

CONCEPTUAL RETRIEVAL AND CASE LAW

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1. INTRODUCTION

Case law retrieval is a major problem of legal research. Keyword boolean retrieval systems generally are less than satisfactory because they select documents by word matching, disregarding the meaning of information. The goals of my research are to facilitate case law searching by using argument content and structures and to find ways to improve upon the design of retrieval systems in general.

The main body of the paper gives a rundown of the research undertaken for my doctoral dissertation — the design of a model for the retrieval of law cases, with emphasis on the development of a knowledge representation. The project intersects a number of distinct interest areas: information retrieval, text processing, artificial intelligence, and legal reasoning. In section 2, the areas of intersection are defined.

A discussion of state-of-the-art information retrieval systems follows, along with an indication of desirable changes for adaptation to the higher standard of performance achieved with conceptual retrieval. A brief review of some background literature on conceptual searching, argumentation and sublanguage analysis comes next.

Finally, there follows a description of the research undertaken for my doctoral dissertation — the design of a project for the retrieval of arguments from law cases, with detail included of the knowledge representation being developed.

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2. THE PROBLEM IN PERSPECTIVE

2.1. Information Retrieval

Conceptual retrieval is one point on the continuum of development from document retrieval to full text information retrieval. At the beginning of the continuum are keyword boolean document retrieval systems. At the end is the situation that Charles Meadow (1979, p. 218) predicted information scientists would anticipate in 2001, "a world of holistic recording in which the intellectual effort of deciding what is worth seeing comes after the recording." Between those two points there are a number of others, among them passage retrieval (O'Connor 1980), compromises between controlled vocabulary and knowledge representation (Karlsgren 1977) and conceptual retrieval (Schank 1981).¹

2.2. Text Processing

The challenge is to achieve adequate expressiveness in a computable representation of text. In my own research, a representation based on case grammar is used, in which semantic analysis and precision are stressed. Recent work on sublanguages has been employed to advantage. It is conjectured that the language of law case reports is a sublanguage.

There is no attempt herein either to provide for automatic language analysis or to deal with the discourse analysis concerns about sentence linkage. However, the intent is that the target representation will eventually be amenable to automatic or semi-automatic creation from text.

2.3. Artificial Intelligence

There are two challenges of particular interest. The first is the development of an expressive and tractable knowledge representation. The second is the replication of human

¹ Schank does not define conceptual retrieval. Sowa says, "Concepts represent any entity, action, or state that can be described in language, and conceptual relations show the *roles* that each entity plays." (Sowa 1984, p. 8). Toulmin (1972, p. 8ff) warns against defining "concepts" badly, and discusses definitions and concepts at length.

cognitive acts in the search mechanism.

The representation must be expressive enough to permit the unambiguous translation into it of legal concepts and facts. Legal concepts are known to be open-textured, that is, incompletely defined. Facts, in order to be understandable, must be related to appropriate real world knowledge.

As well as the facts and legal concepts themselves, the associations between them must be represented and the overall structure of the argument preserved in the translation from text to notation, in order to provide for meaningful retrieval.

The second challenge, the development of a search capability that replicates human cognitive processing, is described below.

2.4. Legal Reasoning

Legal reasoning, taken as a special kind of human cognition, is not fully understood. Yet, like using language, some people do it well enough in life.

In this project, I am attempting to replicate a kind of legal reasoning in order to improve upon information retrieval techniques. This kind of reasoning is demonstrated in case law research. The lawyer wants authority for his² point of view. He wants a viable argument that will support his claim — from a binding case if he can get it, from a persuasive one if he cannot. Failing that, he will take any helpful argument he can find. He may even want some combination of legal concepts and facts related to the issues in his current problem, which, although it does not constitute an argument in itself, will help him to construct one.³ A conceptual retrieval system could give him what he wants.

Others have looked to the well-known jurisprudence writers for help in understanding legal reasoning. Among the writers whose work has been tapped are Bentham, Austin, Hohfeld, Cardozo, Hart, Levi, and Fuller. My concern is primarily with arguments. I have found most helpful the philosophers interested in the new rhetoric. Chief among them are Chaim Perelman and Stephen Toulmin.

3. CASE LAW RETRIEVAL

3.1. State of the Art

The information retrieval systems available for legal literature — LEXIS, WESTLAW, Q/L and so on — share the problems of other information retrieval systems. Their biggest difficulty is the limitation of the keyword boolean algebra format.

Some attempts to improve upon the design have looked promising but failed to affect mainstream developments. The SMART retrieval system with its emphasis on vector manipulation was one (Salton 1971). Other developments involved automatic analysis of text and statistical analyses of term distributions, reviewed in Salton 1975, and Sparck Jones 1971, among others.

