

**PRECEDENT-BASED LEGAL REASONING IN
CONTRACT LAW**

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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 looking up old cases to aid them in preparing their own briefs. Key issues in this project are the representation of legal cases and the organization of a dynamic memory containing many instances of such cases, legal concepts, and general world knowledge. We restrict our research to the domain of contract law, concentrating on simple cases such as those presented to beginning law students. The first phase of this project is underway and its goal is the representation of a reasonable set of simple contract law cases and a dynamic memory which is able to receive new cases, integrate them into memory with existing cases, and discover related cases (precedents).

1. Introduction

We are interested in constructing models of legal novices (i.e. first year law students) learning contract law by the case method. The case method, which is also employed in business schools, stresses the importance of analogical reasoning and generalization during the learning process. Law students are not presented with laws and legal principles, instead, they learn from cases and are expected to abstract the principles from the examples.

Consider the following three situations:

1. Buyer promises to buy twenty tons of steel per month from Seller at \$100 per ton, subject to cancellation by Buyer on sixty days notice.

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2. Buyer promises to buy twenty tons of steel per month from Seller at \$100 per ton, subject to cancellation by Buyer without notice at any time.
3. 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 if Frank will pay him \$50 a month.

Situation 1 describes a valid contract which is enforceable in a court of law. Situations 2 and 3 describe failures to form a contract due to the lack of consideration on the part of one of the parties. The lack of consideration takes the form of an illusory promise (i.e. a promise where the person making the promise has not necessarily incurred any new obligation) on the part of one of the parties. In situation 2, the Buyer is not required to purchase an ounce of steel. In situation 3, LaRue is promising to do something which he is already required by law to do, as a result, there is no binding contract.

What legal and general world knowledge is necessary to understand each of the above situations? What would a program have to know in order to realize that situations are conceptually similar from a legal point of view? What kind of memory organization would allow the system to be reminded of relevant cases?

2. Previous Work

The work described in [Meldman 75] is one of the first attempts to apply AI techniques to law. Meldman focused on the area of intentional torts, specifically, assault and battery. His prototype system would be presented with a situation, try to instantiate an intentional tort by matching the facts of the situation to the corresponding components of the tort representation, attempt to fill in missing slots by querying the user, and eventually inform the user of the result. At this point the user could enter into a question and answer session to explore other aspects of the situation and the conclusion.

McCarty and Sridharan have been developing a computational theory of legal argument through their work on the TAXMAN (I and II) project [McCarty & Sridharan 81]. The focus of their current research is the development of a conceptual representation of legal concepts in the domain of corporate tax law which facilitates the modeling of the legal arguments which comprise the majority and dissenting

opinions in a tax law case. Although this work deals with a different area of law, we anticipate that the prototype + deformation model proposed by McCarty can be adapted to the decisions in contract law cases.

Researchers C. deBessonnet and G. Cross are working to develop a conceptual representation for the statutes of the Louisiana State Civil Code [deBessonnet & Cross 84]. Their goal is to produce a formal representation for statutes in a normalized form. Other work on converting legal concepts to normalized form can be found in [Allen & Enghold 78].

Waterman and Peterson take an expert systems approach to evaluating civil claims [Peterson & Waterman 84]. Their purpose is to construct an expert system which can determine fair payments for the parties to personal injury cases. The system, called LDS (Legal Decisionmaking System), is implemented in ROSIE, an English-like programming language developed at the Rand Corporation [Waterman & Hayes-Roth 83].

Gardner [Gardner 83, Gardner 84] is developing a program which can analyze legal problems in the area of contract formation by offer and acceptance. The program is presented with a (manually translated) version of a typical examination question that a first-year law student might see involving offer and acceptance. The program must then produce all possible interpretations of the situation.

For other work in the application of AI to law see [Cook, et al. 81, Sprowl 79, LEXIS 75, Hafner 78, Stamper 80].

3. Goals and Methodology

The standard approach for constructing an expert system is to sit down with an expert in a particular field and try to elicit the rules and scenarios which constitute his expertise. This task is extremely painful for both the knowledge engineer and the expert because it relies heavily on the ability of the knowledge engineer to ask the right questions. The expert is often not conscious of the process he uses in solving a problem [Michie 79].

Even assuming that one was successful in automating the process of knowledge transfer, the computer would then know everything the expert knows at that particular point in time and that would be the end of it. The computer would not know how to extend its knowledge (as an expert continually must) or even adapt it to unfamiliar situations. What is missing in this approach is a conceptual model of the acquisition process itself (i.e. how the expert became an expert).

