
INFORMATION MANAGEMENT AND VIRTUAL LIBRARY

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Introduction

The term information management recognizes that information is a resource which needs to be managed like any other resources such as man, materials and money. It does not say anything about the type of information or the method of handling it. Information management is a concept and is not the exclusive part and parcel of any one profession - it is a multidisciplinary activity. From an organisational point of view, the effective management of information resources depends on understanding and communication between all the different functions involved, each having an important role to play.

Libraries and information units have witnessed invasions of computers as a tool within last two decades. Libraries have successfully managed to serve their users with a simple menu of services which can be accessed from their own terminals or workstations, either through local or wide area networks or dial-up connections. It is likely that in the next decade, users may be offered a common interface to these services. Users still have to learn several different methods of accessing information. The combination and analysis of the results of several searches can be a complicated process. However, the disciplines of computer science, human computer interaction, cognitive science, artificial intelligence and linguistics are being brought together to produce more user-friendly or intelligent interfaces.

New Information Tools and Services

Use of latest technology have certainly increased delivery of information both accurately and speedily. Apart from print media and microforms, the publication of information on CD-ROMs has provided an alternative to the use of on-line databases.

At present about 5,000 databases are available on-line. The rapid development of information industry has also increased the options. Supplying electronically- all the information a user requires - also implies the provision of full documents incorporating graphics. Access to the full text of information is becoming more prevalent although a few commercial systems offer graphics. The development and use of optical media for the storage of large amounts of digital data have paved the way for the implementation of in-house systems for the electronic storage, handling and delivery of complete documents. But , the introduction of such systems requires decisions on the indexing, processing, security and retrieval of documents handled electronically.

The recent development of infography (the combination of graphics and information processing), we are moving figuratively and literally into another dimension. Now, it is possible to physically enter the three-dimensional world created by computer imaging. Not only it is possible to enter this world, but one can also interact with the surrounding imagery, get immersed in it, just like in the real world, with appropriate responses from the "virtual environment". The term "virtual" commonly used in computing, is applied to something which does not exist but is made by software to appear to do so. The implication of the phrase "virtual reality" is that, what one is experiencing, is just like reality.

Virtual reality is a computer environment in which the user is "immersed" and can experience simulated visual, auditory and force sensations. It enables the user to move around in real time in a virtual world, processing information. Virtual worlds need not obey all the laws of nature; they can even add new ones of their own. Things that are abstract or hidden in real world can be made visible, while extremely complex sets of data can be made easier to assimilate.

In the popular imagination, virtual reality has grabbed attention as a technology which offers a doorway to our dreams. Everything we ever wanted to do is apparently possible. All one has to do is to have a head mounted device (HMD), slip on a data glove or a full body suit and virtual reality will support the experience without physical commitment, inconvenience and danger of the real thing.

Virtual Reality

Virtual reality is already a science, a technology and a business supported by significant funding from the computer, space, medical communications, design and entertainment industries worldwide.

The human-computer interface is where the virtual reality development intersects with the evolution of computers. Human computer interfaces are tools for helping minds and machines work together more effectively. A virtual world is computer-generated environment that one operates with natural gestures, not by composing computer programs, but by walking around, looking around, and using one's hand to manipulate objects for some tasks. Virtual reality is the ultimate of computer interface.

Current virtual reality systems create artificial environment largely through vision with a limited use of hearing and touch. The user wears a head-mounted display (HMD) and look through extremely powerful lenses at two tiny screens in front of each eye.

The picture on the screens is generated by the host computer with highly complex three dimensional mapping systems. An electromagnetic position-taker informs the host computer of the position and orientation of the headset, so that the images appear to move in front of the user when the head is turned.

A data glove worn by the user translates his hand gestures into information which the computer displays and the object touched by the user are moved accordingly. The user is immersed in the midst of the computer generated scenes, which he can manipulate according to his wish. The user has the impression of actually being in the midst of and an active participant in the computer generated environment.

The real time quality of virtual reality needs vast computing power if it is to produce anything even remotely convincing. To generate a worldscape which looks like the real thing, requires extremely sophisticated software which not only models geometrical shapes from every possible perspective but also renders surface textures and lighting effect accurately.

