

# HTLEX: A Hypertext System for the Interpretation of the Law

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## 1. INTRODUCTION

The number of laws and rulings produced is increasing at a speed greater than man's ability to understand them. Traditional technological systems, such as databases and hypertexts, have met this problem until now. Those databases, however, that allow a document subset to be selected, beginning from a much more numerous set, do not help the user to understand what the relationship is among these documents.

Hypertext systems, analogously, begin with one document and permit correlated documents to be accessed, but do not provide a complete view of the relations existing among them.

This report introduces the HTLEX system that files the links among legal documents and manages them in a database. The system is able to dynamically supply the chains of logic links, that are generated when a document is selected, and to represent these links by utilising a graphic interface allowing for hypertext navigation.

This graphic hypertext may be interpreted as representing experience; which is understood as both the ability to make available and immediately utilise an intelligently created set of logic chains that logically connect concepts.

HTLEX utilises a file of links made up of citations and accomplishes Vannevar Bush's aim set out in his essay «As We May Think». «The lawyer has at his own disposition the opinions and associated decisions of his entire experience, as well as those of his friends and those of the authorities».

## 2. LEGAL INTERPRETATION AND EXPERIENCE

The occupation of legal experts is to give meaning to a collection of concepts that refer to an event, that are contained in the laws, rulings and authorities and that are intrinsically interconnected.

This activity is denominated legal interpretation and is based upon *in-*

*telligence* (from the Latin words <inter legere>; to tie together); this is the ability to logically connect the concepts and the information contained in the documents, and upon *experience*, which is the ability to make the results of the processes of intelligence attainable, and therefore usable.

Legal interpretation essentially consists of connecting the concepts found within the documents which are the laws, rulings and authorities.

Until now technology was only directed toward automating the document selection phase. Now it can be used to represent the relative connections that appear among them.

We shall see in the following how the HTLEX system can be an aid to legal interpretation by means of automated management, not only of the information in the documents but above all of a file of logic links connecting them.

### 3. HTLEX: THE LINK DATABASE

The enactment of a law is usually without meaning if its content is not integrated with other laws, and with the logically linked rulings resulting from it.

An intelligent person has the ability to follow the document chain beginning from a document and is, in some way, able to find the other documents connected with the first one.

The expert keeps the image of the logical connections among the documents useful in solving a given problem in mind. This allows him to identify the needed documents immediately.

The problem is that of representing experience, which is understood as the ability to identify the documents and the inter-related information that is useful in a specific context.

The objective of the HTLEX system is to make the knowledge about the laws and rulings accessible even to the non-specialist.

The HTLEX system is particularly useful in reconstructing unified logical paths within a network consisting of all the possible logical paths among the documents. These are selected by means of the following types of questions:

1. Which articles of the law are connected to that being examined?
2. Which articles of the law are connected to the articles of the law connected to the one being examined?
- ...
- n. Which articles of the law are connected... to the articles of the law... connected to the one being examined?

The system then shifts its attention from documents to logic links. The

objective is no longer to store and manage the document, but to connect the several documents logically.

To make the system operative it is necessary to create a database in advance which files the logic links needed to utilise the system. It is also necessary to classify the documents according to a uniform standard.

The following example refers to Italian administrative law and uses a file of citations, both explicitly contained in the law and obtained by first researching and then processing the records of the Italian Supreme Court.

A standard borrowed from that used by the Italgjure system of the Supreme Court was used to identify a rule. In particular, the system prototype utilised a file of about 10,000 links structured in records of the standard of the active rule in effect, the type of link and the standard of the passive rule.

The user must provide the system with the standard of the rule, beginning from the one which he wishes to analyse the citations.

Recursivity in selecting the links is effected by means of normal data processing systems. This permits the dynamic reconstruction of the following tables, starting from a specific article of the law.

The first column of the following tables contains the normative standard of the article of the selected law. Each line of the table contains a chain of citations.

Table 1 contains the chains of the active citations, that is to say the articles of laws linked to one another that finish in calling up the rule under examination.