The work discussed in the previous section generally focuses on the structure of law and ignores the cognitive processes a lawyer engages in when presented with a new case. In a typical scenario, a potential client goes to see a lawyer and begins telling a story. During the story, the lawyer will be reminded of similar situations which may prompt the lawyer to ask questions or generate expectations about what will come next.

Normally, by the end of the story, the lawyer has a pretty good idea of how the client's case relates to other cases the lawyer has handled or read about and is in a position to offer advice about how to proceed. Thus, the processes involved in understanding a case are analogous to those involved in story understanding. The difference is how the legal knowledge drives the understanding process.

We are designing a process model to read English descriptions of contractual situations, construct a conceptualization of the situation through integrated parsing [Dyer 83], and connect the conceptualization into episodic memory [Dyer & Flowers 84].

We have decided to model the acquisition of legal knowledge of contract law by examining the process by which it is learned by beginning law students. The *Case Method* is almost universally employed in teaching contract law. Students are presented with cases and commentary on the cases. As they read each new case, it is indexed in memory with other similar cases. When asked to analyze a new case, the student draws upon her knowledge of other cases in order to answer the questions. Therefore it seems logical that the cases in memory must be organized in such a way that:

- Reading a new case reminds the student of previous similar cases.
- The reminders aid in understanding the current case by generating expectations about

what is to follow.

- Where many similar cases are indexed together, a description of the cases is constructed (by a process of generalization) and is used instead of actual instances.
- Cases are indexed so that if two cases are next to each other, it is safe to use one as the justification for conclusions drawn about the other.

The model of episodic memory is therefore crucial to our research. Also of great importance is how the natural language situations are parsed and the integration of the parsing process with episodic memory [Dyer 83].

4. Representing Contracts

The following diagrams show various aspects of contracts represented by concepts, roles, and structural descriptors in the NIKL representation language [Moser 83, Brachman & Schmolze 84, Sondheimer, Weischedel, & Bobrow 84]. Most of the diagrams will be incomplete in order to allow us to focus attention on the important relationships. Roles whose names appear in parentheses are interpreted as representing some kind of restriction on the original role definition. Value restriction concepts (VRConcepts) for roles will often be omitted where unimportant or obvious.

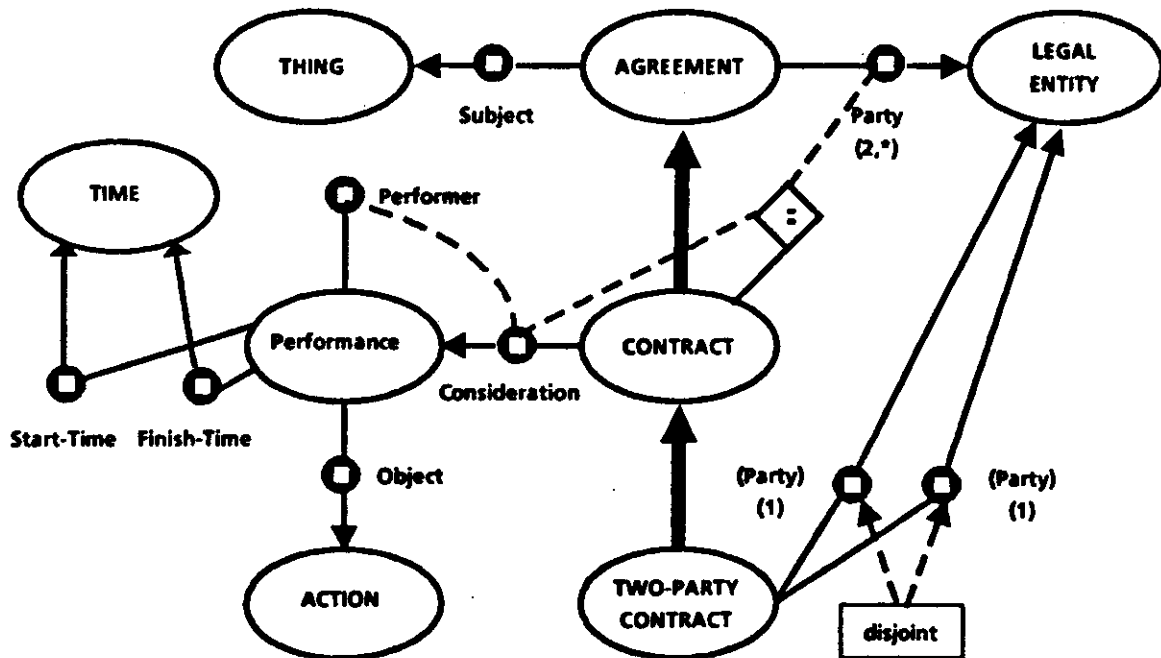


Figure 1: a CONTRACT is a kind of AGREEMENT between 2 or more LEGAL-ENTITIES. All parties to a contract must provide some CONSIDERATION which is a kind of ACTION.

