

Chapter 12

Web Page Adaptation and Presentation for Mobile Phones

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ABSTRACT

According to the explosive growth of mobile phones, mobile Web has been a part of our life. People can access the Web with their mobile phones and obtain information anywhere and anytime. This trend will stimulate the coming of mobile commerce, where people look for and purchase products on the Web whenever they want. Mobile Web is one of the key technologies for mobile commerce. However, since mobile phones have to be handheld, their interface is strictly limited. Users have to browse large-sized Web pages designed for large displays with a small screen and poor input capability of mobile phones. Additionally, considering mobile users browse Web pages in various situations, users' needs towards presentation functionalities may differ depending on their browsing situations. To provide comfortable Web browsing experience under these constraints, we have proposed two systems for mobile phone users. One system provides various presentation functions for Web browsing so that users can select appropriate ones based on their browsing situations. The other system provides functions to navigate users within a Web page so that they can find the information of their interest without getting lost in the page. In this chapter, we briefly introduce designs of these systems and introduce results of user experiments, through which we show that our systems can reduce users' burden on mobile Web by enabling to select appropriate presentation functions adapted to their situations and by navigating them on a large Web page with the entertaining interface.

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INTRODUCTION

We are witnessing the explosive growth of mobile devices. The number of mobile subscribers in the world is projected to be over 4 billion by 2010 from 2.7 billion at the end of 2006. According to this trend, Web access using mobile phones has been also getting popular. In some countries, such as Japan and India, the number of users who access the Web using their mobile phones has exceeded that of PC users. The mobile Web is already a part of our life. At the same time, electronic commerce has got popular as well. Considering these facts, we can expect that the next decade will be the decade of mobile commerce. As a key technology of mobile commerce, mobile Web browsing is important, since people find something to purchase on the mobile Web anywhere and anytime.

However, the current usability of mobile Web is still far from comfortable standard. The problems are twofold: the one comes from a low-bandwidth and the other does from the poor interface of mobile phones, i.e., a small screen and poor input capability. As for the bandwidth, the situation is getting better according to the improvement of the communication facilities, which is apparent from the launch of the advanced connection services, such as 3G and CDMA. On the other hand, the limited interfaces are difficult to improve, since mobile phones have to be handheld. In this chapter, we focus on conventional mobile phones, which only have an ordinary (non-touch) screen and a telephone keypad. As represented by the iPhone from Apple, some advanced smart phones with a touch-screen of comparatively larger size are released; however, the majority of mobile phones in the world still follow the conventional style. Such conventional mobile phones are especially suffered by their limited interfaces on Web browsing.

To solve the problems on Web browsing using mobile phones, we have proposed two browsing systems to provide following functions:

1. Selectable presentation functions based on multimodal mobile user situations
2. Navigation within a Web page

The rest of this chapter is organized as follows. We firstly review prior works related to Web page presentation on mobile devices. Next, we introduce the first and the second system and report the user evaluation. Finally we describe future direction and conclude our chapter.

RELATED WORK

To solve problems of Web browsing using mobile phones, many studies have been conducted. Power Browser (Buyukkokten, Garcia-Molina & Paepcke, 2000; 2001) summarizes text contents within a Web page and then creates an index of the page, deleting all images within the page. When users select a content from the index of the page, it is fully displayed. By doing so, it can reduce the size of the Web page and display more contents on the small screens of mobile phones. RSVP Browser (Bruijin, Spence & Chong, 2002) extracts and sequentially displays important images from a Web page. Doing this allows users to grasp the outline of the page without being bothered by operations. However, it is effective only for pages that contain many meaningful and large images associated with the content.

Some commercial Web browsers for mobile phones, such as the NetFront (NetFront) and the Opera for Mobile (Opera for Mobile), are initially installed in recently released mobile phones. Among them, restructuring Web pages is standard so that users can read pages using only vertical scrolling. However, it is difficult to properly restructure a complicated Web page, e.g., one containing nesting tables.

These prior works have a significant drawback in which they have to change the layouts of Web pages by simplifying or deleting contents of the pages. If the layout of a Web page is changed,

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