The head mounted display worn by the user cuts off all sights of the real world. The use of two images rather than one allows the computer to calculate a slightly different perspective for each eye. This gives the impression of true three dimensional world. But, it also means that the necessary calculations must be doubled. Some systems now include 3D audio software which synthesizes sounds inside the virtual world and positions them in space. This helps create a greater sense of reality but adds to the computing requirements of the system.

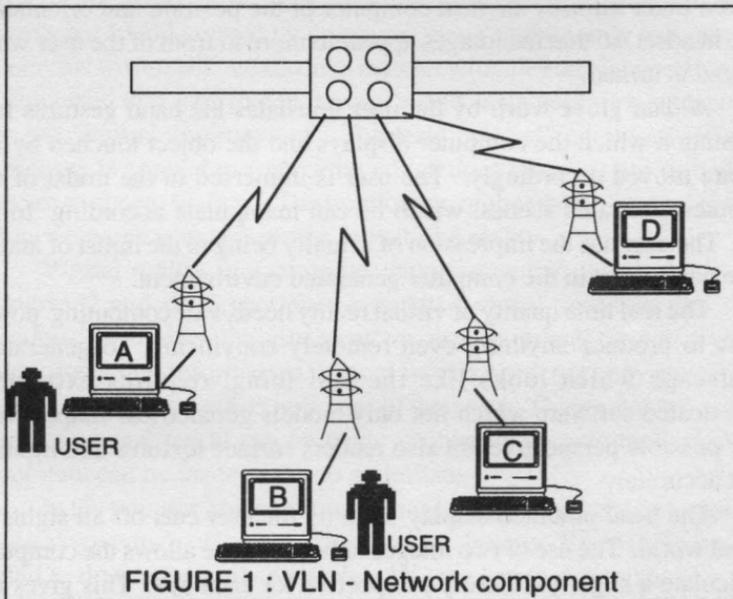
In this, apart from the host computer generated real time images, two devices which play an important role in the virtual reality system are the head mounted device (HMD) and the interactive data glove.

Virtual Library Network (VLN) System

The proposed VLN system will have following components as described below:

1. The Network

The Libraries are connected through very high speed communication lines via satellite as depicted in Figure 1. In this way any two sites can be connected if both are not engaged with any other site. So there can be more than one set of sites connected. For example as in Figure 1 Site A and B are connected and at the same time Site C and Site D are also connected.



2. Front End Software

The front end software will automatically detect the sites which are currently on-line or available on network. After detecting all sites it will provide option to reach any of the sites virtually. This is achieved by providing virtual doors to all sites in front of the user as shown in Figure 2.

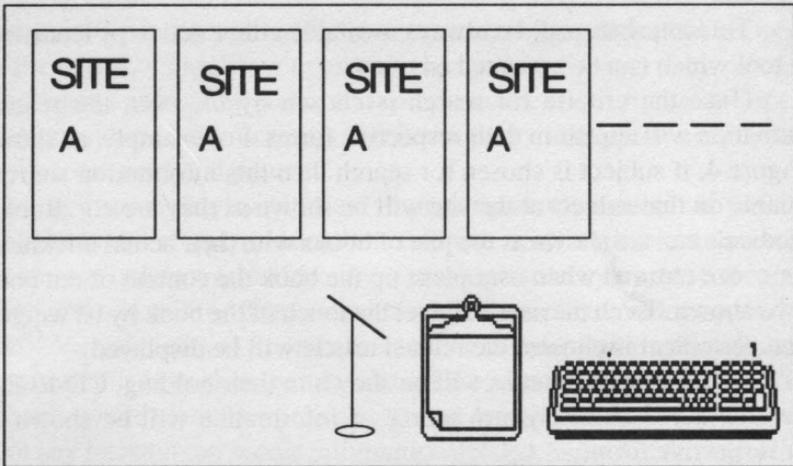


FIGURE 2 : Front End Software U/I

User can open any of the doors visible. User can move to or point to left or right to see if any more doors are available to enter into.

Once the site has been chosen the client will invoke the Backed software at the selected site and the whole conversation will be controlled by the backed software.

This approach gives flexibility to each site for putting their services and information into VLN according to their choice and infrastructure. This is discussed in detail in next paragraph.

3. The Back-end Software

The Back-end Software responsible for providing user interface and thereby facility and information.