TABLE 1. *Table of Active Citations from DPCM 1988 12 27*

HTLEX - [HTS-A4]							
File	Finestre						
Successo	FK	Successo	FK	Successo	FK	Successo	
2	DPCM 1988 12 27	RNNP	DPCM 1988 11 27	RNNP	DPCM 1981 07 18	RNNP	DPCM 1992 08 12
3	DPCM 1988 12 27	RNNP	DPCM 1988 11 27	RNNP	DPCM 1992 09 02		
4	DPCM 1988 12 27	RNNP	DPCM 1988 11 27	RNNP	DPCM 1992 03 10		
5	DPCM 1988 12 27	RNNP	DPCM 1988 11 27	RNNP	DPCM 1992 06 12		
6	DPCM 1988 12 27	RNNP	DPCM 1988 11 27	RNNP	DPCM 1992 09 10		
7	DPCM 1988 12 27	RNNP	DPCM 1988 11 27	RNNP	DPCM 1992 09 10		
8	DPCM 1988 12 27	RNNP	DPCM 1992 03				
9	DPCM 1988 12 27	RNNP	DPCM 1992 04 11	RNNP	DPCM 1992 09 10		
10	DPCM 1988 12 27	RNNP	DPCM 1992 04 11	RNNP	DPCM 1992 08 12		
11	DPCM 1988 12 27	RNNP	DPCM 1992 04 11				
12	DPCM 1988 12 27	RNNP	DPCM 1992 09				
13	DPCM 1988 12 27	MO	DPCM 1992 09 10				
14	DPCM 1988 12 27	RNNP	DPCM 1992 08 14				
15	DPCM 1988 12 27	RNNP	DPCM 1990 02 13	RNNP	DPCM 1990 02 13	RNNP	DPCM 1992 08 12
16	DPCM 1988 12 27	RNNP	DPCM 1990 02 13	RNNP	DPCM 1990 02 13	VARIA	DPCM 1992 08 12
17	DPCM 1988 12 27	RNNP	DPCM 1992 08 12				
18	DPCM 1988 12 27	RNNP	DPCM 1992 08 12				
19	DPCM 1988 12 27	RNNP	DPCM 1992 08 12				
20	DPCM 1988 12 27	RNNP	DPCM 1989 05 12				
21	DPCM 1988 12 27	RNNP	DPCM 1989 05 12				
22	DPCM 1988 12 27	RNNP	DPCM 1988 12 27	RNNP	DPCM 1990 02 13		
23	DPCM 1988 12 27	RNNP	DPCM 1988 12 27	RNNP	DPCM 1992 08 12		
24	DPCM 1988 12 27	RNNP	DPCM 1988 12 27	MO	DPCM 1989 05 12		
25	DPCM 1988 12 27	RNNP	DPCM 1988 12 27	MO	DPCM 1989 05 12		
26	DPCM 1988 12 27	RNNP	DPCM 1988 12 27	MO	DPCM 1989 05 12		
27	DPCM 1988 12 27	RNNP	DPCM 1988 12 27	RNNP	DPCM 1990 02 13		
28	DPCM 1988 12 27	RNNP	DPCM 1988 12 27	RNNP	DPCM 1989 07 31		
29	DPCM 1988 12 27	RNNP	DPCM 1988 12 27	RNNP	DPCM 1990 02 13		

TABLE 2. Table of Passive Citations from DPCM 1988 12 27

HTLEX - [HTS-P4]									
File	Finestre								
	Pres-0	RR	Pres-1	RR	Pres-2	RR	Pres-3	RR	
58	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0023	RNNP	LS 1988 06 23	RNNP	LS 1988 08 23 0400		
59	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0023	RNNP	LS 1988 08 23	RNNP	LS 1988 08 23 0400		
60	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	CR 1947 12 27				
61	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	CR 1947 12 27				
62	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1953 03 11				
63	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1988 06 23	RNNP	CR 1947 12 27 0000		
64	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1988 08 23	RNNP	CR 1947 12 27 0000		
65	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1988 08 23	RNNP	CR 1947 12 27 0000		
66	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1988 08 23	RNNP	LS 1934 07 12 1214		
67	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0017						
68	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	CR 1947 12 27				
69	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	CR 1947 12 27				
70	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1953 03 11				
71	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1988 06 23	RNNP	CR 1947 12 27 0000		
72	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1988 06 23	RNNP	CR 1947 12 27 0000		
73	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1988 06 23	RNNP	CR 1947 12 27 0000		
74	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0005	RNNP	LS 1988 06 23	RNNP	LS 1934 07 12 1214		
75	DPCM 1988 12 27	RNNP	DPCM 1988 12 27 0000	RNNP	LS 1988 06 23	RNNP	LS 1988 08 23 0400		
76	DPCM 1988 12 27	RNNP	DPCM 1988 12 27 0000	RNNP	LS 1988 06 23	RNNP	LS 1988 08 23 0400		
77	DPCM 1988 12 27	RNNP	DPCM 1988 12 27 0000	RNNP	LS 1988 06 23	RNNP	LS 1988 08 23 0400		
78	DPCM 1988 12 27	RNNP	DPCM 1988 12 27 0000	RNNP	LS 1988 06 23	RNNP	LS 1988 08 23 0400		
79	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0019	RNNP	CR 1947 12 27				
80	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0019	RNNP	LS 1983 03 29				
81	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0019	RNNP	LS 1986 03 01				
82	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0019	RNNP	LS 1988 06 23	RNNP	LS 1988 08 23 0400		
83	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0019	RNNP	LS 1988 06 23	RNNP	LS 1988 08 23 0400		
84	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0019	RNNP	LS 1988 06 23	RNNP	LS 1988 08 23 0400		
85	DPCM 1988 12 27	RNNP	LS 1988 08 23 0400 0028	RNNP	LS 1988 08 23	RNNP	LS 1988 08 23 0400		

