Auto–Personalization WAP Portal

A

Jon T. S. Quah
Nanyang Technological University, Singapore

Vincent L. H. Seet
Nanyang Technological University, Singapore

INTRODUCTION

WAP (wireless application protocol) has failed to take off exponentially as anticipated by industry players over the last few years with the slow acceptance by the consumers. The big players of WAP mobile phone manufacturers and mobile operators had over-hyped the advantages of using WAP to access the Internet ubiquitously. This had led to a mismatch in the consumers' expectations when they eventually realized that user experience in surfing the Internet with WAP phones was not what was perceived earlier. The perceived experience was equated with that of surfing the Internet with desktop personal computers, browsing Web sites with rich multimedia contents. The reality is, WAP phones have limited screen real estate, and these came with monochrome displays initially. Thus, WAP contents have to be specially coded to suit the small screens for browsing. WAP phones with color displays were only available in quantity and variety since late 2002. Much of the WAP content available has not yet redesigned to take advantage of the new color displays.

The attainable bandwidth for WAP surfing is only a small fraction when compared to broadband access. The bandwidth attainable by surfing WAP over GPRS (General Packet Radio Service, a 2.5-generation GSM packet data technology) is between 20 kbps to 40 kbps, whereas it is 256 kbps to 1,024 kbps for broadband. Prior to the availability of GPRS, WAP was carried over CSD (GSM Circuit Switch Data) and had an attainable bandwidth of merely 9.6 kbps. With these limiting factors, rich multimedia contents are simply not applicable to WAP at the moment (Gehlen & Bergs, 2004; Bai, Chou, Yen, & Lin, 2005). The limited screen real estate of WAP phones has also created navigation problems which involved many selections and too many moves between cards for consumers to achieve their goals. It was said that WAP is the "Wrong Approach to Portability," and it is a technology designed *by* techies *for* techies, without the best interests of the consumer at heart (George & Sarch, 2001). Others said that WAP's days were numbered and soon it would R.I.P. (rest in peace) (Saymour et al., 2001). It is certain that some amount of guidance is required for the less techie consumers during their initial encounters with WAP.

Nevertheless, WAP is a good technology that allows one to access handy information in a timely fashion and ubiquitously. Like it or not, WAP will be around for some time, but much improvement is needed to make WAP surfing a less painful experience for consumers (Mahmoud, 2004; Sriskanthan, Meher, Ng, & Heng, 2004; Yeo, Hui, & Lee, 2004; Ma & Irvine, 2004; Radhamani & Siddiqi, 2004; Hung & Chang, 2005; Albastaki & Alajeeli, 2005; Gilbert & Han, 2005).

Mobile Internet browsing using WAP phones has created unique problems of its kind. One of the challenges that consumers faced is that they are only equipped with a small screen for browsing WAP contents. This makes navigating to WAP sites of interest on WAP portals a hassle. WAP portals served as consumers' gateway to the WAP sites offered by third-party content providers. These portals usually organize the list of WAP sites into a multilevel tree hierarchy structure. Consumers are required to navigate deep down the tree to access their favorite sites. This article proposes methods for making WAP portals adaptive. Such portals reduce time spent by consumers in navigation, hence there is more time for content browsing. The proposed methods do not require explicit consumers' input for adaptation, but rather they implicitly track consumers' navigation activities among WAP sites and use this input to form the basis of consumers' preferences for adaptation. The methods had also taken into account possible drift of consumers' interests over time, and weighted computation is used to achieve adaptation that will be of relevance to consumers at any point of time. Preliminary experiments with mobile users have yielded promising results.

DESCRIPTION OF THE SYSTEM

Personalization refers to the process of creating a customized consumer experience that is unique to each target consumer by making use of the preferences of these consumers as inputs to the process. Much research has been done in this area (Quah & Yong, 2002; Jelekaninen, 2004; Saleh, Avery, & Siddiqui, 2004; Wu, Chung, & Moonesinghe, 2004; Lin, Wang, & Liu, 2005; Yin & Leung,

2005; Ezeife & Lu, 2005; Tee, 2005; Ueno, Ishikawa, Suzuki, Sumino, & Takahashi, 2005) to devise methods that will be efficient in delivering the customized consumer experience.

In order to relieve consumers of the hassle of customization, an adaptive WAP portal is proposed. The adaptive WAP portal requires no explicit consumer input. Its adaptation is enabled by examining consumers' history of WAP site access. Adaptation is achieved by the following means:

- adaptive link sorting,
- adaptive recommendation, and
- navigation shortcuts.

Consumers' usage data or access history is acquired implicitly by tracking the WAP sites that are accessed during each WAP portal navigation session. The data collected for each access consists of consumer's mobile number, identification number of WAP site accessed, timestamp of access, session identification number, and optionally the duration of visit to the site (in minutes).

