Collaborative Information Networks

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Abstract

In a proposed Collaborative Information Network (CIN) individuals could monitor and index a limited number of information sources and share the results with others in the network thus increasing their efficiency. Background research into developing a model for implementing Collaborative Information Networks is presented. A Collaborative Information Network on the topic of International Careers and Employment is used to describe current research and development. After that Future Networks, and Collaborative Research are discussed. To illustrate collaborative research an example of how a Collaborative Information Network could be developed by participants at CSCL95 is given.

Keywords — Collaborative Information Networks, Educational Networks, Cooperative Searching.

1. Introduction

It is proposed that the collaborative monitoring, indexing and disseminating of information is more efficient than the current practise of individual monitoring. Individuals in a collaborative network would monitor and index a limited number of information sources and share the results with others in the network. This would allow the collective monitoring of more sources of information, than possible by individual monitoring.

The indexing of information according to its usefulness to other users in the network would save time monitoring information of little or no use. The common index developed would eliminate the need for a variety of systems to obtain an overview of information from a variety of sources and/or in different formats. The index would be especially useful for viewing short clips of multimedia and audio-visual material before reviewing the entire package. Further development of the index could provide a comprehensive system for direct access to information from a variety of sources.

In a collaborative system (such as Internet) information sharing patterns, tools and systems, are user and standard dominated. In centralized systems (such as Compuserve) information sharing patterns, tools and

systems are economically and system dominated. It is proposed that collaborative network tools and information networks can be developed, which will compete and surpass the effectiveness of centralized systems. "Without tools and methodologies for gathering, evaluating, managing, and presenting information, the Web's potential as a universe of knowledge could be lost. ... A flood of information unfiltered by the critical and noise-reducing influences of collaboration and peer review can overwhelm users and obscure the value of the Web itself." [1].

In summary, individuals participating in a collaborative network should be able to improve both the quantity and quality of the information they monitor. Users in a collaborative network will have more influence on information sharing patterns, tools and systems than in centrally controlled networks. In this paper developing Collaborative Information Networks is discussed in relationship to past, present and future developments.

2. Developing Collaborative Information Networks

The author is currently developing a Collaborative Information Network (CIN) on the topic of "International Careers and Employment". Background to this network is discussed first, then Laying a Network Foundation for the network and last building on this foundation..

2.1. Background

The author has had an interest in cooperative (collaborative) information systems since the early 1970s. In the late 80s he did research in China which resulted in "A Model for Implementing Cooperative Information Systems in Chinese Academic Institutions" [2]. Although several factors were considered in developing the model, the emphasis was on cultural and social factors [3].

Further research and collaboration resulted in "A Model for Implementing a Cooperative Multimedia Information Network"... This model assumes four stages to the innovation process: Needs Analysis, Initiation, Implementation and Outcomes" [4]. The above is pre-

sented as background to a discussion on current efforts to develop a Collaborative Information Network.

2.2. Laying a Foundation

The author proposes to use existing technology and information, to begin a CIN (Collaborative Information Network) at the university of Alberta. Then once the network is established it will be opened up to the Internet community. Initial searches of the university library and Internet, indicate that the best general Canadian source of information on International Careers and Employment is a newly released second edition of a book. This book has good indexes to selected bibliographies and organizations. These indexes, bibliographies, and organizational lists could serve as foundation indexes and lists for new information. All bibliographic information in the book is recommended, most items have been reviewed and some items are designated as "editor's choice". This recommendation and review process can be used as a model for future additions to the network. Excerpts from the book are already available through the International Center's W3 (World-Wide Web) home page. One concern in putting the book on line is intellectual property rights. This concern needs to be carefully considered by W3 [5] and CIN developers.

Another source of foundational information is existing information on Internet. An initial search found several job services, one of which was international in scope and has been linked to the W3 pages of the International Center at the University.