Table 2 contains the chains of the passive citations, that is to say, the articles of laws called up beginning from the rule under examination.

Furthermore, it is possible, with this system, to manage other types of logic links, for instance, implicit references, analogies or references to other typology of documents. It is possible, for example, to manage the reference between a ruling and an article of the law, or between one ruling and another or between an article of the law and a commentary on it. In this manner, the system could integrate legislation, case law and legal authority.

There is the additional possibility of expressing the validity of the links, for instance, in a proper temporal date segment. Consequently, the selection could let valid references be reconstructed pertaining to a particular day, that in which, for instance, a case was brought under examination.

#### 4. HTLEX: THE EXPERIENCE NAVIGATOR

We have seen the link file enables logic chains, which constitute the base of experience, to be dynamically reconstructed. The tables which are then generated may be seen as a representation of this experience. The problem is to render the content of these tables immediately comprehensible; in other words, how to communicate this experience.

The hypertext system facilitates navigating among documents, yet this

can be disorienting if one is unable to appreciate how the documents relate to one another.

One way to avoid this problem is to utilise a graphic representation of this complexity which is difficult to communicate in more structured ways. The HTLEX system uses an interface that graphically represents the documents and their related links.

The abscissa is associated with the year of the document and the ordinate with the progressive number that identifies the document within the year.

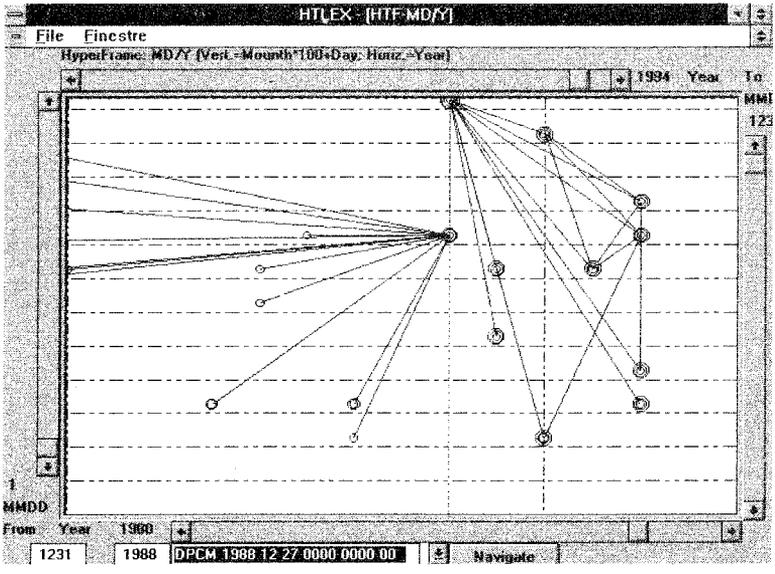
The circle represents a law; the position of the circle is consequently associated with the progressive number of the law and the year in which it was promulgated. The segment that joins two circles represents the link between the two documents.

The graphic interface utilises the data contained in the dynamically constructed tables containing the normative reference chains.

Table 3 represents an example of the general citations that are generated beginning from Authorities of 27 December 1988 concerning the organization of the Italian Presidency of the Council of Ministers (DPCM 1988 12 27).

A variation of this graph represents, on the ordinates, the progressive number that identifies it within the year, instead of the date of the document within the year.

