

Ninth International Conference

IPMU 2002

Information Processing and Management of
Uncertainty in Knowledge-based Systems

Annecy - France
July 1-5, 2002

Proceedings
Volume III

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Ninth International Conference

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**Organized by Université de Savoie, LISTIC - ESIA
ANNECY, FRANCE**

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Using Internet Distributed Communication in Management a Textile Research Project

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KEYWORDS: Distributed communication, interactivity, Internet.

SUMMARY: This paper demonstrates the potentialities of the Internet in the communication distributed between partners of business.

Abstract

This paper describes an experience made in a research project *Cotton properties: Inference through Data Mining Techniques*, funded by Science and Technology Foundation using Data Mining Techniques¹ and by using World Wide Web and Internet tools. Our importance level in society arises from our capacity of using knowledge and react face to new information requirement. Our psychological and intellectual development depends on a fast access to the information and the feeling of insatiability, which characterizes us, compels us to communicate it with frequency and to change ideas constantly. Due to group communication necessity, we talk every day in a direct or indirect way, through group meetings or using traditional medias. However with Internet potentialities, group communication becomes easier, such as the use of mailing lists, chats and discussion forums. The Internet supports numerous services, including electronic mail, file transfer, fax messages, conferencing, bulletin boards, remote computer access, search engines, forums, chats, electronic shopping, EDI² and many more. Information and services are distributed among the various individually managed networks comprising the Internet and are accessible from anywhere in the world to anyone with a valid Internet address and connection.

The two main reasons for organizations use Internet are, worldwide connectivity, access to useful information, and it is cheaper than establishing and operating private networks. Internet provides a range of tools for both communication and information retrieval as shown in Fig.1. Due to vast size and scope of this network important tools have and are still being developed to aid in the access to this information. These tools go beyond the conventional e-mail, news, bulletin board and directory services and include powerful client-server and GUIs³. In a project, it allows, among other things, full contact and discussion between all partners even if they are far from each other.

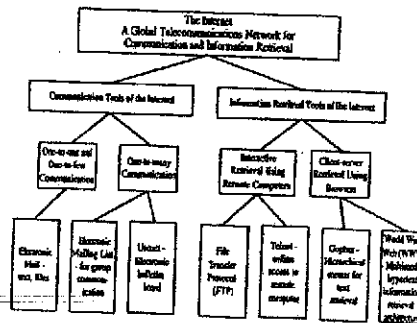


Fig. 1. The Internet as a source of communication and information retrieval tools [Hunt, 97].

Authors are grateful to FCT project funding, POCTI/1999/CTM/32993
Electronic Data Interchange

³ Graphical User Interface

Introduction

The Internet is a global, cooperative collection of over 500 000 Internet domains spanning 83 countries and linking over 12 million host computers. Currently, there are over 40 million Internet users, with a growth rate of 10-15% per month. The Internet supports numerous services, including electronic mail, file transfer, fax messaging, conferencing, bulletin boards, remote computer access, search engines, electronic storefronts, for a, chats, electronic shopping, EDI and many more. The information and services are distributed among the various individually managed networks comprising the Internet and are accessible from anywhere in the world to anyone with a valid Internet address and connection. Organizations join the Internet because it offers worldwide connectivity and access to useful information, and because it is cheaper than establishing and operating private networks. The last years have seen substantial changes in the availability of Internet services and facilities. Not only has commercial access to the Internet become available in many countries, but also the ranges of these services have increased markedly. Significant changes have occurred in many countries of the world with a whole variety of organizations now offering access to the Internet in a variety of ways.

Although commercial access to the Internet has been available for many years, companies were expected to connect only for research and educational purposes. However, the range of these services as well as their performance and cost attributes varies enormously. For users, the Internet provides a wealth of technical information, database and software services, usually at minimal cost. A number of books are now available which describe the many aspects of Internet's operation and usage. The Internet is in a unique position in that it is not owned by any one organization. All users in fact contribute to the overall Internet by making services available to other users on their own network. It is a unique example of cooperation in a competitive world, which benefits everybody providing basic rules and courtesy are respected. There really is no other network, which provides such a comprehensive range of facilities and services.

