Paid Search

Bernard J. Jansen
The Pennsylvania State University

> With paid search, the content provider, search engine, and user have mutually supporting goals.

For many people, Web search engines are now the primary method for finding information, news, and products (www.digitalcenter.org/pdf/Center-for-the-Digital-Future-2005-Highlights.pdf). Consequently, both researchers and the media have focused considerable attention on the speed, accuracy, and efficiency of major search engines such as Yahoo!, Google, MSN Search, and AOL.

However, paid search—an increasingly important, popular, and uniquely contextual form of information interaction on the Web—has thus far attracted less interest.

With paid or sponsored search, content providers pay Web search engines to display sponsored links in response to user queries alongside the algorithmic links, also known as organic or nonsponsored links. This mechanism plays a critical role in financing the nonsponsored links upon which so many users now rely.

A distinctive type of information push and pull, paid search also is increasingly important in locating data on the Web. Because of the uniquely dynamic contextual interplay among content providers, search engines, and users, paid search offers numerous unique benefits.

ORIGINS AND IMPACT

Bill Gross of Idealab (www.idealab.com) is credited with creating the paid-search paradigm in 1998 with the launch of GoTo.com, which later became Overture and is now Yahoo! Search Marketing. Google developed its own paid-search technology, AdWords, over which it settled a patent infringement lawsuit with GoTo.com in 2004. These two entities account for the majority of paid-search traffic today.

The economic impact of paid search is immense. In 2004, paid search was an $8 billion industry and already vital to the success of most major search engines—for example, 99 percent of Google's revenue came from advertising, while Yahoo! received 84 percent of its income from paid ads (Terry McCarthy, "Yahoo! Goes to Hollywood," *Time,* 21 Mar. 2005, pp. 50-53).

In 2005, paid search generated $10 billion globally, a figure that is expected to soar to $55 billion by 2010 (www.clickz.com/news/article.php/3574876).

Although no published studies are currently available on the effectiveness of paid search, anecdotal evidence suggests that sponsored results are just as relevant as nonsponsored results for search queries—if true, an amazing feat for a model less than a decade old. Without a doubt, paid search is now, and will be for the foreseeable future, the primary business model for Web search engines.

A DYNAMIC PROCESS

Satisfying both Web searchers' desire for relevant information and providers' desire for targeted traffic to their Web sites has become increasingly complex. However, the core elements of paid search have remained essentially the same throughout its development:

- *provider content*: a set of keywords associated with concepts along with the associated URLs, titles, and descriptions;
- *provider bids*: bids for specified keywords that are a monetary valuation of traffic to a particular Web site;
- *search engine review process*: a method to ensure that advertiser content is relevant to the targeted keyword;
- *search engine keyword and content index*: a mechanism that matches provider keywords to user queries;
- *search engine user interface*: an application for displaying provider content as links in rank order to a searcher; typically, the interface displays the sponsored links with nonsponsored links;
- *search engine tracking*: a means of matching keywords to queries, gathering provider content, handling bids, metering clicks, and charging providers based on searcher clicks on their displayed links; and
- *searcher*: a person or agent that clicks on a sponsored link deemed to be relevant.

Figure 1 illustrates the dynamic relationship among these elements in the paid-search process.

Keywords

Content providers develop terms and search phrases composed of keywords that

- searchers are likely to submit,
- are applicable to the providers' Web content, and
- will link such content to searchers' underlying intent.

They also tailor the presentation of search results to conform to the targeted queries, possibly with several variations linked to particular sets of queries.

Content providers pay the search engines to present their tailored Web results whenever a searcher submits one of these terms and clicks on the link. The provider can tailor this matching algorithm from exact targeted matches to very loose matches to account for various spellings and misspellings as well as term usage. The search engine matches the searcher's query to the keywords that correspond to the provider's bid.

Auctions

The content providers pay the search engine via a bid on the keyword. However, multiple providers might want to pay a search engine for the same term or phrase. In these cases, an electronic auction handles ranking, typically in descending order according to the bid amount.

Search engines also factor other elements into their ranking scheme, such as which sponsored link receives more clicks. This helps prevent search engines from presenting less relevant content to the searcher solely for profit. In practice, though, the links with the most clicks generally produce the most revenue. All participants in the paid-search process thus have a monetary incentive to strive for relevant content.

The more providers want to display their links in response to a term or phrase, the higher the minimum and maximum bids. Usually, the minimum bid on any keyword is about 10 cents—that is, the search engine gets this amount from the provider every time a searcher clicks on a sponsored link presented in response to the keyword that the provider bid on.

