THE ROLE OF HYPERTEXT SYSTEMS IN AUTOMATED INFORMATION PROCESSING

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Abstract

This paper describes the design of a hypertext interface of a large bibliographical collection called S.M.R.C. (Sanidad Murciana Reyes Católicos) containing documents of the Town Council of Murcia during the Renaissance.

1. Introduction to hypertext systems

The use of hypertext systems offers some very exciting possibilities, particularly for new uses of the computer as a communication and thinking tool. It represents an ideal medium for document presentation, providing a simple and rich interface for intuitive and informal retrieval methods.

In addition, hypertext systems can be used in combination with other tools: wordprocessor, graphic editor, data base, VCR, VDR, speech synthesizer, communication program and any programming language. Therefore, it appears to offer a great deal both in education (Barceló and Pastor 1991; Borne and Girardot 1991; Cantos and Martínez 1991; Giannotti et al. 1991; Layman and Hall 1991; Ponta et al. 1991; Reynolds et al. 1991; etc.) and in documentary applications (Aigrain and Longueville 1991; Canals 1990; Catanazzi and Argentesi 1991; Cesarini and Soda 1991; Ducloy et al. 1991; etc.).

The term hypertext was originally based on the idea of a hypothetical information system by means of which any user could store whole texts and create links among parts of these texts in a nonlinear way. Ted Nelson, one of the pioneers of hypertext, once defined it as a combination of natural language text with the computer's capacity for interactive branching, or dynamic display of a nonlinear text which cannot be printed conveniently on a

conventional page (Nelson 1967). Jeff Conklin defines the concept of hypertext in the following way:

> *"Windows on the screen are associated with objects in a database, and links are provided between these objects, both graphically (as labelled tokens) and in the database (as pointers)."* (Conklin 1987:17)

Originally, the application of hypertext systems was restricted to mainframe computers, which, to some extent, restricted their expansion and use. But fortunately, things have changed and we can now find hypertext systems developed for Apple[1] and IBM[2]/compatible computers.

2. General features of hypertext systems

The following features are of a somewhat idealized hypertext system. Some existing systems have more features than these, and some have fewer or different ones.

- The database is a network of textual nodes which can be thought of as a kind of hyperdocument.
- Windows on the screen correspond to nodes in the database on a one-to-one basis, and each has a name or title which is always displayed in the screen.
- Standard window system operations are supported: Windows can be repositioned, resized, closed, and put aside as small window icons.

The position and size of a window or icon are cues to remembering the contents of the window. Closing a window causes the window to disappear after any changes that have been made are saved in the database node. Clicking with the mouse on the icon of a closed window causes the window to open instantly.

- Windows can contain any number of link icons which represent pointers to other nodes in the database.
- The user can easily create new nodes and new links to new nodes or to existing nodes.
- The database can be browsed in three different ways:

* By following links and opening windows successively to examine their contents.
* By searching the network for some string.
* By navigating around the hyperdocument using a browser that displays the network graphically.

Some hypertext systems have an embedded programming language (i.e. GUIDE[3] includes LOGiiX[4]) which allows the user to perform complex information manipulation, yet keeps the

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[1]   Apple is a registered trademark of Macintosh.

[2]   IBM is a registered trademark of International Business Machines Corporation.

[3]   GUIDE is a trademark of OWL International, Inc.

[4]   LOGiiX is a trademark of OWL International, Inc.

interface simple and intuitive. These programming languages also enable the user to add new capabilities to any hyperdocument which are not available in any hypertext standard feature set.

We can summarize the operational advantages of hypertext as:

- Ease of tracing references.
- Ease of creating new references.
- Hierarchical and nonhierarchical information structuring.
- Browsers provide a global view of documents.
- Customized documents.
- Modularity of information: since the same text segment can be referenced from several places, ideas can be expressed with less overlap and duplication.
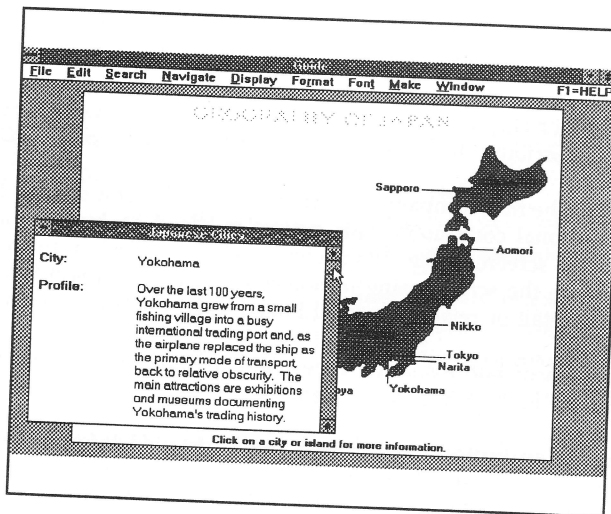

