

Customizing information for engineers

Claire Hill & Gulcin Cribb

The University of Queensland Library
Queensland, Australia

The information resource landscape is diversifying with print resources constantly being converted to electronic formats. Technology, in particular the Internet, has become a common medium for communication, data storage, flexible delivery of courses, and even entertainment. Engineers and researchers are exposed more than ever to the 'convenience' of technology. They have high expectations of search engines and tools. However, recent research has found that traditional search engines are too generic and do not categorise sites efficiently. Subject gateways offer discriminating search facilities that provide efficient and rapid access to quality and relevant resources. This paper will outline the nature and role of the Australasian Virtual Engineering Library (AVEL), an engineering subject gateway, in supporting the information and research needs of engineering professionals in the Asia-Pacific region. AVEL is a subject gateway to provide engineers & IT professionals in universities, research organisations and industry with rapid and efficient access to relevant and quality Australasian materials on the Web. It provides an easy means of indexing and publishing their work on the world wide web, and increased exposure of their work and R&D capacity worldwide.

BACKGROUND

Keeping pace with knowledge is a challenge. Finding resources on the Internet using traditional tools is becoming increasingly difficult and time consuming. The biggest factor in this is that there is no formal structure to the web. It is chaotic and has grown to become unmanageable. This has a strong impact on accessibility of a vast variety of resources. Imagine a library with over a million books, journals, videos, maps or computer files without a system of organisation. Without a library catalogue and classification structure, how would you find the information you need? The phenomenal growth of the Internet is also an obstacle to resource discovery. The number of webpages available is increasing daily. Lawrence and Gillies found in a recent study of the internet that there are currently over 800 million publicly-accessible sites [1]. It is not practical to know the existence of every web-based resource available on a particular subject. With rapid growth and the nature of publishing on the Internet, the issue of quality is significant. There are no standards for publication and the fact that the medium is dynamic complicates access. Web sites are constantly changing, or moving from one location to another.

FINDING ENGINEERING INFORMATION ON THE WEB

The majority of web-users use search engines to locate sites of interest. Scanning a list of sites is also a popular means of accessing web-based information. The search engines find resources by sending computer programs onto the Web. The programs that look for new sites to include in the search engine database do not discriminate between geographic region, subject area, user level or type of website. This results in the accumulation of an enormous amount of sites indexed in the database spanning a range from extremely useful to bizarre.

With the challenges facing web-based publishing such means of access are fast becoming outdated. Take, for instance, search engines. Recent research has revealed that eleven of the most popular engines (Northern Light, Snap, AltaVista, HotBot, Microsoft, InfoSeek, Google, Yahoo, Excite, Lycos, & Euroseek), each index less than 16% of the Web (with respect to the estimated size of the web) [2]. In their attempt to cover all disciplines, search engines fail to cover even a quarter of the publicly available resources on the internet.

Other research on search engines has exposed a lack of maintenance. Greg Notess compares the performance of search engines each month on his personal webpage. In September 1999, ten of the most popular search engines (HotBot, Google, Lycos, Fast, Anzwers, Yahoo/Inktomi, InforSeek, Northern Light, & Excite), contained between 7%-31% dead links [3].

A small study was undertaken, by the authors of this paper, to compare the performance of search engines, subject gateways and subject specific lists of links. The methodology for the study involved executing identical search strategies on the following tools: EELS – Engineering Electronic Library Sweden, EEVL – Edinburgh Engineering Virtual Library, ICE – Internet Connections for Engineers, YAHOO, ALTAVISTA, HOTBOT. The aim of the exercise was to determine the coverage of each tool in terms of Australian content, the relevance of the sites retrieved to the search string entered, and the quality of the record. The study found that these tools are inefficient for finding Australasian engineering resources. There are also various discrepancies between the tools.

Table 1 represents the number of results returned for specified searches on each tool. As can be seen, the gateways retrieve

significantly less results to search engines. This is due to the fact that the gateways are subject specific and only list engineering resources within a particular geographic region. The search engines, however, do not have such a rigorous selection criteria and tend to gather any sites, regardless of subject. With reference to the number of records listed in each tool and the inclusion of Australian content, finding Australian engineering related sites is difficult. Some tools retrieve too few results and others too many.

The quality of the results in terms of their relevance to the search strategy is varied (the broad nature of the search may have affected this conclusion), however, it appears that search engines are more inconsistent. Figure 1 is an example of the search "robotics and australia" entered into the search engine, AltaVista. The first four results shown are US-based sites. Only one mentions the word "Australia" in the description of the site.

The descriptions of the sites within the search results differed between search engines and gateways. The search engines studied only provide a brief description of the site, whereas gateways use metadata schemas to categorise the information and resource contained within the site. This leads to the user being able to determine the relevance of the site without having to link to the site from the search results. A comparison of the displayed classification scheme follows. It must be noted that the description of the site produced by the search engines are merely the first sentences of the site itself. Gateways, on the other hand, are produced with human intervention and the descriptions are composed generally by subject specialist librarians or experts in the field.

ENGINEERS AND THEIR USE OF INFORMATION

In addition to the vast quantity of freely available web-based resources, there is a range of electronic information sources available to engineers for a fee for subscription. Databases such as Ei Compendex, INSPEC and the Australian-based ENGINE provide bibliographic information. Other important sources of information are the Australian Engineering File, patents, standard and technical reports. Resource discovery can be difficult, frustrating and time consuming in terms of locating, connecting and selecting quality resources.