At first level the software will provide the facility to search into the Library. This search can be on Author, Subject, Title, Types of information source etc. This interface is shown in Figure 3.

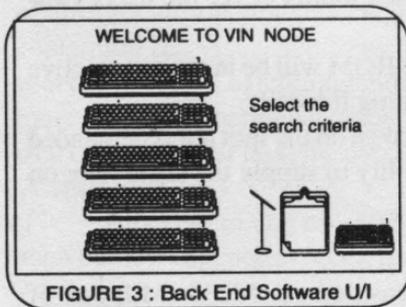


FIGURE 3 : Back End Software U/I

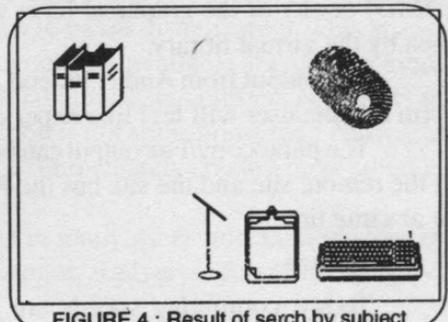


FIGURE 4 : Result of search by subject

This interface will be always available either active or iconified. The tool which can be activated any time.

Once the criteria for search is chosen by the user, the related information will appear in their respective forms. For example, as shown in Figure 4, if subject is chosen for search then this information sources available on that subject at the site will be shown as they are e.g. Books/Periodicals etc. are shown as the pile of books with their actual thickness, colour, size etc. and when user picks up the book the content of the book will be shown. Even the user will feel the touch of the book by its weight. When periodical is chosen, the related article will be displayed.

Audio/Video cassettes will be shown in their holding, CD-ROM, Microfiches and similarly any source of information will be shown in their respective form.

The user can select any of them and see/listen or see/photocopy or ask for FAX depending on the service available at the site. The site may have everything on-line in which case whole of Book/Audio/Video etc. can be seen/played.

If limited information is available on-line then the facility to place a demand will be provided. In this case, user can directly input the demand by any of the input method.

4. Input/Output

The input to the front -end/Back-end software can be in any of the following form;

- 1) Pointing to objects
- 2) Voice
- 3) Writing into virtual writing pad.
- 4) Typing a virtual key board.

The system will understand all types of voice and handwriting.

The output will be on screen of either Head Mounted Device (HMD) or any of the graphical form which totally cover the users view area by the virtual library.

The output from Audio/Video/CD-ROM will be in their respective form and the user will feel like experiencing it locally.

The photocopy/Fax output can be taken on the spot if it is demanded at the remote site and the site has the facility to supply the same later on or at same time.

Future

Today, computing speeds are measured in MIPS (Millions of

Instructions per Second) and new rates such as "gigaflops" are proposed for the fastest of tomorrow's computer technology. Virtual reality systems require great computing power and speed, and the use of hybrid of general-purpose and special processors together with parallel processing, to keep up with its speed and power.

Virtual reality systems are improving at a fast pace. At the same time the high-volume information conduits, now in the prototype stage, are coming online worldwide. Voice and high-fidelity sound, full motion video and text will be transported through the optical cables by the year 2010. Virtual reality is a communication medium providing an answer to the use of this high-density information. Thousands of networked reality systems would create a whole new global network through which people from any location can access information needed. Virtual reality represents a kind of new contrast between human and computers, an arrangement that could grant us great power, and perhaps change us irrevocably in the process.

Librarians and information scientists who are managing information suffer from too much success. Computers have made it possible to manipulate larger and larger amounts of information but humans are cognitively ill-suited for understanding the resulting complexity. The information is readily available but users are unable to efficiently access individual items or maintain a global context of how information fits together.

—Recent advances in virtual reality (VR) technology suggest that encoding subjects of the information using multimedia techniques and placing the resulting visualizations into a perpetual three-dimensional space increase the amount of information that people can meaningfully manage.

Extending this world, an appropriate approach would be the creation of a visual engine that could easily take just about any collection of abstract information and create a VR-based visualization. This space, containing the visualized objects, would be available for one or more users to navigate, examining individual objects and clusters of objects in more detail. If a particular visualization is not appropriate for a particular user on a particular task, the user could immediately create a more suitable visualization.

This system can be extended in many other information sources such as News agencies, Stock Exchanges, Railways, Tourism, etc.