Information retrieval systems actually retrieve documents, as opposed to information, and are particularly limiting for case law retrieval. Keywords are practical for powerful, large volume retrieval of documents "about" a specific topic. When text is represented by keywords, many meanings are attached to the same keyword within the database. Disambiguation depends upon association with other keywords in the matching process. Therefore, concepts from different points of view, but about the same subject, are often pulled together. This is generally an advantage, as is retrieval based on homeosemy, or concepts with similar meaning (Karlgren 1971).

Clearly such a representation by surrogates is not adequate for searching cases. We already have good indexes, both topical and descriptive word indexes. We do know the limitations of the keyword approach.⁴ Keywords are sufficient to represent only the skeleton of a text. They convey neither meaning nor complete ideas. In short, how can one expect to find the law in cases with a system that cannot answer a conceptual question about apples?⁵

Furthermore, case law language presents a particular problem because it is replete with natural language vocabulary; as White expresses it, "The law has in fact very few technical words; therefore, our original question whether legal concepts are necessarily technical reduces to the question whether the everyday language which makes up the vast body of the law expresses technical or everyday

² "His" and other similar pronouns are used throughout, rather than the cumbersome "his/her" and other similar constructions.

³ The following description of a lawyer's search exactly describes the usual cognitive phenomenon, if the attempt to relate it to syllogism is discounted. "No lawyer ever thought out the case of a client in terms of the syllogism. He begins with a conclusion he intends to reach, favorable to his client of course, and then analyzes the facts of the situation to find material out of which to construct a favorable statement of facts, to form a minor premise. At the same time he goes over recorded cases to find rules of law employed in cases which can be presented as similar, rules which will substantiate a certain way of looking at and interpreting the facts. And as his acquaintance with the rules of law judged applicable widens, he probably alters perspective and emphasis in selection of the facts which are to form his evidential data. And as he learns more of the facts of the case he may modify his selection of rules of law upon which he bases his case" (Dewey 1924, p. 545).

⁴ I cannot describe the problem better than did Oliver Wendell Holmes in 1897: "There is a story of a Vermont justice of the peace before whom a suit was brought by one farmer against another for breaking a churn. The justice took time to consider, and then said that he had looked through the statutes and could find nothing about churns and gave judgment for the defendant. The same state of mind is shown in all our common digests and textbooks. Applications of rudimentary rules of contract or tort are tucked away under the head of Railroads or Telegraphs or go to swell treatises on historical subdivisions, such as Shipping or Equity, or are gathered under the arbitrary title which is thought likely to appeal to practical minds, such as Mercantile law," (Holmes 1897, p. 59).

⁵ Salton uses the example of apples. State-of-the-art systems can identify documents about a subject, say apples, presenting the subject from divergent points of view, but they are, nevertheless, "about" apples. In order to answer a question about apples, it is necessary to express the conceptual content, or meaning of the documents — "what the concept of apple actually entails." Salton 1983, p. 267.

concepts," (White 1985, p.17).

Case law is written, formal, and technical, but unlike the language of statutes, the language of case law is similar to everyday language. The language of statutes is less rich in conceptual description than that of cases, because of technical drafting practices. Retrieval of statutes and rules using traditional methods is easier than retrieval of cases because of the limitations on the number of meanings and the control of vocabulary. Numerical section identifiers can be used as well as words for matching and retrieval. Case law is, therefore, more difficult even than other kinds of law to retrieve by the traditional method.

In addition to the keyword limitation, information retrieval systems present a serious problem of awkwardness in handling searches. Boolean logic is extremely powerful for document retrieval. It can be used to *formulate* complicated search queries without limitation. However, the actual *performance* of a complex search using boolean logic is often impossible. The three problems of term negotiation, set negotiation or logic monitoring, and answering the question occur concurrently. It is this difficulty that necessitates the use of technical intermediaries.⁶ It is commonly known that even with a well-trained intermediary, complex factual questions, questions with commonly used terms, (for example, procedural questions with words like "court", "judge", "rule" and so on,) and searches involving synonyms are not presently handled to the satisfaction of the profession or the searchers.

In short, traditional retrieval systems can be reasonably reliable when searches are simple, when concrete descriptions, facts, explicitly named concepts (for example, consideration), or documents "about" something are sought. When specific information, answers to questions, responses to queries about complex factual situations, abstractions, or described ideas not explicitly named are sought, searches are not accomplished easily, if at all.

There is also the problem of very large databases. Are artificial intelligence techniques adaptable to use with quantities of text? Information retrieval researchers have concentrated their efforts on subject analysis using controlled vocabularies as the most viable solution to the problem of processing quantities of text, the natural language being so difficult. However, that approach totally avoids the issue of dealing with meaning.

3.2. Toward Conceptual Retrieval

To improve retrieval, to make it conceptual, two changes must be made: the representation of text must be made more meaningful, and the search capability must be made powerful and more flexible.