Internet's client-server systems

The Internet provides a range of tools for both communication and information retrieval as shown in Fig.1. Because of the vast size and scope of this network important tools have and are still being developed to aid in the access to this information. These tools go beyond the conventional e-mail, news, bulletin board and directory services and include powerful client-server and GUIs, discussed below.

World-Wide Web

For fifty years, people have dreamt of the concept of a universal database of knowledge - information that would be accessible to people around the world and link easily to other pieces of information so that any user could quickly find the things most important to themselves. It was in the 1960's when this idea was explored further, giving rise to visions of a "docuverse" that people could swim through, revolutionizing all aspects of human-information interaction. Only now has the technology caught up with these dreams, making it possible to implement them on a global scale. The World-Wide Web is officially described as a "wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents". What the World-Wide Web (WWW, W3) project has done is provide users on computer networks with a consistent means to access a variety of media in a simplified fashion. Using a popular software interface to the Web called Mosaic, the Web project has changed the way people view and creates information - it has created the first true global hypermedia network. The earliest visions of such systems had as their goal the advancement of science and education. Although the World-Wide Web project has the potential to make a significant impact in these areas, it is poised to revolutionize many elements of society, including commerce, politics, and literature.

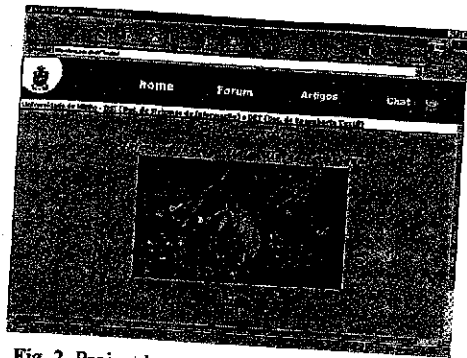


Fig. 2. Project homepage, accessible through the address <http://crox.esa.ipb.pt/~bastos>

What is hypertext and hypermedia?

The operation of the Web relies mainly on hypertext as its means of interacting with users. Hypertext is basically the same as regular text - it can be stored, read, searched, or edited - with an important exception: hypertext contains connections within the text to other documents. For instance, suppose you were able to somehow select (with a mouse or with your finger) the word "hypertext" in the sentence before this one. In a hypertext system, you would then have one or more documents related to hypertext appear before you - a history of hypertext, for example, or the Webster's definition of hypertext. These new texts would themselves have links and connections to other documents - continually selecting text would take you on a free-associative tour of information. In this way, hypertext links, called hyperlinks, can create a complex virtual web of connections.

Hypermedia is hypertext with a difference - hypermedia documents contain links not only to other pieces of text, but also to other forms of media - sounds, images, and movies. Images themselves can be selected to link to sounds or documents. Hypermedia simply combines hypertext and multimedia. Here are some simple examples of hypermedia:

- You are reading a text on the Hawaiian language. You select a Hawaiian phrase, then hear the phrase as spoken in the native tongue.
- You are a law student studying the California Revised Statutes. By selecting

a passage, you find precedents from a 1920 Supreme Court ruling stored at Cornell. Cross-referenced hyperlinks allow you to view any one of 520 related cases with audio annotations.

- Looking at a company's floor plan, you are able to select an office by touching a room. The employee's name and picture appears with a list of their current projects.
- You are a scientist doing work on the cooling of steel springs. By selecting text in a research paper, you are able to view a computer-generated movie of a cooling spring. By selecting a button you are able to receive a program, which will perform thermodynamic calculations.
- A student reading a digital version of an art magazine can select a work to print or display in full. Rotating movies of sculptures can be viewed. By interactively controlling the movie, the student can zoom in to see more detail.

The Web, although still in its infancy, has already enabled many of these examples. It facilitates the easy exchange of hypermedia through networked environments from anything as small as two Macintoshes connected together to something as large as the global Internet.

Electronic mail (e-mail)

The most popular Internet application is electronic mail. For business, this means an unparalleled degree of communication with staff in the field, with suppliers, and most important of all, with customers and potential customers. The format of an Internet e-mail address follows the form `user@organization.domain`, where the organization name could be the name of a company, of a Government agency, or of an educational institution.

