LEARNING TO UNDERSTAND CONTRACTUAL SITUATIONS*

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ABSTRACT

In the field of law, decisions in previous cases often play a significant role in the presentation and outcome of new cases. Lawyers are constantly recalling old cases to aid them in preparing their own briefs. How do lawyers remember cases? What are the features they use to organize and retrieve past decisions? How do lawyers learn which features are important? To address these questions we are constructing a model of legal novices (i.e. first year law student) and the processes by which they learn contract law. Our model is embodied in a computer program called STARE (from the latin, *stare decisis* which refers to the principle of using past cases to decide current disputes). STARE will read descriptions of contractual situations and attempt to predict the decision based on its general commonsense knowledge of agreements, the previous cases stored in an episodic memory, and knowledge of some basic legal concepts.

I. INTRODUCTION

We are interested in constructing a model of first year law students learning contract law. Law students already have a great deal of commonsense knowledge about the social interactions between people (agreements), right and wrong (justice), and the world in general. They are taught new concepts with specific legal meanings and how to relate these concepts to their commonsense knowledge. They are also taught how to reason analogically from new cases to previous cases and use these reasoning chains to predict and support the decisions in the new cases. To better understand what STARE will face, let's consider an example case that a law student might encounter:

Case-1: LaRue a police officer, promises Frank, a merchant who owns a store on LaRue's beat, that he will keep an eye on Frank's store during his lunch hour if Frank will pay him $50 a month. Frank agrees.

Is there a contract in CASE-1? Answering this question requires knowledge about social roles (role themes) such as policemen, merchants, and public servants, what it means to promise to do something, to keep an eye on someone else's property, and to agree to something. In addition, we infer certain facts from the situation: LaRue has a goal of earning extra money, Frank believes that LaRue has the authority to perform his promise, and there is an agreement between Frank and LaRue. We can now tentatively answer the question based on whether we believe that LaRue is free to moonlight during his lunch hour. If we know that policemen are obligated to act if they witness a crime, even if they are not on duty, then we would probably say there is not a contract. We have a commonsense heuristic which states that one cannot assume a new obligation if it conflicts with an existing obligation.

Assume that we have the above case in memory along with the decision that there was no contract and the supporting reasoning chain for the decision. Now we read the following case:

Case-2: Fred, a police officer, promises Barney, a merchant who owns a store which is not on Fred's beat, that he will keep an eye on Barney's store instead of walking his beat if Barney will pay him $50 per month. Barney agrees.

Given that CASE-1 is in episodic memory, we have no trouble deciding that there is no contract in CASE-2. This assumes that we were able to get to CASE-1 to use it for the current situation. How cases are organized and indexed in episodic memory is crucial to our ability to understand new situations. The reminding of CASE-1 could have occurred from the role themes (both situations involved a policeman and a merchant), the nature of the agreement (protection), or because the same commonsense knowledge was used to understand both cases. In reality it is a combination of these elements.

Our memory now contains CASE-1 and CASE-2 which are indexed together. Now we read next situation:

Case-3: O'Hara, a police officer on vacation in Florida, promises Alfred, a store owner, that he will keep an eye on Alfred's store during Alfred's lunch hour if Alfred will pay him $10 a day. Alfred agrees.

We should be reminded of either CASE-1, CASE-2, or both (since we only have two cases in memory) and must now decide if CASE-3 is similar. We know that there was no contract in the previous cases because of a conflict with a pre-existing obligation. In CASE-3 no such obligation exists so we should conclude that there is a contract.

What kind of knowledge is necessary to 1) recognize the presence or absence of an obligation, and 2) build the appropriate indices into episodic memory?

II. KNOWLEDGE AND MEMORY

As we have just seen, understanding and reasoning about contractual situations requires interaction between a variety of knowledge sources. The following abstract constructs are essential to understanding CASE-1, CASE-2, and CASE-3: goals (Wilensky, 1978a), plans (Schank & Abelson, 1977), themes (Wilensky, 1978b), interpersonal relationships (Schank & Abelson, 1977), events (Dyer, 1981), social acts (Schank & Carbonell, 1979), and role themes (Dyer, 83). We must also be able to represent legal concepts corresponding to OFFER, OBLIGATION, PROMISE, and ACCEPT. In the following sections we shall address the issues of representing general knowledge, legal knowledge, and their integration in memory.

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A. General Knowledge

In the introduction, we identified some of the commonsense knowledge we must represent. There is knowledge about social roles. We represent this knowledge using role themes (RTs) (Dyer, 1983). RTs are organized in an inheritance hierarchy and contain knowledge about societal relationships. Consider what we know about policemen: Policemen are public servants, paid by our tax dollars, whose task is to enforce our laws. They are often assigned a particular area to patrol (beat) and are responsible for protecting the people and property within that area.

Actually we know much more, for example, we know that policemen, firemen, and paramedics all have a responsibility to the public. Therefore, in addition to RT-POLICEMAN, RT-FIREMAN, and RT-PARAMEDIC, we have a more general role theme, RT-PUBLIC-SERVANT which supersedes these three. We conclude that it is the knowledge contained in RT-PUBLIC-SERVANT which tells us that there is a pre-existing obligation in CASE-1 and CASE-2. Once we recognize the obligation, we apply commonsense rules such as:

RULE-1:

IF a pre-existing obligation conflicts with a new obligation

THEN the new obligation is invalid

B. Legal Knowledge

The first chapter of a contract law text book generally attempts to define what a contract is (Calamari & Perillo, 1970). Unfortunately this attempt is bound to fail because there is no complete definition. What the introductory definitions serve to do is provide the student with basic conceptual entities and some weak relations between them. The semantics of these entities evolves as a function of the student's experience and in a sense is defined by the actual cases. We begin by defining basic legal concepts which can be used to represent cases and decisions. These concepts, such as RIGHT, DUTY, OFFER, ACCEPT, and BREACH are used to organize knowledge structures in memory.