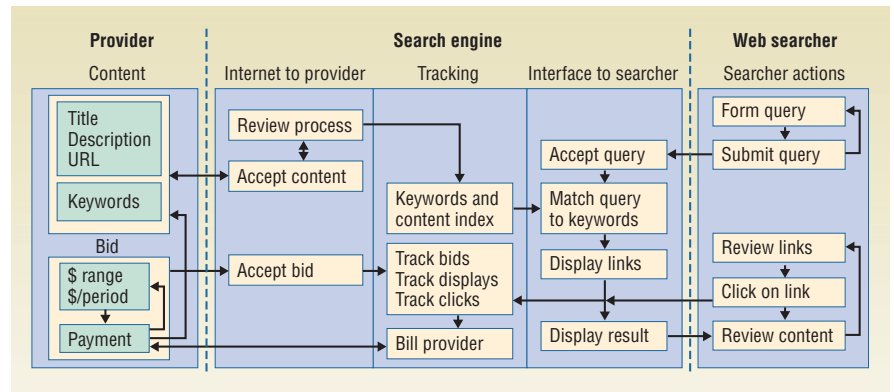For competitive markets, the bids can get much higher. According to

TopPayingKeywords.com, the most expensive keyword phrase at the close of 2005 was "Chicago personal injury attorney" at $50 per click, closely followed by "mesothelioma" at $42.57 per click.

From the content provider's viewpoint, electronic paid-search auctions are a mathematical optimization problem. Bidders might face hundreds to thousands of keywords that need to be priced. Bids aren't static, so content providers must be ready to change their bids quickly to exploit changes in consumer behavior and react to the competitive environment. For this reason, researchers are developing complex machine-learning algorithms that more efficiently weigh risks and attain maximal returns.

Searcher actions

When a searcher submits a query, reviews the sponsored links, and clicks on a link, the searcher's browser displays the provider's Web page that the link points to. The search engine tracks this click and all others within a given period; at the end of this period, it bills the provider and provides various statistics concerning the provider's campaign.

Based on these statistics, providers can choose to alter bids, maximum costs per period, and keywords in real time. They can also change terms or phrases, the price they're willing to bid, the degree of term matching, and even the price they pay in a given period. In this way, content providers become

active participants in searchers' information-seeking process.

BENEFITS

Most advertising models measure the cost of an advertisement based on how often and when it is shown. For example, broadcasting an ad several times during the Super Bowl will cost considerable money, while showing the same ad once on a local TV station at 2:00 a.m. on a Tuesday will be relatively cheap. However, there are no reliable mechanisms for translating this "cost per impression" into sales.

In contrast, paid search makes it possible to measure how many people viewed a link as well as how many "came to the store," or clicked on the link. It's also possible to measure the number of users who executed a transaction or took an action on the Web site.

Another benefit of paid search is that the content provider, search engine, and user have mutually supporting goals. As in most forms of online searching, the user has some information need bounded by cognitive and situational factors, while the search engine must service relevant content to the user. What makes paid search unique is that the content provider seeks via keyword selection to determine the user's underlying intent and attach some monetary value to it.

Suppose, for example, a user searches for "digital camera." While content containing this expression

Figure 1. Paid search on the Web is a dynamic process involving numerous participants and goals.

might be relevant, a standard search mechanism doesn't address the reasons underlying the query: Is the user getting ready for a vacation, taking up photography as a hobby, or looking for a gift for someone special?

Paid search enables the content provider to make these connections. The drive to understand the searcher's intent and algorithmically tie it to content is what separates paid search from traditional forms of metatagging that focus solely on elements such as author, topic, creation date, and content terms.

For users, paid search also significantly reduces the spam that often accompanies organic results. Providers have a cost incentive to present relevant content, and search engines have both automated and manual review processes to facilitate this process.

Despite the many benefits of paid search, concerns remain. One of the fastest growing online problems is *click fraud*, which involves clicking on sponsored links—either manually or via automated software—without any intention of making a purchase. Perpetrators seek either to deprive a rival of advertising funds or to direct phony traffic to a Web site to boost pay-per-click revenue.

Nevertheless, the appeal of paid search appears to be growing. The major search engines continue to expand the basic model, linking paid search to other information media such as telephony and television. For example, both Yahoo! and Google provide campaign management tools that permit providers to synchronize paid search with other online advertising campaigns.

This cross-medium linkage can significantly increase the synchronization of information pull and push, providing more relevant content to the searcher. Certainly, the goal of all involved is to get the right information to the user at the right time and in the right form. ■

Bernard J. Jansen is an assistant professor in the College of Information Sciences and Technology at The Pennsylvania State University. Contact him at jjansen@acm.org.