To accomplish the first step the conceptual elements of the cases and their relations should be identified and represented. That is to say, if arguments are to be retrieved, their elements — including the legal concepts,

the facts, and the significant relations among them -- must be identified and represented. There is the problem of identifying implicit legal concepts and implicit relationships. I have neither ignored nor solved it.

Secondly, a searcher must be able to navigate among the represented relationships and match complex patterns of legal concepts and facts with maximum flexibility. The need for flexibility is important, because case searching is not done in a logical, linear fashion. It is done by repeatedly redefining the original claim, as new information is gathered, until the answer is attained or the search is abandoned.⁷ When searching with boolean operators, it is difficult to follow the logical complexity of the search through repeated redefinitions of the question. If the searcher were able to replicate rhetorical reasoning he would have a powerful searching capability and would find the logical progression of his search natural and easy to follow. As he searched, he would be following the cognitive process of devising an argument; and devising an argument is, after all, what he set out to do.

4. BACKGROUND REVIEW

4.1. Conceptual Retrieval

Roger Schank's work brought conceptual retrieval to the fore in both natural language processing and information retrieval (Schank 1975, 1981). In law-based systems, much of the research involved statutes and codes that are written in carefully drafted technical language, for example, TAXMAN, (McCarty 1977, McCarty and Sridharan 1980, 1981, 1982). Another example is the Louisiana Civil Code project, (deBessonet 1982, deBessonet and Cross 1984).

A number of projects dealing with cases or case-like situations have been done. Of particular interest is the work of Carole Hafner who worked with negotiable instruments cases and statutes (Hafner 1978, 1981). Anne Gardner's research is interesting in this context. She has worked with open-textured concepts, and is particularly concerned with the nature of legal arguments (Gardner 1984, 1985).

4.2. Argumentation

Work on rhetorical reasoning began, of course, with Aristotle (*Topics*, *The Rhetoric*) and Plato (*Phaedras*). Emphasis was placed on the oratorical element for many years after that. In recent years, interest in the analytical element has reawakened; see especially, Perelman 1963, and Perelman and Olbrechts-Tyteca 1969.

Stephen Toulmin followed in the same tradition (Toulmin 1958, 1972). He constructed a model of argumentation, which has been demonstrated to be applicable to law (Toulmin, Rieke, and Janik 1979). Furthermore, it has

⁶ Schank comments on the need to know the particular system as well. (Schank 1981, p. 95.)

⁷ Rissland's work with hypotheticals is based on an understanding of this aspect of legal reasoning. Her taxonomy of moves provides a mechanism for approaching search from this angle (Rissland 1982, 1983, and 1985).

received favourable notice from members of the profession.⁸ In addition, a recent attempt has been made to combine it with a Montague grammar to produce a computable formulation for arguments, (Brkic 1986).

The work of the argumentation theory writers, among them, Brockriede (1975), Cherry (1978), and Hample (1979), was concerned with the dialog form of argument and with the cognition of sender and receiver. Similarly, Birnbaum's work has been involved with a functional form of argument (Birnbaum, Flowers, and McGuire 1980, Birnbaum 1982).

However, arguments in law cases are the reported reasons for the decisions. They are not transcripts of the presentation of the argument from both sides.

Argumentation theory is concerned with the interaction of the arguers, with meaning in the dialog as the argument develops. It is not suitable for the analysis of decisions. The rhetoricians' analytical approach that focuses directly on the means of persuasive reasoning provides a better analytical instrument. Therefore, I rejected the argumentation theory viewpoint, in favor of the rhetoricians'.

4.3. Sublanguage

The seminal article on sublanguage analysis, or, as it was previously called, analysis of language in a limited domain, was Harris's *Mathematical Structures of Language* (Harris 1968). There has recently been a resurgence of interest in sublanguages, as seen in the following collections: Britton and Black 1985, Grishman and Kittredge 1986, and Kittredge and Lehrberger 1982.

The language of law is distinctive in both syntax and semantics. The characteristics of language used in law cases has been of interest to a number of different groups related to law and computers for years.⁹ The value of special language characteristics in knowledge representation is of course to reduce instances of ambiguity by specifying constraints on meaning.

Some syntactic characteristics of the language of the law have been identified, (Dickerson 1965). Among them are the commonly recognized examples of embedding of clauses in multiple layers, and the use of two-noun phrases that emphasize meaning, such as "fair and reasonable" and "known and communicated". Both are from *Hadley v. Baxendale*. (See Figure 3.) In law as in other distinctive domains, syntactic variation has not proven to be especially helpful in disambiguation of sublanguages.

The word selection phenomenon is the most distinctive feature of sublanguages, and appears to be the most useful in disambiguation. Characterizing word groups,

specifically noun classes, with regard to their contextual use is a start. The difficulties come in trying to clearly distinguish the technical use of a particular noun or group of nouns commonly used in natural language, the flexible use of language, intentional vagueness to allow for broad interpretation, changing meaning for specific terms (a phenomenon of historical growth) and of course the open-textured concepts which change their meanings as the ideas they represent become more clearly defined through experience as cases accumulate on the subject.