As with social acts (Schank & Carbonell, 1979), these are basic concepts, decomposable into more primitive entities. For example, an OFFER consists of the offerer communicating to the offeree that the offerer will do something (possibly achieving a goal for the offeree) if the offeree will do something (possibly achieving a goal for the offerer). However, we are interested in inferences made at the level of the OFFER and not at the level of communication, unless the method of communication is important to our understanding of the situation. The idea of proposing basic legal concepts and expressing laws using these concepts is not new. Hohfeld defined a set of concepts and the relationships between these concepts early in this century (Hohfeld, 1913). However, the usefulness of any set of basic concepts derives from the inferences they permit. Here are some examples:

OFFER: Gives the offeree the power to create a DUTY for the offerer.

DUTY: X must perform or face punishment.

ACCEPT: Creates a DUTY for both parties.

BREACH: The non-breaching party is entitled to compensation and/or the breaching party faces punishment.

C. Episodic Memory

The interactions between the different knowledge abstractions, the basic legal concepts, situations, and decisions are important in defining and computing indices for episodes. Another important consideration in deciding what indices to use is the issue of remindings (Schank, 1982). We want to use indices which will enable us to recall related situations. Recalling our three cases, what indices should we use so that:

- CASE-2 reminds us of CASE-1 as we read it because the parties and the circumstances are similar.
- CASE-2 gets indexed with CASE-1 because the decisions and the support for the decisions is similar.
- CASE-3, while possibly reminding us of either CASE-1 or CASE-2, actually is indexed separately because the decision is different.

Clearly the role themes are one index we want to use. RT-POLICEMAN allows us to recall each situation from any other. However, we cannot merely assume that role themes are always an appropriate index. For example, suppose we have:

Case-4: Harry, a police officer, promises Joe that he will paint Joe's garage on his day off if Joe pays him $50.

We do not want to index this case by RT-POLICEMAN because the information is not important to the decision. The fact that Harry is a police officer doesn't matter because it his day off and painting a garage is not part of his job. However we have already been reminded of the other cases. Another problem arises when several cases share an index. Chances are that we do not want to use that index for remindings because there is no discrimination from the result. To constrain the proliferation of indices, the following strategy applies:

IF feature F is used to support a decision in situation S

THEN use F as an index to S

Thus we must index cases by their decisions, and more importantly, by the reasons which led to the decisions.

The components of a contract can be roughly defined as:

OFFER + ACCEPTANCE + PERFORMANCE + TERMINATION

Decisions generally cite the failure of the situation to fit the definition of one or more of these components. In CASE-1, LaRue has failed to make a legitimate offer, the reason is the existence of a prior obligation. The same holds for CASE-2. We've now learned something about the legal concept OFFER, namely that an saying you'll do something if someone else does something is not necessarily a contractual offer.

CASE-3 should be indexed as a valid contract. If we did not recognize the existence of the OFFER in this situation and were later informed that a contract exists, then we must modify our concept of OFFER to handle the new situation.

III. METHODOLOGY

There have been different research projects over the past decade investigating the applications of AI to law, each with its own methodology. One of the earliest projects took a frame-based approach, trying to instantiate frames from the current situation and soliciting additional information to fill the missing slots (Meldman, 1975). Others have taken an expert systems approach using large numbers of rules to encode knowledge (Peterson & Waterman, 1984). Understanding in this case consists of applying various rules to reach a decision.

There has also been some work on developing a formal representation for statutes and standard documents which would reduce the amount of ambiguity they contain (deBessonet & Cross, 1984; Stamper, 1980; Sprowl, 1979; Allen & Enghold 1978). Finally, there are projects which begin to address the problems involved in representing and identifying legal issues and decisions (McCarty & Sridharan, 1981; Gardner, 1983, 1984). A survey of six law and AI projects is found in (Cook, et. al., 1981).

Our approach substantially differs from most of those above in that we are primarily interested in the cognitive issues involved in understanding legal situations and decisions. Contract law provides a rich domain for studying:

- the organization, storage, and retrieval of episodes in memory
- how knowledge is acquired and refined
- the interactions between different kinds of knowledge
- how remindings occur and are used during processing
- the relationship between law and commonsense notions of right and wrong

We are constructing a process model of how first year law students learn to understand contractual situations which focuses on the role of episodic memory and the interactions between knowledge structures. This model is being implemented in a computer program called STARE. STARE is being designed to read contractual situations in English, build a conceptualization of the situations through integrated parsing (Dyer, 1983), connect the conceptualization into episodic memory (Dyer & Flowers, 1984), and decide whether a contract exists based on general knowledge and the indices in memory. In the event of ambiguous decisions, STARE may solicit additional information or present multiple interpretations. STARE will also be able to answer questions about its processes and knowledge structures. It will be able to retrieve episodes using conceptual indices.

IV. CONCLUSIONS AND FUTURE WORK

Implementation of STARE is currently underway. Initially STARE will accept situations as bare conceptual fragments. It will use these fragments to build up the actual conceptualization of the situation and then index the situation in episodic memory. In order to complete this phase, we are constructing a taxonomy of basic legal concepts, representing commonsense knowledge of role themes, societal and interpersonal goals, social acts, and modelling the interactions between these knowledge sources. Finally, we must address the issues relating to episodic memory, how episodes are organized, what the indices are, the effect of new episodes on the existing organization, and remindings.

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