EXAMPLES IN LEGAL REASONING: LEGAL HYPOTHETICALS

Edwina L. Rissland* **

Department of Computer and Information Science
University of Massachusetts
Amherst, MA 01003

ABSTRACT

This paper discusses examples, particularly hypotheticals, their use and generation, in legal reasoning. It examines the use of sequences of hypotheticals.

I INTRODUCTION

In the legal domain, as in many others like mathematics, linguistics and computer science, examples are crucial to reasoning. In the law, cases play the role of examples; many of the examples considered are "hypothetical" as opposed to "real", that is cases that have been actually litigated. In particular it is the "fact situation", that is, a short summary of the relevant facts of the case, that receives the most attention. This is especially true in legal education, for instance in standard courses like contracts, torts, civil procedure and constitutional law, where hypothetical cases are used to explore doctrines and approaches, and to uncover students' assumptions and biases. Hypotheticals are also important in legal scholarship and in legal codification,, for instance as found in the Restatement of Contracts and Restatement of Torts, which are compendia of legal principles, illustrated and limited by sets of real and hypothetical cases.

It is interesting to compare the status of examples in the law and ,in mathematics. In mathematics there is no distinction made between real and hypothetical examples — any example is as real or as make-believe as any other — unless one wants to single out examples that are used in proving a statement by assuming its negative. In fact, the notions of truth in these two fields are very different. In mathematics, truth is absolute and binary; what is true today will be true tomorrow. In the law, one deals with "quasi-truth"; truth is in the interpreting eye of the beholder, and even so, what is true today may be reversed tomorrow — for example, Brown v. Board of Education in 1954. In the law there is much more weight given to interpretation and adjudication in determining truth than in mathematics, although at some levels truth in mathematics is not so black and white either (Lakatos 1976, Davis 197?).

Even so, in the law, hypotheticals ("hypos") can in some contexts assume the status of real cases; for instance in the classroom where certain favorite reference exemplary hypos are treated like real cases. This is not so in legal practice, especially in common law systems like those of the United States and Great Britain, which rely heavily on the doctrine of precedent ("stare decisis") .

II GENERATING HYPOTHETICALS

Given the importance of hypos, one is immediately led to ask "Where do hypos come from?" This question can be decomposed into two:

1. What properties should the hypos have, and how are they determined?
2. How does one generate a hypo with the desired properties?

To use the language of our previous research on examples (Rissland 1970, 1980, 1981), the first question is one of "constraint generation", and second of "constrained example generation" (CEG), using the constraints resulting from answering the first. Our paradigm of CEG actually provides a description of the hypo generation observed in law school classroom discussions. Of special relevance to such hypos is the "modification" component of CEG.

Our model can be summarized as follows:

When presented with a task of generating an example that meets specified constraints, one:

1. SEARCHES for and (possibly) RETRIEVES examples JUDGED to satisfy the constraints from an EXAMPLES KNOWLEDGE BASE (EKB); or
2. MODIFIES existing examples JUDGED to be close to, or having the potential for fulfilling, the constraints with domain-specific MODIFICATION OPERATORS; or
3. CONSTRUCTS an example, for instance by instantiation of domain-specific models or templates, or by combining two existing examples from the EKB or by using other knowledge like definitions, principles, and heuristics from a DOMAIN KNOWLEDGE BASE (DKB).

*This research supported in part by grant IST-80-173^3 of the National Science Foundation.
**This research done while the author was a Fellow of Law and Computer Science at the Harvard Law School.

Retrieval, Modification, and Construction are usually attempted in that order; of course they may be combined with each other.

We have implemented this model and experimented with it in domains like mathematics (Rissland and Soloway, 1980b), tactical planning (Wall and Rissland 1982), and elementary LISP programming (Rissland and Soloway 1980a).