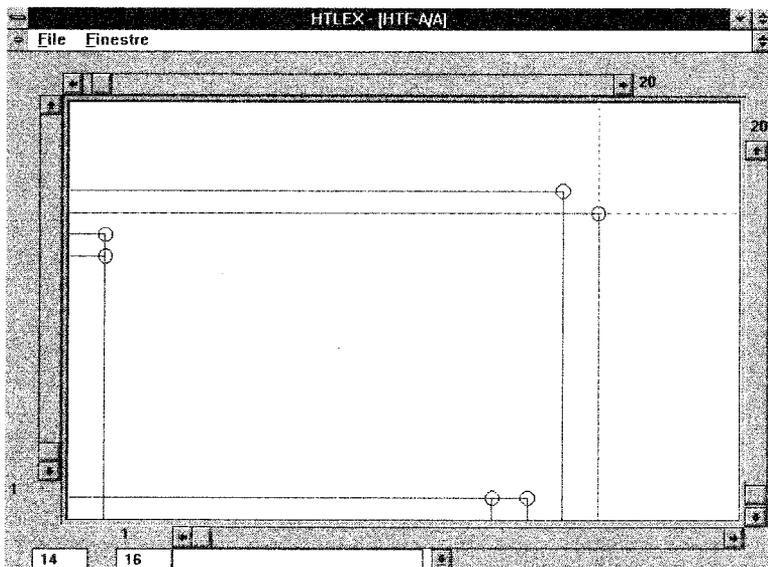
TABLE 3. Graph of Citations (year, month and day) from DPCM 1988 12 27



When the symbol that represents the law is selected, a table appears, showing which articles of the law are represented. Selecting the standard that identifies the article of the law causes the system to open a window containing the relative text. In this way more than one window having tables, graphs and texts can be kept open.

Another type of representation shows which are the citations among the various articles of the same law (see Table 4). The articles are represented on the abscissa and the ordinate. The symbol on the point of the x and y co-ordinates represents a reference between Article x and Article y.

TABLE 4. *Graph of Citations among the Articles of the Same Law from DPCM 1988 12 27*



These graphic representations either make it immediately comprehensible to the user, or at least provide a rather precise idea of *where the user* is from the initial reading of a law.

## 5. THE PURPOSE OF USING HTLEX

Understanding the law should not necessarily be the exclusive dominion of legal professionals, such as lawyers and judges, but should be accessible to who ever may be interested.

To achieve this a documentation system facilitating the interpretation of a complex legal system, often distinguished by a large number of rules and interrelated regulations, is necessary.

The aim of the HTLEX system is to avoid dissipating the experience of those who have interpreted complicated legal issues. In particular, it seeks to preserve the logical associations; starting from the most common ones, such as explicit citations, and going to those which are more complicated, such as analogies and logical references, in order to make them more accessible to others.

Technological development offers the possibility of creating a file of references containing a great number of records extracted by scrutinising the statutes.

The heart of the system is the loading of a structured file with links initially created by scanning legislative sources. In Italy these include *The Official Government Gazette*, *The Regional Bulletin* and *The Gazette of the European Union*. The availability of acts, the electronic medium and the formatted standardisation of citations can allow texts to be perused automatically. This archive could be used to trace the logic links between the norms of the European Union and those of the Member States, and from these to those on the regional level.

The system could permit a user to analyse what may happen if a new legislative act were introduced. In amending a law which is in force in order to understand the consequences of such an amendment requires the knowledge of which chain of norms support the norm that one wishes to amend.

Beyond this, the system could be further utilised for the automated editing of co-ordinated acts by means of automated amendment of such documents subject to modification; the amendment could be associated to the link and performed automatically by the *cut* and *paste* procedures. In this way the problem of creating a *unified act*, that represents the attempt to re-write a linear text having the same meaning of that which is contained in hypertext, is less critical.

## 6. CONCLUSION

The HTLEX system prototype makes a contribution to the debate on artificial intelligence. The problem is not so much one of creating a machine that is capable of autonomously creating logical associations, but rather one of constructing a system that automatically yields associations produced and stored by human intelligence.

The automatic system that has been created is aimed at aiding experience, not at producing artificial intelligence. The real problem is how to make intellectual ability and accumulated experience available, starting from the knowledge and interpretation of documents.

We have seen how data processing can be applied to the legal field in order to enhance these human attributes. In particular, HTLEX's file of links and graphic interface constitute a way in which we can store experience, in order to be able to communicate it.

#### REFERENCES

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