In addition to an information foundation, a CIN needs a people foundation. To lay this foundation, the author is recruiting people interested in the topic to be CIN editors. This can involve three types of activities: creating new information, adding new information and updating existing information. It is hoped that these activities will provide a "collaborative filtering" [6] of information according to its usefulness to other users. The International Center at the university has already put their information on Internet and others are considering doing this. It is anticipated that each W3 page will have an editor responsible for the content. Once this foundation of editors and an information structure is in place the network can be opened up to others and new information added.

2.3. Building on The Foundation

As people use a CIN, they can also contribute to its development. Additional information can be added and the location (i.e. local library call numbers) of information items identified. This would be done by sending email messages to an editor. Other items of information may have already been identified. One such item is an "International Career Quotient" test. This test provides a good overview of ones preparedness for an international career. It could also be used as an index to information especially for items on which one

scored low. Another source of information is a local organization which has over 400 audio-visual materials. Initially the catalog to these materials could be made available on Internet. As time and funding permits short review clips from recommended items and full versions of selected items could be added. Another way of finding additional information is the collaborative analysis of cooperative searches [7].

Another source of information is user comments and information from newsgroups. An initial search of "job" newsgroups, did not find any newsgroups dedicated to international employment. Separate sections of the bibliographic index could be used for comments from users and newsgroups. There may also be an advantage to have these comments divided into temporary and permanent categories.

Another way of expanding the network would be to develop "instructional networks" for students studying subjects related to international careers and employment. In an instructional network information could be indexed according to topics listed in the course outline. Each student could be assigned to edit a specific topic. Students could conduct searches, which could be added to the network through student editors. Teachers (Professors, Instructors) could then edit the students work for the next class of students. They could also pass the information on to an appropriate editor from the broader International Career and Employment CIN. As CINs standards and interfaces are developed, it is anticipated that much of the information sharing process would be automated in future networks.

3. Future Networks

What has been described so far in this paper, is the potential for developing CINs using today's technology and information. A brief outline of potential structures, standards, interfaces, and research needed to develop widely used CINs is presented below.

3.1. Structures and Standards

The simple people networks of students, teachers and local editors need to be expanded into national and international networks. This could be done by developing local, national and international coordinating committees. In addition committees need to be set up to handle issues like copyright and network ethics. Central processing facilities need to be set up so that users can locate CINs which are appropriate to their information needs.

Standards for information exchange could be an extension of HTML (Hypertext Markup Language) and other standards for W3 (World-Wide Web). One standard needed is for bibliographic information. Another is for contact information (name, organization, phone, fax etc.). Standard review clips for audio-visual and multimedia materials could be used to save network re-

sources. Other standards could be built into interface tools.

3.2. Interface Tools

Basic interface tools based on existing W3 (Internet) tools like Netscape and Mosaic could be developed for using, linking and editing CIN documents. Some of the W3 tools being developed may be useful in developing CINs. For example, tools are being developed for collaborative authoring [8] guided tours [9] "Navigational View" Building [10] Virtual Classrooms [11] and "A distributed software development environment supporting cooperative work" [12]. In addition to the current features of programs like Netscape, the basic user interface would need features for processing bibliographic and contact information. The interface should also be compatible with other programs so that information stored in CIN format could be used in Word Processors, Fax Programs, databases etc.. Interface tools should provide for personal indexing, storing, and tagging of information.

Users could subscribe to CINs at various levels. Some of the levels which could be specified are: geographical location, recommendation (by editors and other users), content (introductory, advanced, general or specific. CIN users should also be able to order full version of items which are not available online or for which their is a charge. In order, to provide anonymous feedback usage statistics (i.e. did the user print, read, and/or store the information), could be gathered and forwarded to editors. Comments and other information could also be sent to the editor.

The basic editors' interface would have all the features of the basic user interface plus features for editing. Items could be easily added to existing information (point and click on menus). Recommendations could be made either by the editor or from usage statistics and user comments. Advanced editing functions would be done using an advanced editing interface (for editorial committees). Some of these functions would be to approve new groups and editors, to change indexes, to set standards and network practices.