5. CONCEPTUAL RETRIEVAL AND CASE LAW INFORMATION

5.1. Objectives

The objective of my research is to be able to retrieve arguments and parts of arguments from an information base of cases. The point is to be able to produce the information related to a query. I am trying to provide neither a reasoning system for experts, nor an advisory system for laymen, but a retrieval system, a conceptual retrieval system — admittedly one of limited dimensions.

5.2. Input

A casebook, Milner 1985, was chosen as my source to guarantee a selection of substantive cases covering a variety of legal concepts with a minimum of text.

Contract law was chosen as a domain because of the clarity of the concepts and the precision of the language. Furthermore, contract law is reasonably simple at the beginning, and later becomes more complex. For example, a simple contract situation of offer, acceptance, consideration, and performance is familiar to all. However, the problems of third parties and of remedies, particularly equitable ones, provide a rich field for examining complexity later, if a simple conceptual system can be made to start.

5.3. Analysis

The argument supporting the *ratio decidendi* of each case is analyzed according to the Toulmin layout for arguments (Toulmin 1958). The reasons for using only the *ratio*, eliminating the *obiter dicta* and extraneous factual material, is to be able to focus the research on the use of the argument structure. Determining what is in fact the *ratio* will be easier than is usual in a random body of cases; because the source is a teaching text, the cases included are clearly focused. Furthermore, they are accompanied by notes indicating the editor's intended point in including them.

The Toulmin pattern of an argument is a simple analysis but adequately accommodates all the elements of an argument and their relations. In particular, when applied to a legal argument, the facts, legal concepts, and authority for a particular point of view stand in appropriate relation to each other. The components of the pattern are: claim, grounds, warrant, modal qualifiers, rebuttal, and backing. The *claim* is the final statement, the conclusion or

⁸ "The model of reasoning which is closer to what is actually engaged in, especially at the appellate level, and the model which is the most adequate for the purpose (and, I think ought to be used) is what some call the 'good reasons' approach (particularly identified with Stephen Toulmin)." (Blackstone 1971, p. 234.) See also Stone 1964, p. 327ff.

⁹ These are only a few of the obvious sources: Mellinkoff 1963, Dickerson 1965, Sprowl 1979, Charrow, Crandall, and Charrow 1982 White 1985.

the goal of the argument. The *grounds* are the facts asserted to support the claim. The *warrant*, described as a hypothetical, bridge-like statement, is the logical authority for going from the grounds to the claim and is particularly useful in law.¹⁰ *Modal qualifiers* such as "probably", "presumably", and conditions of acceptance, limit the scope of the application of the warrant in the particular instance.¹¹ Conditions of *rebuttal* are included when the authority of the warrant must be set aside.¹² Finally, the *backing* establishes the general authority for the warrant and its validity is determined by the rules of the area of argument.¹³

The arguments are subjected to linguistic case analysis of the type discussed by Fillmore (1968), and applied by many since then. Semantic information, relating to the special subgroups of nouns, is attached as appropriate.

The twice-analyzed arguments are then organized in frames.¹⁴ An example of a very preliminary analysis may be seen in Figure 1. The case-slot frame representation is used to enhance the expressiveness of the representation and to insure semantic precision.

In developing the knowledge representation, the accurate expression of the arguments is the paramount goal. The meaning of the facts, legal concepts and their relations must be properly expressed in the logic of the representation language. It is a necessarily rigid counterpart to the textual language if it is to compute, even though adequate expressiveness and flexibility are recognized subgoals.

The language of the text cannot be translated directly into a logic-oriented notation. It is necessary to interpret the text on three levels while undertaking the translation. First, there must be an understanding of the underlying rhetorical reasoning in order to make the implicit steps in the argument explicit and to keep the story together (maintain the cohesion of the argument). Secondly, there are the problems of language interpretation. What is said; and what is meant? What possible ambiguities must be screened out by the representation? Third is the problem of making the notation a viable logical representation of the content.

The question of whether or not rhetorical reasoning can be represented by a logic with definite truth values always

¹⁰ "This distinction, between data and warrants, is similar to the distinction drawn in the law-courts between questions of fact and questions of law, and the legal distinction is indeed a special case of a general one — we may argue, for instance, that a man whom we know to have been born in Bermuda is presumably a British subject, simply because the relevant laws give us a warrant to draw this conclusion," (Toulmin 1958, p. 100).

¹¹ "...we may need to add some explicit reference to the degree of force which our data confer on our claim in virtue of our warrant." (Toulmin 1958, p. 101.)

¹² For example, if the man from Bermuda had become a naturalized American.

¹³ In the example case, the relevant Bermuda legislation — is it still in force?