A **CONTRACT** is an **AGREEMENT** between two or more **LEGAL-ENTITIES** which specifies that each **LEGAL-ENTITY (Party)** must perform some **ACTION**. The agreement to perform the **ACTION** is the **Consideration** of the **Party** to the **CONTRACT**. The **PERFORMANCE** of each **ACTION** will be performed by one of the parties and has a **Start-Time** and **Finish-Time**. A **TWO-PARTY-CONTRACT** is a **CONTRACT** between precisely two legal-entities which must be disjoint (i.e. a person cannot make a contract with herself).

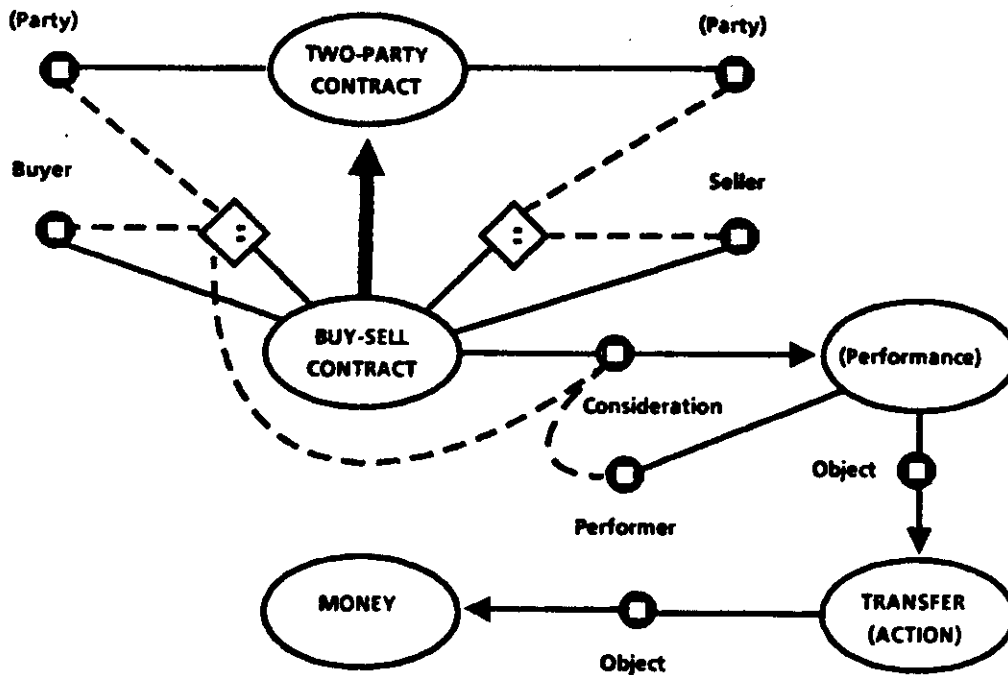


Figure 2: a **BUY-SELL-CONTRACT** is a kind of **TWO-PARTY-CONTRACT** where the **OBJECT** or the **TRANSFER-ACTION** of the **CONSIDERATION** of the **BUYER** is **MONEY**.

5. BUY-SELL-CONTRACT

A **BUY-SELL-CONTRACT** is a **TWO-PARTY-CONTRACT** where one **Party** is the **Buyer** and the other **Party** is the **Seller**. The **ACTION** to be performed by both parties is a **TRANSFER-ACTION** and the **Object** which will be transferred from the **Buyer** to the **Seller** is **MONEY**.

These constraints are represented by the diamond-shaped symbols containing an = sign. The dotted lines define role-chains and the = sign means that the role chains must refer to the same concept. The diagram is somewhat simplified, actually there should be a specialization of **TRANSFER-ACTION** (perhaps **BUY-ACTION**) where **VRConcept** of the **Object** role is restricted to be **MONEY**.

