Rotating Banner Advertisements on the World Wide Web

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INTRODUCTION

Advertising spending on the Internet has soared. Indeed, by some accounts, Internet advertising is projected to reach $23.5 billion by 2005 (eMarketer, 2002). Although there are several ways of advertising on the Internet, for example, buttons, banners, paid links, superstitials, and so forth, banner advertising is the most common form of advertising on the Internet (Meland, 2000). Advertising using banners (usually placed near the top of a page) is currently the most popular form of online advertising. Banners may be static (stationary) or dynamic (rotating). In the case of static banners, all visitors to a particular site are exposed to the same banner. In contrast, dynamic banners describe cases where ad servers to a particular site deliver different banners to different clients/visitors. This approach presents the possibility of time/space sharing among different advertisers.

This article discusses one particular type of dynamic/rotating banner advertising. Specifically, we present a model to deliver and track the effectiveness of dynamic rotating banner advertisements. The advertising is dynamic in that different banners may be delivered to different users, and it is rotating in that each user (depending on the length of time spent at that site/page) will be exposed to multiple advertisements. These banners may be from a single advertiser (different executions of an ad) or from different advertisers. The latter allows for better space/time sharing and cost effectiveness.

Rotating ads provide the ability to deliver multiple ads to users by associating many ads with a single Web page. Most Web sites have popular pages that users visit often. Rotating banners allow companies to deliver more than one advertisement for these pages, thereby increasing their yield from the page.

Measuring click-through, that is, clicking on an ad banner, has been and remains important in assessing the effectiveness of online advertisements. Research has shown that there are many factors that influence peoples' click-through behaviors (Cho, 2003a). For example, many banner-related factors, for example, the size of the banner, location of the banner, and dynamic animation (Razzouk & Seitz, 2003) and other individual factors, for example, person's involvement with the product/service being advertised (Cho, 2003b; Yoon, 2003) determine the effectiveness of banner ads on the Internet. For example, Cho (2003b) confirmed that while people whose involvement is low are generally less likely to seek additional information, they are also more likely to be influenced by ad-related factors.

However, of late, click-through rates have been declining (Dreze & Hussherr, 2003). This disturbing trend has caused advertisers to think about ways in which click-through rates may be improved. Recent findings suggest that advertisers may be able to reverse the trend by using rotating and dynamic banner advertisements. For example, Chatterjee, Hoffman and Novak (2003) found that there is significant heterogeneity in consumers' click-proneness to banner advertisements and that there are significant gains from repeated exposures to banner ads – but mainly for consumers who are not otherwise click-prone. In addition, consumers who are more involved with the product are more likely to click than those who are not (Cho, 2003b). Such findings might suggest that rotating (rather than static) banner ads, which allow for space/time sharing enabling multiple exposures to messages from multiple advertisers, may be an effective way to improve click-through rates and effectiveness of banner advertisements. Recent experimental evidence also confirms that the level of attention and message recall or association of banner advertisements is also a function of position (i.e., top versus bottom) and graphics (Razzouk & Seitz, 2003).

BACKGROUND

Review of Web Advertisement Models

The process of advertising on the Web consists of two parts: delivery of advertisement to a client computer using the Internet, and tracking effectiveness of the delivered

advertisement. There are two basic types of advertisement delivery models: delivery-focused and measurement-focused. Delivery-focused models emphasize the advertisement delivery method and do not have the ability to track effectiveness of the advertisement. Measurement-focused models use modified advertisement delivery mechanisms that help in measuring effectiveness.

We consider two delivery-focused models: the static ad model and the dynamic ad model. In the static ad model, when a user requests a page, the Web server responds with the requested page. The page has content and HTML code to insert a banner image into the Web page. This banner image is the advertisement. A server finds the requested banner image for the Web page. The page content and banner image are then transmitted to the user's computer, that is, the client, over the Internet. A Web server log records transfer of the content page as a "hit" in the server's log. When an ad file is sent out to the client, the server also records that the user's browser successfully downloaded the advertisement. In this model each page has only one ad associated with it and this ad is changed in batches, either once per day or once per week.

The dynamic ad model is very similar to the static ad model described previously. In addition to the Web server, there is a separate server called an ad server that stores all the banner advertisements that are delivered to the client. The ad server also has special software that makes a decision regarding which ads should be served to the client or user. A summary of delivery-focused models is provided in Table 1.

We consider two measurement-focused models. The first, cache-measurement, "allows for the appropriate measurements of ads stored and provided from cache by a proxy server or browser, as well as those ads actually provided by the ad server" (Bennett 1998). The second, browser measurement, allows for the recording of ad-related activity using software (e.g., Java) that runs on the requesting browser. A summary of the measurement-focused models is provided in Table 2.

Static and Rotating Banner Advertisements

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Static banner advertisements are defined as those in which the banner space is utilized by a single advertiser, whose banner appears along with a Web page through the duration of client's visit. Each such ad provides a link with the advertiser's home page via a "button". We should note that the term *static* simply refers to the fact that the ad belongs to a single advertiser. However, each ad may include moving or animated elements (text, graphics, or both) and other features that attempt to draw attention to the ad.

In contrast, *rotating banner advertisements* refer to ads belonging to different advertisers that can share the same banner space for the duration of the page visit. That is, two or more advertisements appear in succession on the user's screen in the same banner space. Each ad appears on the user's screen for a predetermined duration, and is then replaced by another ad belonging to a different advertiser. This "rotation" continues as long as the page is displayed on the user's screen. Furthermore, similar to static ads, each ad in the rotation provides a link to the advertiser's page for the duration of display.

FUTURE TRENDS

A Framework for Delivery and Tracking of Rotating Banners

In this section we develop a theoretical framework to examine how rotating banner ads may be delivered and evaluated. Figure 1 shows the proposed framework for the delivery and tracking of rotating banners.

The proposed system consists of two components: ad delivery and ad tracking. The following sections describe each in turn.

Table 1. Delivery focused models

Model	Content Delivered by	Ad Delivered by	Delivery Mechanism
Static Ad Model	Web server	Web Server	One ad associated with each page. These ads are changed in daily or weekly intervals.
Dynamic Ad Model	Web server	Ad server	Different ads are dynamically associated with each page. This can be done based on the user.

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