¹⁴ Frames were introduced by Minsky (1975), and have been used in many forms since then. Their peculiar strength is that they can be designed to accommodate especially well the descriptive representations of complex concepts.

comes up here. There is no inherent antagonism between logic and rhetoric. To assume there is, is to take an unnecessarily rigid view of logic.¹⁵

The justification for attempting to model a rhetorical reasoning domain in a logic notation is that rhetoric is working, everyday logic. It is a practical problem in case literature that is generalizable in human life.¹⁶

5.3.1. Argument Representation

The Toulmin model forms the base. It is the outline within which the argument is drawn. It keeps the major relationships between the parts in focus, and provides a safeguard against inadvertent omission of important content.

The most significant relationship is the one between fact and legal concept. In *Hadley v. Baxendale* (Figure 3) "special circumstances" is the important concept. The facts of the case related to the concept establish a base definition for it. Also, the facts take on a new significance. It might ordinarily have been assumed that if something as big as the mill shaft had broken, it was a major event and the miller might not have been expected to have had a spare or to have carried on.

In *Stamper v. Temple*, Figure 2, the decision states that a strong expression of emotion cannot be used as evidence of intention. It is a classic instance of the need to associate specific facts and legal concepts. How meaningful is the concept without the fact? What is "strong"? What kind of emotion? The concept was so weak that the judge had to help it along with an example of his own device. It is not a statement of fact, but it helps to give some meaning to the concept of "strong expression of emotion".

Other instances relationships between facts and legal concepts occur in *Hadley v. Baxendale*. We hear about the amount of injury that would "ordinarily follow breach, damages that may "fairly and reasonably" be considered, and circumstances that, "in all probability," would not have occurred. Facts when linked to these concepts are descriptive and limiting. In each of these cases, if the relationship of the facts to the concepts were not established, the representation would be less meaningful.

Partial identification is a rhetorical technique. It is intimately connected with the reasoning behind *stare decisis* and has to do with the classification of types into categories. Points of comparison are drawn in order to affect the classification of new cases. If a case is a member of a certain group, a specified treatment will be applied, in accordance with precedent, resulting in a predictable outcome in a given situation.

In the attached excerpts, there is not a clear example of two similar cases. However, in *Hadley v. Baxendale*, the discussion of the applicability of the "in such cases as these" indicates the points of comparison which will be important later, at least from the judge's current position.

¹⁵ Toulmin 1958, Perelman and Olbrechts-Tyteca 1969

¹⁶ "When people follow an argument, however, they get at its 'meaning' without generating a formal proof." (Sowa 1984, p.18.)

Later again, he speaks of "other cases" and classifies the potential exceptions he does not regard as exceptions. These are concepts that must not be overlooked in representing the argument.

Partial definition is central to the problem of case retrieval, but there are other types of argument recognition of which can lead to better results. It is important to recognize rhetorical reasoning in order to be able to use it in the representation and, in later retrieval. Representing these reasoning techniques as they are used will improve the integrity of the knowledge base and make it possible to relate facts and legal concepts in a meaningful way at search time.

Argument by division is commonly used in law. The whole is divided into parts, and the parts treated separately. The example here comes from *Hadley v. Baxendale*, the argument about special circumstances — had they been known and had they not been known. The judge presents two alternatives; if one is followed, "it would be very unjust". Therefore, the other, his own preference, prevails. In the representation, both alternatives are included but their apposition is a part of the argument too, and the representation must include it. It is especially difficult if the argument is not fully drawn.

There is, in *Hadley*, an argument by exclusion, directed toward proving the nonexistence of a part. An argument is made to counteract an anticipated argument dealing with exceptions to the special circumstances rule. The sentence that begins "It is said that" is the statement of an expected opposing argument. There are several problems to consider. Was the argument actually made? Can the phrase be dismissed as literary? What is the appropriate designation for the speaker? How should the truth value be reckoned? Should it be merely treated as another hypothetical? These questions involve the representation of language and logic, but they are unavoidable just here. Adequate representation of the meaning of the various arguments has been more difficult than anticipated.

The use of hypotheticals to represent possible variations in the fact situations, as in the description of the "special circumstances" part of the rule, is another problem of considerable dimensions. It is made even more difficult by the intertwining of arguments. One hypothetical leads into another, then the focus shifts back to the first for completion of the argument — all the while, the deontic obligation operator and the modal possibility operator are in effect. In the background is another strand — the argument of the case at hand the principal argument. It is extremely difficult to be certain that the strands are sealed off, that there is not unintentional interaction among the component representations that would prejudice the integrity of the representation.

It may be possible to relieve some of the congestion by using inheritance from one hypothetical to another where there is only a slight change in the proposed fact situation. Possibly a description could be inherited and modified. The situation is none the less complex.