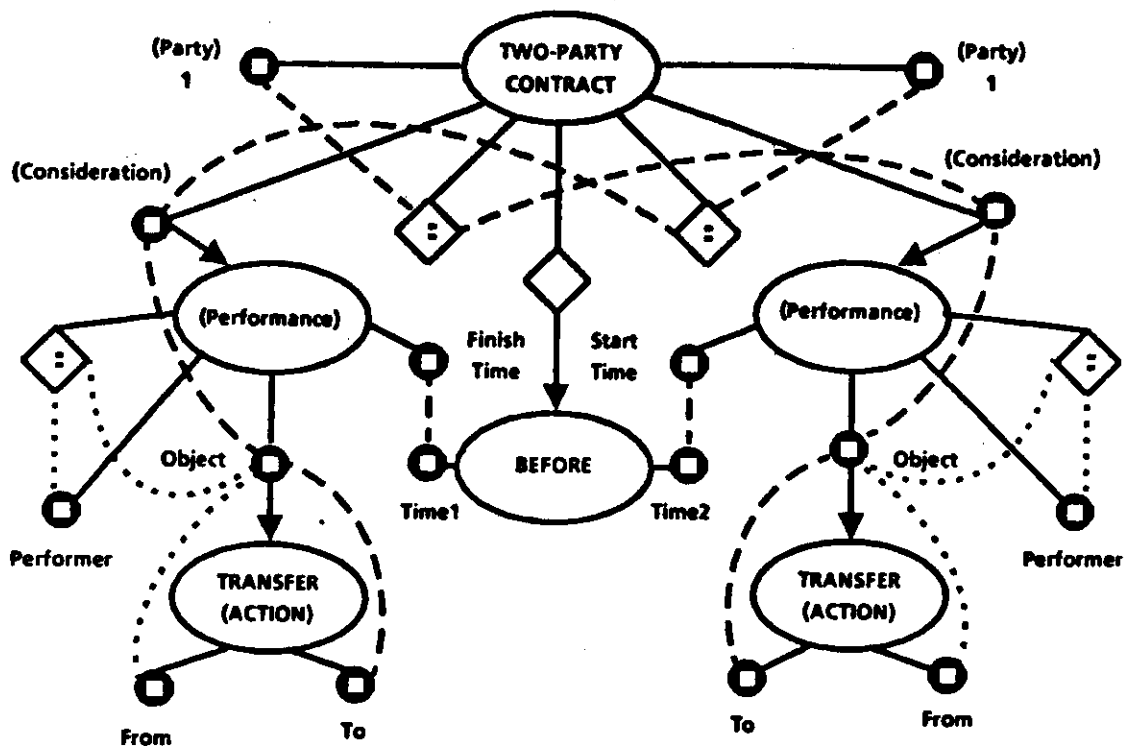


Figure 3: a TWO-PARTY-CONTRACT is a kind of CONTRACT with exactly 2 parties where the CONSIDERATION for each party is a TRANSFER-ACTION and one TRANSFER-ACTION must be completed before the other can begin.

6. TWO-PARTY-CONTRACT

We've already begun our definition of a TWO-PARTY-CONTRACT and shall complete it Figure 3. This figure shows the relationship between the parties to the contract and their responsibility in carrying it out. It specifies who must perform what ACTION and requires that one ACTION be completed before the section ACTION is begun. The latter constraint is represented by the empty diamond-shaped symbol which points to the BEFORE concept.

7. TRANSFER-ACTION

Finally we define a TRANSFER-ACTION in terms of a Precondition and an Effect. The Precondition requires that the LEGAL-ENTITY filling the From role POSSESS the Object. The Effect is that the Object is now possessed by the LEGAL-ENTITY filling the To role of the action. We have not shown in the diagram that the Precondition must also be false as a consequence of the action but this must obviously be so.

