Spinning a Userful Weblet

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weblet: a highly interconnected portion of the World Wide Web devoted to a particular end, usually maintained by a single individual or organization and located at a single site.

Introduction

The WWW is a marvelous medium, but in spite of rapid improvement, the content leaves something to be desired. Our research group has addressed three content related deficiencies: 1. lack of technical depth, 2. disorganization, and 3. few educational materials on traditional subjects. We briefly discuss each item, what we've done about it, and examine usage statistics gathered by our Web Server and custom software.

Content

1. **Technical Depth.** The bulk of the world's technical literature is not accessible via the Web. Our part of a solution is to place all of our research results, approximately 100 technical reports, on line. We hope this activity will be replicated by research institutions everywhere, each supporting an area of expertise, to create a complete and utilitarian web of instantly accessible, interconnected knowledge.
2. **Disorganization.** Because the Web is developed anarchically, organization is weak. However, anyone can create an organizational structure with links to source materials. We maintain three structural pages for the Web:
   - the Annotated Scientific Visualization Weblet Bibliography with links to all the relevent weblets we are aware of. Each entry is annotated with a few comments to give the user some idea of what to expect if a link is followed. An annotated bibliography is more work than a simple pointer page, since the author must actually examine and judge the weblets to which the page is linked.
   - the Web Weavers page contains links to pages with information useful to those developing weblets. This page has been available for about three months.
   - the K-12 online educational resources page has links to a wide variety of K-12 educational resources. This page is about two months old and, as one might expect, is difficult to keep up-to-date. NASA intends to expand this page to be a major central resource for K-12 educators.
3. **Educational Materials.** The Web is well-suited to delivering educational materials, but there is a gigantic need for content. Teachers are an obvious resource to develop these materials, and teachers are often available in the summer. Thus, we hired two high school teachers this summer to develop educational Web pages related to computational aerosciences. Only one of them has finished. This atmospheric ozone hole page is meant to teach high school students the important field of atmospheric ozone chemistry.

Statistics

To see how successful (or otherwise) these offerings are, usage statistics were gathered from our WWW server and custom software and graphed in the figure. These data were massaged to eliminate obvious sources of error. For example, home page accesses were subtracted from the total html accessses because the home page is accessed every time anyone starts up Mosaic at our large facility.

Note the strong upward trend in total accesses and unique hosts, with a particularly strong acceleration around May. This may reflect placing the last of the technical reports on line and, later, new users as the Web Weavers and K-12 pages became available. Overall Web traffic was also up and may have accounted for some of the increase.

The biggest surprise is interest in technical papers. Although we expected minor interest in these reports, they are requested approximately 1000 times per month. These accesses are for the full papers, not just abstracts. In contrast, over the last six years only a few hundred paper copies of these reports have been sent out to requesters, although many of the reports have been published in journals and conferences. We cannot know how many people actually read the reports gathered electronically, or how many read the reports in the standard literature, but it is quite clear that WWW publishing is much superior to sending out paper copies of technical reports on request. Specifically, more reports are delivered to more users with much less manpower and fewer dollars. Printing, envelope stuffing, and mailing are eliminated, and users can find the reports via net surfing.

The Annotated Scientific Visualization Weblet Bibliography has a very stable access pattern -- 850 (mean) accesses per month for the last eight months with a standard deviation of 71. For reference, about 350-500 people attend the annual IEEE Visualization conference. Our page has apparently captured the 'market' for a scientific visualization jump page. Most of the scientific visualization community is on the Internet. This community is not growing much, which the stable statistics reflect.

As might be expected, the Web Weavers and K-12 education pages are very popular, with skyrocketing access statistics. Note that almost identical numbers for the last two months cause the lines to overlap. With increases in WWW use and more schools coming on line, we expect access to these pages to increase rapidly.

The atmospheric ozone hole work received 121 accesses the first month it was available but only 19 the next. This usage suggests that a great deal of work is necessary to make much of an impact by developing new materials.

Future Work

Beyond expanding current efforts, there are a few new avenues we would like to persue:

- Web access for students at K-12 schools in the local telephone calling area. The school supplies a PC, modem and phone line (which many have), and we provide a network server that only allows WWW access. Other facilities, e.g. email, will not be provided so as to reduce support requirements and avoid competition with private providers. Since we already have fast network connections, the additional hardware needed is quite inexpensive, but minimizing support costs is difficult and may scuttle the concept. If successful, this project will provide a bridge between now and a future where high speed data pipes will (we hope) connect schools to the world.
- Online technical journals. The cost and number of technical journals is growing rapidly. This is straining library budgets and some libraries have had to drop journal subscriptions. Online journals require only disk space, a network connection, and a running computer to be available around the world, although indexing issues need to be worked out. Such journals require the same rigorous editing and reviewing paper journals enjoy; otherwise, online journals will acquire a reputation for sloppy, low-quality work. Such reputations are difficult to lose.

Conclusion

The Web is a superb means of disseminating technical information to a large audience at low

cost. Also, pages with links in a specific subject area seem to find broad acceptance very quickly and provide significant utility, although they must constantly be kept up to date. Finally, developing textbook-like K-12 educational materials will require a sustained and large effort to provide significant utility.

Access to NAS
WWW server in 1994

Accesses

| | 30000 | 27000 | 24000 | 21000 | 18000 | 15000 | 12000 | 9000 | 6000 | 3000 | 0 |

total html

K-12 and web
weavers overlap

K-12

unique hosts

web weavers

tech reports

Al Globus

visualization

jan feb mar apr may june july aug sept