Electronic mail, or e-mail, is a fast, easy, and inexpensive way to communicate with other Internet users around the world. In addition, it is possible for Internet users to exchange e-mail with users of other independent networks such as CompuServe, Applelink, the WELL, and others. Internet users often find that the expanded capability to communicate with colleagues around

the world leads to important new sources of information, collaboration, and professional development.

Besides basic correspondence between two network users, e-mail presents additional opportunities for communication. Through various methods for distributing e-mail messages to lists of "subscribers," e-mail supports electronic discussions on a wide range of topics. These discussions bring together like-minded individuals who use such forums for discussing common problems, sharing solutions, and arguing issues. Another type of electronic communication that is growing in popularity is the electronic journal, or "e-journal." Although some e-journals require certain types of software and hardware to display each issue, most e-journals are distributed to a list of subscribers as an e-mail text message, either complete as one issue, or retrievable at the article level by mailing a command to a software program that automatically sends the appropriate file. The very definition of a "journal" is undergoing change in the electronic environment, as e-journal publishers experiment with different publication models (e.g., sending articles out individually as soon as they are ready rather than waiting until a group of articles are gathered for an "issue").

Network news

Network News, often called USENET News, is a large collection of around 10 000 special interest bulletin boards. Over 4000 of these are devoted to particular geographic areas and location-specific newsgroups exist for nearly all major metropolitan areas in the Internet-connected world. Not every provider carries every metropolitan newsgroup, most smaller providers carry only newsgroups specific to their own location for example. Newsgroups are divided into several broad categories and a useable ordering of content is achieved by following a hierarchical pattern. The 'comp' newsgroup category, short for 'computer', contains over 500 groups devoted to specific areas of computer technology. For example, the hardware category includes specific types of machines and the software category includes specific application types, as well as specific product offerings from major manufacturers.

FTP (file transfer protocol)

FTP allows users to transfer files from machine to machine on the Internet. Access to files posted to the Internet such as directories, catalogues and bibliographies are examples of research-related applications of FTP. It is possible to transfer files in various formats, allowing the user to retrieve software programs, graphic images and other files, which are not necessarily in ASCII text. Also available via FTP are the contents of a variety of electronic journals as well as copies of selected software packages.

The Internet is a network of thousands of machines, and many of these provide public access via anonymous FTP. This means that the TCP/IP software and FTP can be used to log into a remote machine with the userID of anonymous. This restricted access to remote machines grants access to vast numbers of files that can be transferred back to a local Internet machine. Text files, computer programs and graphics are just a few of the types of files available through anonymous FTP.

Discussion forums and chat rooms

The widespread use of computer conferencing for work purposes, both as an adjunct to and a replacement for the traditional meeting room, has encouraged partners of projects alike to approach discussion and search of results in ways that incorporate collaborative work and the social construction of knowledge.

Discussion and dialog between partners and among people involved is a key feature of computer conferencing and the foundation of constructivist work techniques.

Dialog has been recognized by Moore (Moore & Kearsley, 1996) as a determining factor in the amount of transactional distance that exists in most, if not all, instructional events: those taking place in a traditional meeting room and those taking place at a distance where partners may never see one another.

Transactional distance describes not only a dimension of a physical separation but also a communication gap that must be bridged by dialog in some structured fashion so that shared meaning can be constructed, discussion and search of results can occur, and the potential for misunderstanding and miscommunication is significantly diminished. When meeting at a distance some form of communication technology must be used to carry this critically important

dialog between partners and all the people involved. In electronic venues, this usually takes one of several forms of computer conferencing. Computer conferencing can be used both asynchronously, which allows time for reflection between postings, and synchronously, allowing real-time, interactive chats or open sessions among as many participants as are online simultaneously. There are a number of different forms of synchronous online communication, discussion forums or electronic chats.

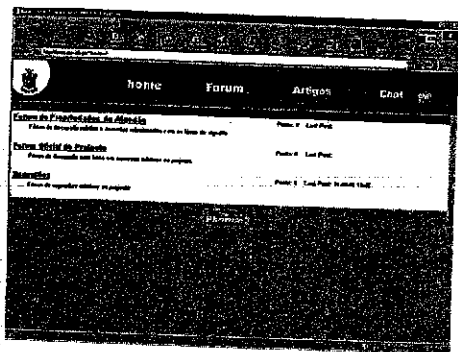


Fig. 3. Project Forum.