As noted above, facts not directly relevant to the *ratio decidendi* are not used. Furthermore, only sentences that contain information relevant to the argument, according to the Toulmin pattern, are included. This cannot be regarded as truly a sentence by sentence analysis for that reason.

A question of the level of representation arises from the reporting in the case. In other cases where there have been previous trials and facts are reported as they were viewed at the different judicial levels from either side of the argument — there is a flavor of this in *Hadley v. Baxendale* — sorting out the level of reportage, along with the expressions of doubt, possibility and probability at the same time is complicated. Decisions on these levels of reporting and of arguing have been made on an *ad hoc* basis. The same priority of trying to keep the principal argument together and integrated has predominated.

Another facet of the reporting problem that occurs is the reinterpretation of facts, especially in the light of the warrant. If the facts are reiterated with some interpretive material as to their meaning, as are the details of the relationship between Hadley and Baxendale, then the additional information is added to the representation, but the information already present therein is used.

5.3.2. Language Representation

The goals of language representation are to represent each meaning a single time and to make certain that each meaning is really distinct.

Having found a way to link the parts of the argument in a suitably loose organization, it was important next to establish the level of the representation. Focus was placed on the meaning, rather than the occurrence of verbs, clauses or sentences. Repetitious statements which carried no additional information were excluded. Consider, for example in *Weeks v. Tybald*, Figure 1, the statement concerning the facts of the plaintiff's statement to the defendant: in one place it was "told", and in another "words were spoken". The event is represented as simply having occurred. Neither verb was used.

The question of maintaining the language of the text is and has been difficult. The distinctive words are always included in the representation. Generally, the representation stays as close to the language of the text as possible. As has been shown, there are a number of omissions of words and of sentences, in connection with the representation of arguments. It has been recognized that the entire text as written is the most desirable knowledge base. However, since it is not presently possible to use a full text base efficiently, the best available solution is the next best goal.

There is also the problem of the words one would expect that do not appear in the text. For example, in both *Weeks* and *Stamper*, we are talking about intention, but in neither case does the word appear. In both cases something approaching an offer is being discussed, yet "offer" does not occur in the text in *Weeks*.

In some places where the sense was clearly indicated, additions have been made to make the meaning explicit. In both *Weeks* and *Stamper*, "give" is used to mean "pay"

in connection with the spurious offer. The represented statements both make the meaning of payment quite clear.

Finally, cases of this type are commonly known as "mere puff" and again the words do not appear. If the description of the events of the case and the argument are adequate, will it be possible for representation of these cases to compete with a keyword system where such words could have been added to augment the retrieval capability?

Meaning was stressed over the representation of the linguistic content. In *Stamper*, recall the number of levels in a single sentence:

"We are constrained
to believe
that what is called an offer
is nothing but a strong expression"

The major problem is, that we are dealing with something that is not what it is supposed to be, may be put aside for a time. However, it is important to know which of the levels of thought need be expressed. Is this really a belief? In this instance, I decided it was simply a way of stating an opinion, the deciding one, in the face of an opposing argument. "Constrained", "believe", and "called" have not been represented. The offer is said to be nothing but a strong expression, and so on. The representation belies the language but the meaning is represented. Many of the language representation problems became logic problems as well as is apparent below.

5.3.3. Logic in Representation

As shown above, although there was no mention of intention in the cases of *Weeks* and *Stamper*, intention was central to the argument. It was therefore included in the representation as a viable concept, as an inherent problem in the argument. Similarly, the ideas of promise or agreement do not emerge clearly from either case. Here a more conservative approach was adopted. The issue of the nature of a full-fledged agreement develops more fully in other cases, although the knowledge is implicit in this situation.

These "contracts" are inchoate entities. They must be properly represented. Nothing should be ambiguous enough to allow erroneous inference in view of cases to be added later. The most difficult problem of representation of these early cases is the state of the incompleteness of the agreements. They are not failed contracts, in the sense of having been completed, but not being valid; nor are they completed contracts which have been breached. They are non-events, contract that did not happen, yet they must be represented as if they had some existence. They are promises which were made with more or less intent, but not enough to entail legal consequences. The problem centers about the offering statements which have been decided, by the courts, not to show intention on the plaintiffs' parts to be legally bound.

Negation further complicates the representation of the inchoate contract. There is no offer; and there is no intention. Yet both offer and intention must be represented as

discussed in order to analyze the reasoning. The intention in both *Weeks* and *Stamper* is not "not to contract", but there is intention to promise which is not of a type suitable to be described as intention to contract. So, there is not intention to contract, yet intention remains. A value must be ascribed to the intention.

The representation of disjunction has caused some difficulty. In *Weeks*, is the offering statement appearing to have been made to either the husband (former suitor) or the husband's father? Putting aside the question of truth values, the problem of representing as a disjunction the receiver of the statement is complex. To whom was the offer really made? Was it made to the son, to the father and son, to the father, to someone, to no one? If the possible offeror cannot be unambiguously identified, how would we be certain of whether there is or is not an acceptance in a complete contractual situation?

