Chapter VIII
Search Engine Performance Comparisons

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ABSTRACT

This chapter reports the results of a project attempting to assess the performance of a few major search engines from various perspectives. The search engines involved in the study include the Microsoft Search Engine (MSE) when it was in its beta test stage, AllTheWeb, and Yahoo. In a few comparisons, other search engines such as Google, Vivisimo are also included. The study collects statistics such as the average user response time, average process time for a query reported by MSE, as well as the number of pages relevant to a query reported by all search engines involved. The project also studies the quality of search results generated by MSE and other search engines using RankPower as the metric. We found MSE performs well in speed and diversity of the query results, while weaker in other statistics, compared to some other leading search engines. The contribution of this chapter is to review the performance evaluation techniques for search engines and use different measures to assess and compare the quality of different search engines, especially MSE.

INTRODUCTION

Search engines, since their inception in the early to mid-1990, have gone through many stages of development. Early search engines were derived from the work of two different, but related fronts. One is to retrieve, organize, and make searchable the widely available, loosely formatted HTML documents over the Web. The other is then-existing information access tools such as Archie (Emtage, 1992), Gopher (Anklesaria et.al. 1993), and WAIS (Kahle, 1991) (Wide Area Information Servers). Archie collects
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information about numerous FTP sites and provides a searchable interface so users can easily retrieve files through different FTP sites. Gopher provides search tools to large number of Gopher servers on the Internet. WAIS has similar functionality to that of Archie, except that it concentrated on wide variety of information on the Internet, not just FTP sites. With the fast development of Web, search engines designed just for the Web started to emerge. Some of the examples include WWWW (World Wide Web Worm), then-most-powerful search engine AltaVista, NorthernLight, WebCrawler, Excite, InforSeek, HotBot, AskJeeves, AlltheWeb, MSNSearch, and of course, Google. Some of these search engines disappeared in history; others were re-tooled, re-designed, or simply merged; yet others have been able to stay at the front against all the competition. Google since its inception in 1998 has been the most popular search engine mostly because of its early success in its core algorithm for search, the PageRank algorithm (Brin & Page, 1998). Search engines today are generally capable of searching not only free text, but also structured information such as databases, as well as multi-media such as audio and video. Some of the representative work can be found in (Datta et al., 2008) and (Kherfi et al., 2004).

More recently some academic search engines start to focus on indexing deeper Web and producing knowledge based on the information available on the Web, e.g., the KnowItAll project by Etzioni and his team, see for example (Banko et al., 2007). In a relatively short history, many aspects of search engines including software, hardware, management, investment and others have been researched and advanced. Microsoft, though a later comer in the Web search business, tried very hard to compete with Google and other leading search engines. As a result, Microsoft unveiled its own search engine on November 11th, 2004 with its Web site at http://beta.search.msn.com (Sherman, 2005). We refer to it as MSN in this discussion. The beta version of the search has since evolved to what is now called Live search engine (http://www.live.com). This chapter reports the results of a project attempting to assess the performance of the Microsoft search engine when it was in its beta version from various perspectives. Specifically the study collects statistics such as the average user response time, average process time for a query reported by MSE itself, the number of pages relevant to a query, the quality of the search in terms of RankPower, and comparisons with its competitors. The rest of the chapter is organized as follows: Section 2 provides an overview of search engine performance metrics. The goals and the metrics of this study are described in Section 3. Section 4 discusses the method of study and the experimental settings, followed by the results and their analysis in Section 5. Our thoughts and conclusions about the study are presented in Section 6.

PERFORMANCE METRICS FOR WEB SEARCH ENGINES

While user perception is important in measuring the retrieval performance of search engines, quantitative analyses provide more “scientific evidence” that a particular search engine is “better” than the other. Traditional measures of recall and precision (Baeza-Yates 1999) work well for laboratory studies of information retrieval systems. However, they do not capture the performance essence of today’s Web information systems for three basic reasons. One reason for this problem lies in the importance of the rank of retrieved documents in Web search systems. A user of Web search engines would not go through the list of hundreds and thousands of results. A user typically goes through a few pages of a few tens of results. The recall and precision measures do not explicitly present the ranks of retrieved documents. A relevant document could be listed as the first or the last in the collection. They mean the same as far as recall and precision are concerned at a given recall value. The second reason that recall