3.3. Collaborative Research

To develop future CINs considerable research is needed. To date most of the research has be conducted by the author. At this stage he is looking for others to collaborate in the research. One way to facilitate collaboration would be to develop a CIN on collaborative networks. Coordinating and standards committees could be set up and editors and users recruited on the basis of their research interest. Another way to further CIN research would be to set up a network on CSCL (Computer Supported Collaborative Learning). CSCL '95 conference proceedings could act as a information foundation. People networks could be set up by using conference "Topics of Interest" to recruit editors and users.

4. Conclusion

In order for CINs to work the collaborative efforts of many people are needed. With tighter budgets and time constraints, will we find the time to work collaboratively? Or will centralized systems dominate the next century so that only the rich have access to the bulk of the world's information. Whether CINs as outlined in this paper or some other system(s) dominate information access in the next century, it is hoped that the relatively free access to information enjoyed by the public (especially the academic community) can be maintained.

Acknowledgments

References

1. December, J. 1994. Challenges for Web Information Providers Computer-Mediated Communication Magazine Vol. 1, No. 6. (October 1, 1994) pp. 8.

2. Ibsen, David, J. S. 1990. A Model for Implementing Cooperative Information Systems in Chinese Academic Institutions. Unpublished doctoral dissertation, University of Toronto.

3. Ibsen, D. J. S. 1991. Factors Affecting Access to Database Services. Paper presented at The 3rd Beijing International Symposium on Computerized Information Management, October 14-18, 1991.

4. Ibsen, D. J. and Lewis J.H. 1993. A Model for Implementing a Cooperative Multimedia Information Network. In Davies, G. and B. Samways (Eds.) Teleteaching: Proceedings of the IFIP TC3 third teleteaching conference, Teleteaching '93, (Trondheim Norway, August 20-25, 1993).

5. Norderhaug, T. Juliet M. Oberding, J.D. 1995. Designing a Web of Intellectual Property. Abstract to a paper in the proceedings of Third International World-wide Web Conference "Technology, Tools, and Applications" (Darmstadt, Germany, April 10-14, 1995).

6. Roscheisen, M. Mogensen, C. Winograd, T. 1995. Beyond Browsing: Shared Comments, Soaps, Trails, and On-line Communities. Abstract to a paper in the proceedings of Third International World-wide Web Conference "Tech-

nology, Tools, and Applications" (Darmstadt, Germany, April 10-14, 1995).

7.   Ibsen, David J. S. 1991. Cooperation and Education Keys to Improving Access to Computerized Information. ASCD (Singapore) Review, Vol. 1, No. 3, pp. 23-24.

8.   Paoli, J. 1995. Cooperative Work on the Network: Edit the WWW! Abstract to a paper in the proceedings of Third International World-wide Web Conference "Technology, Tools, and Applications" (Darmstadt, Germany, April 10-14, 1995).

9.   Nicol, D. Smeaton, C. Falconer-Slater, A. 1995 Footsteps: Trail-blazing the Web. Abstract to a paper in the proceedings of Third International World-wide Web Conference "Technology, Tools, and Applications" (Darmstadt, Germany, April 10-14, 1995).

10. Mukherjea, S. Foley J. 1995. Visualizing the World-wide Web with the Navigational View Builder. Abstract to a paper in the proceedings of Third International World-wide Web Confer

11. Dwyer, D. Barbieri, K. Doerr, H. M. 1995. Creating a Virtual Classroom for Interactive Education on the Web. Abstract to a paper in the proceedings of Third International World-wide Web Conference "Technology, Tools, and Applications" (Darmstadt, Germany, April 10-14, 1995).

12. Baentsch, M. Molter, G. Sturm P. 1995. Webmake: Integrating Distributed Software Development in a Structure-enhanced Web. Abstract to a paper in the proceedings of Third International World-wide Web Conference "Technology, Tools, and Applications" (Darmstadt, Germany, April 10-14, 1995).

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