In his article on the information seeking habits of engineers, Thomas Pinelli reports that engineers have defined information seeking behaviour. In selecting an information source, the decision is based on minimizing loss in terms of "effort (either physical or psychological, which must be expended in order to gain access to an information channel" [4]. Further, the accessibility of information is the most important factor influencing an engineers decision to process that information. Particularly for engineers working in industry, colleagues and informal networks are popular starting points for producing or designing a product, process or system.

The Australasian Virtual Engineering Library recently held a pilot focus group session with a cross-section academic staff and postgraduate students from the University of Queensland. The objective of this session was to determine the information seeking needs of the target audience and then accommodate

these needs within AVEL. The importance of locating expertise and contact information for colleagues was expressed. A critical component of engineering research is keeping up-to-date with breakthroughs and the discoveries of groups undertaking similar research.

A focus group session was also held by The University of Queensland Library to determine the information needs of high achieving, new academic and research staff. During this session, the need for personalized information services was revealed. Researchers are overwhelmed by the amount of information and need to locate reliable information in an efficient and personalized manner.

The trend towards personalized or customized web-based services is gaining increasing acceptance in both for profit and non-profit services. It has emerged in reaction to the mass of information available on the web. Personalized information services allow individuals to create a tailored version of an information source. This means that depending on individual preferences, a service can provide as little or as much information as required by individual users. Examples of these services can be seen in technologies such as MyYahoo, MyLibrary, or MyGateway.

SOLUTION - SUBJECT GATEWAYS & AVEL

Engineering information-rich gateways provide a solution for finding selected high quality engineering information on the web. While subject gateways do not offer individual customized services to users, a gateway acts as a filter to the wealth of information provided on the Web. In this sense gateways are customized to communities with defined areas of subject interests. As users, engineers do not need to sift through thousands of retrieved results retrieved. When using a gateway such as the Australasian Virtual Engineering Library (AVEL), Edinburgh Engineering Virtual Library (EEVL) and Electronic Engineering Library Sweden (EELS), engineers can be assured that the information is relevant to their needs.

The Australasian Virtual Engineering Library (AVEL) is a gateway to quality Australasian engineering and IT resources on the web. AVEL has been established from initial funding from the Department of Employment, Training and Youth Affairs. It is a project involving several partners institution who have contributed financially and in-kind to the project. AVEL is a unique national partnership between the library community and the engineering academic and professional communities. The partner institutions are:

- The University of Queensland
- The University of New South Wales
- The University of Melbourne
- Queensland University of Technology
- Monash University
- The Institution of Engineers, Australia
- Distributed Systems Technology Centre
- Centre for Mining Technology and Equipment

AVEL is also working in collaboration with the National Library of Australia and the Edinburgh Engineering Virtual Library (EEVL).

AVEL draws together a range of quality engineering resources into a single database. This database is available to search and browse from the AVEL website (<http://avel.library.uq.edu.au>). The aim is to develop AVEL as the first port of call for quality Australasian engineering and information technology resources on the internet.

The value of gateways lie in the human intervention in the process of creating the database. The user perspective is important to the success of the AVEL project. Engineers, engineering educators, and subject specialist librarians are involved in the process of creating the records in the database. It is the role of the engineers and engineering educators to select sites that are eligible for inclusion in the database. Some provide brief reviews of the site chosen to be included in the record. The process of selecting resources means that those resources which are deemed to be not of a quality standard are not included. The resources that are included in the database, while not comparable to those included in search engines in terms of quantity, are extremely relevant to the target users. With a small database that is bound by subject specificity, it is much easier to find relevant resources.

The AVEL organises sites using a metadata schema. Metadata is defined by Taylor as "structured data which describes the characteristics of a resource... a metadata record consists of a number of pre-defined elements representing specific attributes of a resource, and each element can have one or more values" [5]. The metadata used by AVEL and other gateways is based on the Dublin Core standard. Using a similar infrastructure means that interoperability and cross-searching between gateways can be achieved.

CONCLUSION

In conclusion, it is evident that search engines are no longer sufficient tools for locating engineering and related information on the web. Gateways are now leading tools for resource discovery.

As the AVEL gateway develops, more quantitative and qualitative methods will be used to understand information needs of engineers and to ensure AVEL meets these needs. The findings from these sessions and the feedback provided by users via the webpage is critical to the ongoing provision of quality information and to the sustainability of AVEL. AVEL has the potential to become the tool of choice for Australasian engineers and IT professionals. With the input of the engineering community, developing a quality, useful and comprehensive tool is achievable.

The AVEL webpage can be found at:
<http://avel.library.uq.edu.au>

REFERENCES

1. Lawrence, S. & Lee Gilles, C., Accessibility of information on the web. *Nature*, 400, 8July 1999, 107-109 (1999).
2. Lawrence, S. & Lee Gilles, C., Accessibility of information on the web. *Nature*, 400, 8July 1999, 107-109 (1999).

3. Notess, G.R., *Search Engine Showdown: The user's guide to searching the web*. [Online] <http://www.notess.com/search/> [Date accessed: 22 September 1999] (1999).

4. Pinelli, T.E., The information-seeking habits and practices of engineers. in Cynthia Steinke (ed.) *Information seeking and communicating behaviour of scientists and engineers*. New York: The Haworth Press, 14 (1991).

5. Taylor, C., An introduction to metadata. [Online] <http://www.library.uq.edu.au/iad/ctmeta4.html> [Date accessed: 11 November 1999] (1999).