Fig.1 Sample screen of Guide 2.0

3. S.M.R.C. (Sanidad Murciana Reyes Católicos): A practical application

Our application, S.M.R.C., is a sample of the extensive potential of hypertext systems in information and documentation. It has been designed by means of GUIDE, a hypertext system running on IBM/compatible computers. Our aim was to create a flexible and rich environment that provides efficient retrieval facilities and an interface which can guarantee user orientation.

S.M.R.C. is a converted document of a former documentary data base (Asensi 1992) for hypertext representation, which is still working in its original version. It contains documents of the Town Council of Murcia during the Renaissance. The different registers used for its implementation are the following:

DOC. Nº294
Fecha= 20/12/1483
Tipo-Documental= Acuerdo concejil 1483-84
Asunto= Prevención de la enfermedad y auxilio a los enfermos
Signatura= AMM AC 1483, fo, 76
Descriptores= Enfermos
Resumen= Alonso García de Mendoza, está recuperado de su dolencia puede regir su oficio de cequiero. El consejo ordenó que volviese a ejercerlo.

S.M.R.C. contains three different components:
- Data base
- Thesaurus
- Terminological dictionary

3.1. GUIDE

We shall now make a brief description of GUIDE, the hypertext system used for the design of S.M.R.C., before describing the different components of our application.

In 1986 OWL became the first company to introduce GUIDE, a commercial hypertext system for the use with personal computers. This system is based on buttons[5] and links[6]. These become visible on the screen as the cursor change shape according to the type of button. These are activated on the screen using a mouse to expand a subject which provides any number of levels of detail or related material linked into other documents.

GUIDE has four types of buttons. Each type plays its part in creating highly interactive, intuitive user interface for any hyperdocument.

- **Expansion button** lets the user "hide" detailed information behind a word, phrase or graphic. Clicking on an expansion button has the effect of zooming to display the detailed information behind the button.
- **Reference Button** connects related topics both within a document and between documents. A reference button in one document can be linked to specific points in other documents. Clicking on a reference button instantly displays the linked information.
- **Command Button** links text or graphics with scripts. A command button script instructs special extension to an interpreter, which performs specific tasks. Some examples of the tasks handled by interpreters include displaying data and files from other applications or controlling devices connected to the serial port.
- **Note Button** can be attached to any word, phrase or graphic. They display a temporary pop-up window which can contain text or graphics. Note buttons are typically used to explain unfamiliar terms or to provide supplementary information that readers might need on a temporary basis.

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[5] Specific locations in the information where readers can jump along a link to a related topic. Buttons are usually activated by a click of the mouse.

[6] Computer-supported connections (cross-references) which permit rapid, easy movements between related information.

3.2. Data base

The data base is a module constructed by a series of files, similar to those of the original version of S.M.R.C.. But, in contrast to the original version it is now built up by means of linked modules using the expansion button facility supplied by GUIDE. This type of button enlarges and implements the contained information in order to get a so-called hyperdocument.

By means of this module, we are able to get further information related to any of the topics which are to appear on the different windows. For example, if the user comes along with *San Ginés de la Jara* (Fig.2), simply by pointing on this name with the mouse-pointer and clicking the mouse button, a second window (Fig.3) will immediately appear with related data on this small Murcian village -of main importance in the 16th century Murcia. In addition, the related information cannot only be a text-based one but also a graphic-based one, for example scanned images of 16th century documents.
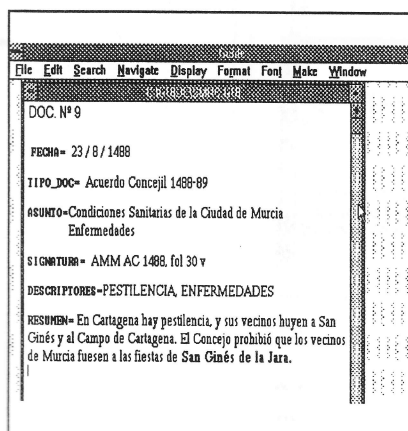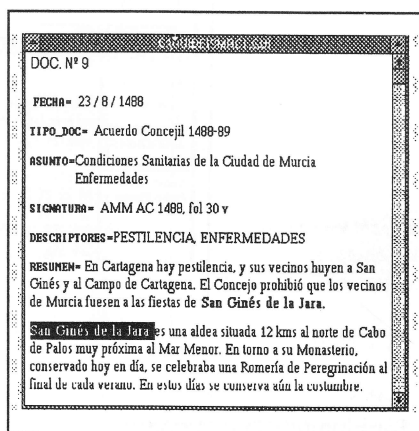
Fig.2 Sample screen of the data base module.