In the representation of *Hadley v. Baxendale*, deontic logic is necessary to express the obligation imposed by the rule articulated. Although Alderson states that the rule "ought" to be followed, he is in fact obliging the judge in the new trial and judges in similar cases to be required to use the rule. First, he states the conventional rule to be applied to breach of contract cases with regard to determination of damages. He then goes on to discuss the problem of communication between parties where special circumstances exist that may result in more serious damage than would normally be anticipated in a breach.

The scope of application of the obligation operator presumably is the entire rule. When the language of the case is examined carefully, however, the exact scope of the operator is not so clear. It seems that we pass in and out of the discussion of the rule and the facts of the case at hand. Yet the rule is clearly intended to apply to all similar cases. Can it reasonably be said that the context makes the application clear, but the language of the case is not so precise?

There is an instance of two-level causation in *Hadley*. The delivery of the broken mill shaft by the carrier was delayed, so the manufacture of the new shaft and ultimately the delivery of the new shaft, were also delayed. The representation of causation as directly associated as are these two events is not as difficult as other instances of It is a comparatively neat example of a typical type of event. One of the major challenges in developing a representation for cases generally would certainly be the problem of dealing with remoteness and lengthy chains of related events.

The representation of probability — for example, probable occurrences to be expected in the event of a breach, and the probable result in the majority of cases. This concept of probability to be applied as part of a general principle, and coupled with the need to contemplate supposed occurrences, has become an extremely difficult matter to handle in this and in other case representations. The use of probability as a reasoning device consists in the reduction of information by simplification. The technique is intended to be used here. It is not clear what the full implication of the invocation of probability considerations is. How are

they best represented?

The purpose of the exacting representation and the frame-based organization of the information in this complex network is to allow for effective searching.

5.4. Search Methods

The design (not yet implemented) permits two methods of search. The basic method involves iterative pattern-matching and inferencing. Inferences are drawn in the process of searching in order to retrieve information that is implicit in the data. Inferences are used to improve understanding of the information in the database to elicit the meaning or implication of various pieces of information relevant to the specific search. Questions, that is, problems expressed in a logical form suitable for pattern-matching, are to be used to test the design.

In this first search method, an attempt is made to match each transcribed question with a segment of the database. Whole, partial, and failed matches are reported in a meaningful way, related directly to the question formulation.'

The second search method, using spreading activation, (Quillian 1968, Hirst 1987), allows for search of peripheral information at junctures to be specified in the course of the search. Pattern-matching functions are used within the spreading activation search.

Retrieval is tested by using problems based on the content of the sample cases. Some will be derived from the casebook itself, where they appear in the form of notes on the cases. Questions are designed to test the system's ability to retrieve associated legal concepts and legal concepts associated with facts, using rhetorical reasoning techniques including, but not limited to, the following: transitivity, partial identification, and some types of analogy.

6. CONCLUSION

To the extent that the experiment works, it will demonstrate that conceptual retrieval of arguments from case law is feasible. It will show that expressive representations can be made to work in information retrieval. It will show that the implementation of basic rhetorical reasoning techniques makes for powerful and practical retrieval. In so doing, the project will indicate the need to develop more meaningful information representations and more powerful search techniques for use in future information retrieval systems.

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- WEEKS v. TYBALD, (1605) Noy 11; 74 E.R. 982.**
- "In this case it would appear that the plaintiff or his father was told by the defendant, whose daughter the plaintiff later married, that he would give 100 pounds to him that should marry his daughter with his consent.' Held, for defendant. 'It is not averred nor declared to whom the words were spoken, and it is not reasonable that the defendant should be bound by such general words spoken to excite suitors.' "
- CLAIM:** intention1 instance of: intention
 value = (otherthan (to-contract)) **GROUNDS:** (promise1
 instance of: promise
 promisor = D
 promisee = ?x
 what = (if (and (marry22 instance of: marry
 wife = (daughter D)
 husband = (?y))
 (consent D marry22)))
 (then (give1 instance of: give
 (giver = D)
 (recipient = ?y)
 (amount = L100))))
 (occur marry22 (P (daughter D)))
 (apparent-value ?x (or (P
 (father P))))
 (or (not (aver (value ?x)))
 (not (declare (value ?x)))) **WARRANT:** (promisee (?x))
 (promise1 (description) = general-words)
 (intention1
 "(value = (to-excite (suitors)))) **BACKING:** (common-law-
 concept12
 instance of: common-law-concept
 (if (intention (value = (otherthan (to-contract)))))
 (then (not (bound promisor))))

Figure 1: A case report and a preliminary version of its representation.