An electronic chat is a series of real-time, short (usually 1 to 3 lines) text phrases and sentences exchanged with the other chat users who are logged onto the same computer system and facility. The interactions appear as individual lines of text, prefixed by the nickname of the contributor, that scroll up the screen as they are entered.

Internet Relay Chat (IRC) is an example of a synchronous communication program that is international in scope and is available to anyone with access to a client program and who can log on to any one of the IRC servers located across the Internet. IRC can involve large, international groups of people, many of whom may be strangers. Real-time electronic chat is commonly used for recreation and social interaction. On IRC, both topic and tone of discussion is policed only by the participants, with the result that a shared culture has gradually developed that defines communication norms and conventions somewhat differently than they are in face-to-face conversations.

This project uses computer-supported collaborative work with supported chats for information exchange, brainstorming, discussion and problem-solving in business settings. There is

increasing interest in the use of chats for cooperative work purposes through virtual meetings.

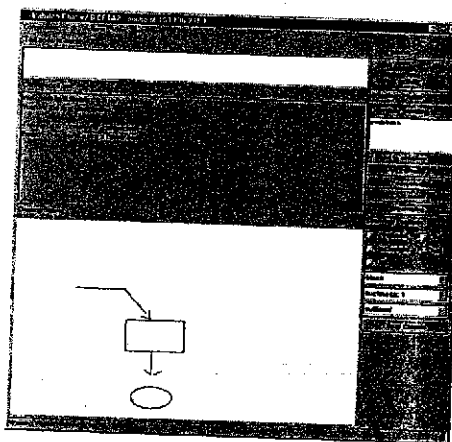


Fig. 4. Project Chat, implemented in Java Script⁴.

Advantages and Limitations of Synchronous Online Communication

- **Advantages.**

Aoki (1995) notes that brainstorming and other activities requiring spontaneity can be handled effectively in a synchronous chat, as can decision-making, that requires a quick turn-around time rather than extended discussion (Siemieniuch & Sinclair, 1994).

Synchronous communication can simulate an instructional environment that is familiar to students, faculty, administration and funding sources (Fanderclai, 1995).

Synchronous communication adds the excitement of interacting with others in real time and builds a sense of social presence (Aoki, 1995) - there really are people on the other side of the computer screen - and a heightened sense of involvement in the ongoing communication events (Ruedenberg et al., 1995). This can lead to what Csikszentmihalyi (1977) refers to as a "flow experience" in which action and awareness are fused, the passing of time is unremarked, and the activity itself becomes intrinsically rewarding and deeply engaging. This sense of involvement and engagement can be critical in building a sense of community among the participants (Reid, 1991).

⁴ JAVA script programming language

• **Limitations:**

IRC software provides each participant with a small window (approximately two lines deep across the screen) in which to type their contributions, which is input in its entirety into the conversation when the 'return' or 'enter' key is pressed. Only then can the new input be seen by all participants. Turn-taking in synchronous communication is problematical as there are no observable kinesthetic or para-verbal cues to indicate when someone wants to enter the conversation or to change the subject. Siemieniuch and Sinclair (1994) suggest that verbal and non-verbal protocols currently used in face-to-face meetings may be inadequate for synchronous computer-mediated communication, and perhaps some controls must be built into the software to rationalize the passing of control from one participant to another to permit efficient interaction.

Synchronous communication requires substantial typing skills to communicate effectively, and the conversation may move too fast for non-native speakers of the language, who have no time to reflect, frame questions and compose responses as the text incessantly scrolls up the screen (Aoki, 1995).

Conclusions

Much research on the development and use of communication conventions in computer-mediated communication has been conducted on transcripts of asynchronous conferencing in instructional environments (Harasim, 1990; Henri, 1992). Research on communication conventions in synchronous computer-mediated communication has occurred in settings such as chat rooms placed in www pages and IRC's, which are used primarily for social and recreational activities. Not surprisingly, in this synchronous format most of the research has concentrated on the social aspects of communication, such as play and role taking (Kuehn, 1993; Ruedenberg et al., 1995).

In this project and due to the special distance between the partners involved, the use of this type of computer-mediated communication provided a useful and comfortable form of communication, bringing one more value in the results gotten during all the study to be made.

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