Fig.3 Expansion button

3.3. Thesaurus

The thesaurus is a module based on the application of a former program called GESTO (Martínez et al. 1992), which builds up a thesaurus containing all the descriptors appearing in the different files of the data base.

In its original version, GESTO allows the user to look up any descriptor term offering additional information of any other descriptors related to it. GESTO also offers the opportunity to get a printed copy of all the descriptors and the documents in which they appear.

We have slightly modified the original version of GESTO in S.M.R.C. in order to allow us to construct of a file containing all the descriptor terms with all their references. This file can easily be modified as soon as we want to enlarge the document with further information.

Any descriptor term can be extracted by means of the GUIDE command SEARCH. This command supplies us with a list of linked documents to the descriptor we are searching (Fig.4). Furthermore, to increase the potential of traditional thesaurus, we have equipped this one with reference buttons.

The running of GESTO can be done by means of a command button which calls up a program called GESTO.EXE written in LOGiiX -programming language supplied by GUIDE. In this case, we will be able to work simultaneously with two windows on the screen, one operating with the data base and the other with the thesaurus.
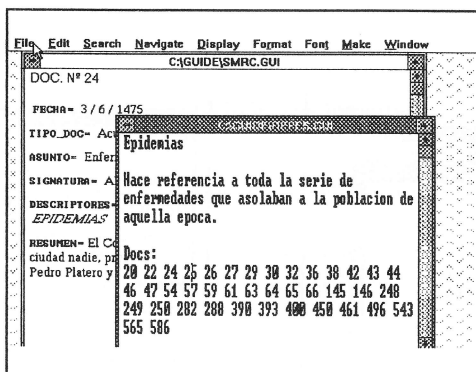
Fig.4 Sample of the Thesaurus module

3.4. Terminological dictionary

The aims of this module are:

- Supply the user with more information -explanations- on words related with specific subjects, for example medical terms.
- Supply the user with explanations of words according to their meaning in the 16th century.
- Supply the user with a series of synonyms on the consulted term.

The terminological dictionary is built up by a series of note buttons. These buttons display the additional information (Fig.6) on the screen as long as the user keeps the click button of the mouse pressed. Moreover, this module does not operate in an isolated form, but in cooperation with the rest of modules -data base and thesaurus- due to the links between them.
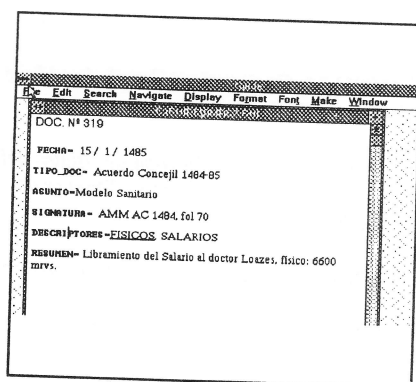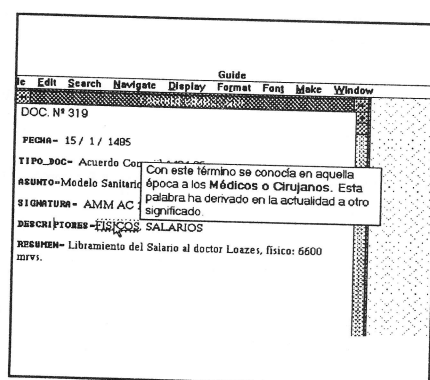
Fig.5 Sample screen of the Terminological module.

Fig.6 Note button

4. Conclusions

This paper has described the design of a hypertext interface of a large bibliographical collection containing documents of the Town Council of Murcia during the Renaissance.

There is no doubt, that hypertext properties guarantee a flexible and user-friendly environment for document organization and navigation.

At present, we are studying the application of S.M.R.C. in connection with VCR and VDR in order to improve and enrich our application with other kind of information: sound and images.

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