STAMPER v. TEMPLE (1845) 6 Humph. 113 (Tennessee)

TURLEY J.: "We are constrained to believe that what is called an offered reward of \$200, was nothing but a strong expression of his feelings of anxiety for the arrest of those who had so severely injured him, and this greatly increased by the distracted state of his own mind, and that of his family; as we frequently hear persons exclaim, 'Oh, I would give a thousand dollars if such an event were to happen or vice versa'. No contract can be made out of such expressions; they are evidence of strong excitement, but not of a contracting intention."

Figure 2: Case excerpt exhibiting problem of levels of language.

The plaintiff sent the broken shaft of his mill with the defendant carrier from Gloucester to Greenwich. The broken shaft was to be used as a model for a new shaft. The defendant contracted to carry the broken shaft, but had not been told and was not aware that the mill was not able to function. He unduly delayed delivery to Greenwich. As a result, the new shaft was not delivered to the plaintiff in a reasonable time. The plaintiff successfully sued for damages for loss of profits due to the delay. Below is an excerpt from the appeal.

ALDERSON B.: We think that there ought to be a new trial in this case; but, in so doing, we deem it to be expedient and necessary to state, explicitly the rule which the Judge, at the next trial, ought, in our opinion, to direct the jury to be governed by when they estimate the damages.

It is indeed, of the last importance that we should do this; for, if the jury are left without any definite rule to guide them, it will, in such cases as these, manifestly lead to the greatest injustice. . . .

Now we think the proper rule in such a case as the present is this: Where two parties have made a contract which one of them has broken, the damages which the other party ought to receive in respect of such breach of contract should be such as may fairly and reasonably be considered either arising naturally, i.e., according to the usual course of things, from such breach of contract itself, or such as may reasonably be supposed to have been in the contemplation of both parties, at the time they made the contract, as the probable result of the breach of it. Now, if the special circumstances under which the contract was actually made were communicated by the plaintiff's to the defendants, and thus known to both parties, the damages resulting from the breach of such a contract, which they would reasonably contemplate, would be the amount of injury which would ordinarily follow from a breach of contract under these special circumstances so known and communicated. But, on the other hand, if these special circumstances were wholly unknown to the party breaking the contract, he, at the most, could only be supposed to have had in his contemplation the amount of injury which would arise generally, and in the great multitude of cases not affected by any special circumstances, from such a breach of contract. For, had the special circumstances been known, the parties might have specially provided for the breach of contract by special terms as to damages in that case; and of this advantage it would be very unjust to deprive them. Now the above principles

are those by which we think the jury ought to be guided in estimating the damages arising out of any breach of contract. It is said, that other cases, such as breaches of contract in the non-payment of money, or in the not making a good title to land, are to be treated as exceptions from this, and as governed by a conventional rule. But as, in such cases, both parties must be supposed to be cognisant of that well-known rule, these cases may, we think be more properly classed under the rule above enunciated as to cases under known special circumstances, because there both parties may reasonably be presumed to contemplate the estimation of the amount of damages according to the conventional rule. Now, in the present case, if we are to apply the principles above laid down, we find that the only circumstances here communicated by the plaintiffs to the defendants at the time the contract was made, were, that the article to be carried was the broken shaft of a mill, and that the plaintiffs were the millers of that mill. But how do these circumstances shew reasonably that the profits of the mill must be stopped by an unreasonable delay in the delivery of the broken shaft by the carrier to the third person? Suppose the plaintiffs had another shaft in their possession put up or putting up at the time, and that they only wished to send back the broken shaft to the engineer who made it; it is clear that this would be quite consistent with the above circumstances, and yet the unreasonable delay in the delivery would have no effect upon the intermediate profits of the mill. Or again, suppose that, at the time of the delivery to the carrier, the machinery of the mill had been in other respects defective, then, also, the same results would follow. Here it is true that the shaft was actually sent back to serve as a model for a new one, and that the new one was the only cause of the stoppage of the mill, and that the loss of profits really arose from not sending down the new shaft in proper time, and that this arose from the delay in delivering the broken one to serve as a model. But it is obvious that, in the great multitude of cases of millers sending off broken shafts to third persons by a carrier under ordinary circumstances, such consequences would not, in all probability, have occurred; and these special circumstances were here never communicated by the plaintiffs to the defendants. It follows, therefore, that the loss of profits here, cannot reasonably be considered such a consequence of the breach of contract as could have been fairly and reasonably contemplated by both parties when they made this contract. For such loss would neither have followed naturally from the breach of this contract in the great multitude of such cases occurring under ordinary circumstances, nor were the special circumstances, which, perhaps, would have made it a reasonable and natural consequence of such breach of contract, communicated to or known by the defendants. The Judge ought, therefore, to have told the jury that, upon the facts then before them, they ought not to take the loss of profits into consideration at all in estimating the damages. There must therefore be a new trial in this case.
[Rule absolute.]

Figure 3: Example used in discussion of argument representation.