Information on the duration of visits to the sites is gathered from the WAP gateway of the mobile operator of the Adaptive WAP portal. It is the best node to retrieve such information since WAP gateway proxies all the requests from WAP phones to the WAP sites requested. The usage of "duration of visits" information is an optional feature, as in some implementation this information is difficult to retrieve. Commercially deployed WAP gateways usually store logs of the WAP sites that were accessed by consumers for charging purposes. In system implementations with the absence of the "duration of visits" information, the number of hits to WAP sites is used. The rationale of using "duration of visits" information is to produce adaptations that closely reflect consumers' WAP browsing behaviors. WAP sites where consumers' frequently spent more time browsing should be made easily for the consumer to revisit in the future.

Preferences or interests of consumers can be inferred over time, based on the collected usage data that will be used to adapt consumers' WAP surfing experiences. Consumers' interests tend to drift over time. This behavior has been taken into account in the proposed adaptation methods by introducing temporal weights which influence the relevance of a site accessed in the past. What this essentially means is that a site accessed in the past has less influence in the adaptation as compared to those sites that were accessed recently.

Temporal weights are calculated with respect to each of the past WAP portal navigation sessions. The adaptation methods will take into consideration usage data of a target consumer for the last N sessions, where N is predefined by the mobile operator of the adaptive WAP portal. Having identified the last N sessions used for adaptation, the proposed methods will calculate the temporal weights of each of these sessions using Equation 1:

$$W_S = \frac{1 + Timegap_{oldest} - Timegap_s}{Timegap_{oldest}}$$

(Equation 1)

Adaptive Link Sorting

This method reorganizes the tree structure by sorting the links according to individual consumer's past accesses to these links. Specifically, the method will enable links in a category that are accessed by a consumer to be sorted based on the consumer's preference model that was generated using usage data in the past sessions. The original order of the links within the category accessed is overridden. The motivation behind adaptive link sorting is to reduce the number of scrolling (upwards and downwards directions) that is needed on the limited screen real estate of WAP phones. These phones typically can only display three to four lines of text within the display area of the screen.

The algorithm will use the target consumer's usage data (similar to that of Figure 2) of the last N sessions for computing the access scores of each link.

The algorithm used by the method is presented as follows.

Let *L ε {links in category X}* where X is the category that is accessed by a target consumer and the links in this category are to be re-sorted. The algorithm will use the target consumer's usage data (similar to that of Figure 2) of the last N sessions for computing the access scores of each link L denoted by **Score_L**.

Let *S ε {last N sessions}*. N is a configurable input parameter to the algorithm that is decided by the mobile operator of the WAP portal.

For each *L ε {links in category X}*, the respective access scores will be computed using Equation 2:

$$\mathbf{Score_L} = \sum_{S=1}^{N} W_S \cdot A_{LS}$$

(Equation 2)

W_S denotes the temporal weights as presented in Equation 1.

A_{LS} denotes the total duration of visits to link L in the Sth session. In implementations where information on duration of visits is not available, A_{LS} will then denote the total number of access (i.e., clicks) to link L in the Sth session.

Related Content

Pushing Elusive Alliances into the Light: Discovering the Value of Informal Networks on the Internet
Rian van der Merweand Leyland F. Pitt (2003). *Journal of Electronic Commerce in Organizations (pp. 14-31).*
www.irma-international.org/article/pushing-elusive-alliances-into-light/3410

Channel Identification and Equalization based on Kernel Methods for Downlink Multicarrier-CDMA Systems
Mohammed Boutalline, Belaid Bouikhaleneand Said Safi (2015). *Journal of Electronic Commerce in Organizations (pp. 14-29).*
www.irma-international.org/article/channel-identification-and-equalization-based-on-kernel-methods-for-downlink-multicarrier-cdma-systems/133393

Modelling Website Stickiness at Initial Encounters
Jasmine A.L. Yeap, T. Ramayahand Azizah Omar (2016). *Encyclopedia of E-Commerce Development, Implementation, and Management (pp. 299-309).*
www.irma-international.org/chapter/modelling-website-stickiness-at-initial-encounters/148967

Consumer-Brand Engagement With E-Commerce Market Place Brands
Pankaj Kumar Mohantyand Dipanjan Kumar Dey (2020). *Journal of Electronic Commerce in Organizations (pp. 21-37).*
www.irma-international.org/article/consumer-brand-engagement-with-e-commerce-market-place-brands/257193

Internet Commerce and Exporting: Strategies for Electronic Market Entry
Munib Karavdicand Gary D. Gregory (2001). *Internet Commerce and Software Agents: Cases, Technologies and Opportunities (pp. 24-42).*
www.irma-international.org/chapter/internet-commerce-exporting/24606