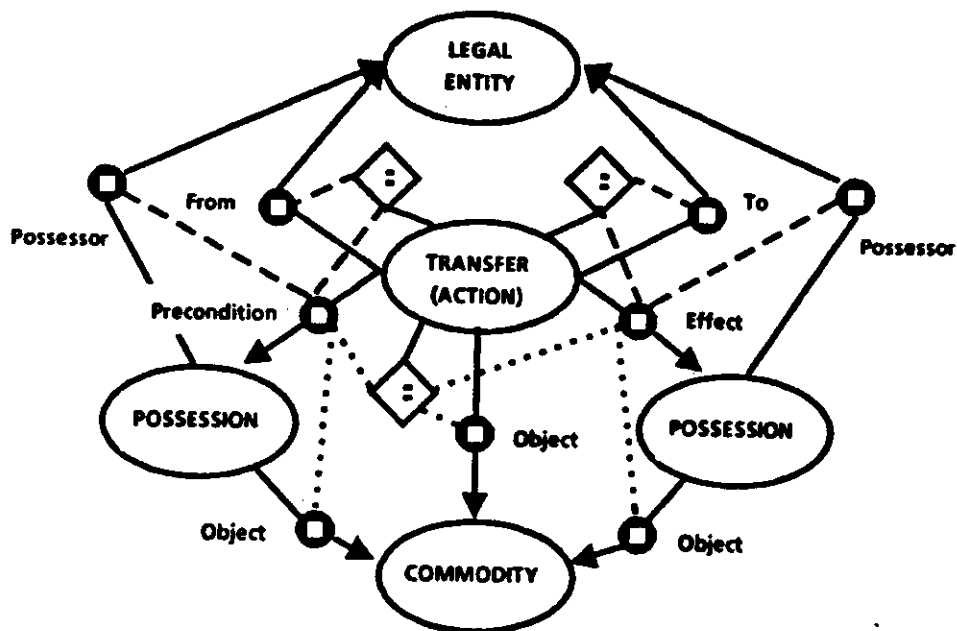


Figure 4: a TRANSFER-ACTION is a kind of ACTION resulting in the transfer of possession of Object from From to To.

8. Episodic Memory

Recalling the situations presented earlier in the paper, we see that Situation 1 will fit quite well into our representation because it is an example of a real contract. In order to handle Situations 2 and 3 which represent exceptions (i.e. non-contracts) we must extend our model so that it can recognize deviations and use them as indices in memory. Thus our episodic memory will contain both actual contractual situations and various non-contractual situations as well.

One method for extending the model is to manually add concepts like NON-CONTRACT and NON-CONTRACT-ILLUSORY-PROMISE. A problem with this approach is that it implies a purely static model of legal knowledge. One of our primary goals is to learn new legal principles from our episodic memory. After Situations 2 and 3 are placed in our network, they should reside somewhere above Situation 1. This means that only the terminal nodes in our network will correspond to actual contracts. Other nodes will refer to either generalizations of these contracts or situations which didn't quite fit due to the presence or absence of some legal feature. This is one of the indices we propose

to use in organizing memory.

9. Heuristics

Our current system uses the NIKL classifier to integrate new cases into existing episodic memory. We are exploring different strategies for using legal knowledge (represented as rules) and experiential knowledge (from episodic memory) to direct the classification process. To do this the classifier must be able to make generalizations based on the current memory organization and then produce a heuristic which it can apply in future cases. We are looking at other research in inductive learning [Rissland 83, Michalski, Carbonell, & Mitchell 83].

For example, after Situation 2 has been understood and integrated into memory, understanding Situation 3 should cause a reminding of Situation 2 and cause a *new legal rule* to be generated which says that lack of consideration is important to the existence of a contract. There is still the problem of incorrect generalizations but this will primarily occur when there are superfluous features. This new legal rule can be generated by the following heuristic:

IF C1 is a instance of a contract case with feature F AND C2 and C3 are not contract cases and both lack feature F

THEN conclude that feature F is important to the existence of a contract

Applying this heuristic to our 3 situations we see that:

- Situation 1 is a contract case where both parties have provided consideration.
- Situations 2 and 3 are not contracts and consideration is missing from one party.

We conclude that consideration is important to the existence of a contract.

10. Status of Implementation and Future Work

Currently we can represent a small set of cases involving buy-sell contracts as a network of NIKL concepts. Our system can take a new case, represented as a NIKL network, and invoke the NIKL classifier to integrate the case into the existing episodic memory network.

One of the interesting issues we plan to address is what changes need to be made to the

classification scheme to enable the system's legal and world knowledge to direct the parsing and explanation processes. We are currently implementing our own version of NIKL in T [Rees, Adams, & Meehan 84] to run on our Apollo workstations and LOCUS network.

11. Summary

Our initial research efforts have been directed towards developing a conceptual representation for contract law, an episodic memory of contracts and cases, and an algorithm for incorporating new situations into the existing memory. We are building a model of legal knowledge acquisition based on the *Case Method* which is used to teach contract law to beginning law students. The foundations of this model are the representation of legal and world knowledge and the organization of an episodic memory of contractual situations.

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