrowsers, (iv) input and output components and methods, (v) memory and storage, and (vi) batteries.
- **Microbrowsers:** Microbrowsers are a small version of desktop browsers such as Microsoft Internet Explorer and Firefox. They usually apply one of the four approaches to access the mobile Internet: (i) wireless language direct access, (ii) HTML direct access, (iii) HTML to wireless language conversion, and (iv) error.
- **Web content adaptation:** Various methods are used to browse the mobile Web and none of them is dominant. Most of them use the segmentation-and-ranking approach, that is, they display the page components in the order of their importance. This chapter investigates some of the methods:
 - **Page segmentation:** which is used to segment Web pages
 - **Component ranking:** which is used to rank page components after segmentation
 - **Other ad hoc methods:** such as text summarization, transcoding, and Web usage mining

Though each method employs a different strategy, their goals are the same: *conveying the meaning of Web pages by using minimum space*. The major problem of the current methods is that it is not easy to find the clear-cut components in a Web page.

A related survey of Web content adaptation is also given by Alam & Rahman (2003).

INTERNET-ENABLED MOBILE HANDHELD DEVICES

Mobile users interact with mobile commerce applications by using small wireless Internet-enabled devices, which come with several aliases

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