III SEQUENCES OF HYPOS

In law school discussions, hypos often come in a sequence; that is a proposition *or* doctrinal position is enunciated and then explored by considering it on a sequence of cases. The proposition is then usually refined and the process repeats itself. This is much the same as the extended "proofs and refutation" style of concept and theory development in mathematics and other fields (Lakatos 1976, Kuhn 1970). In classroom mathematics, however, emphasis is usually on one or two examples or counter-examples in response to a conjecture. In the law, the sequence of hypos usually starts with a "seed" case which is often a synopsis or simplified version of a studied "real" case. Typically, one then performs a series of modifications starting from the seed case, to generate the hypos. Usually it is just the fact situations of the cases that are being considered.

As an illustration, the following is a sequence of hypos taken from a discussion of intentionality from a first year course in torts. The purpose of the discussion was to contrast issues of "intent to harm" (strong intentionality) with "intent to act" (weak intentionality). The seed case is the real case of Vosburg _v Putney (Gregory, Kalvin and Epstein 1977), litigated at the appeals level in Wisconsin in 1891, in which the plaintiff, Vosburg, aged fourteen at the time *of* the incident, sued the defendant, Putney, aged twelve, to recover damages from injury which was caused by a kick inflicted by the defendant upon the leg of the plaintiff, a little below the knee, and which occurred in a schoolroom during school hours. The opinion of the appeals court devoted much discussion to strong intention.

The class was asked to consider these ideas in the following hypos:

HO: The original seed case
H1: Same as HO except that the defendant is a spastic, and therefore cannot control his actions terribly precisely.
H2: Same as HO except that the defendant runs down the classroon aisle and trips over plaintiff's outstretched leg, just after class has started.
H2; H2 except just before class is to start.
H3: HO except that the incident happens in the playground.
H3': H3 with the addition that the incident happens while they were playing soccer.
H4: HO with the addition that plaintiff wears a shinguard, since he is fearful of injury.
H4: H4, except that plaintiff does not get hurt.
H5: HO with the addition that plaintiff's leg was to be amputated and the defendant's kick merely caused the amputation to occur two week earlier.
H6: Plaintiff is a hemophiliac

These hypos can be described in terms of the features modified:

H1 and H6: the class of the actors
H4: an attribute of an actor as well as the outcome;
H2 and H2': the sequence of events, specifically the time.
H3: The place of the event;
H3': H3 modified to deal with the context of the event.

The point is that by varying one or a few features of an example, one arrives at a new one. Some *of* the hypos *are* very closely coupled: H2 and H2', H3 and H3', and H4 and H4' ; others are less so. The teacher, when asked about the ordering of the hypos, remarked that the order was not as important as making sure that the set of hypos spanned a variety of possible fact situations that would emphasize and illustrate the different doctrinal approaches and sympathies of the students.

This same phenomenon of seed example followed by sequence of hypos generated through modification can be seen throughout the standard law courses. For instance, in discussing in personem and quasi in rem jurisdiction, in which the issue is whether a court has jurisdiction over an individual by virtue of his being in or owning property in a state, a civil procedures course was presented with the following sequence of hypos in rapid succession.*

H1: I own an undeveloped tract of land in New Hampshire.
H2: H1 + never go there and never pay taxes.
H3: H2 except pay taxes.
H4: HI + make improvements to land.
H5: H1 + build a cabin and never go there;
H6: H5 + rent it out.
H7: H5 + let friends use it.
H8: H5 except spend two weeks a year there.

Note that in our description of the hypo sequence in terms of modifications, there is often more than one way to describe the generation of the hypo. For instance, H3 can also be described like H2 as a modification of HI. These relations among the hypos of "constructed from modification" allow description of the hypos as an "examples-space" of examples (as nodes) and modifications (as labelled arcs) (Rissland 1978).

In summary, one can frequently analyze sequences of hypos, such as found in classroom

*In the seed case, Pennoyer v. Neff [Cound, Friedenthal and Miller 1980] Pennoyer was served with process even though he was a non-resident of the state.

socratic discussion at law school, as consisting of a seed example and a sequence of subsequent examples generated by modifications; the modifications are made to various features of the examples such as time and place attributes. Construction also occurs, but in our observations much less frequently than modification.

IV CONSTRAINT GENERATION

It is an interesting and complex question how one decides what one wants in a hypo. The constraints often come from pedagogical goals, like when a teacher carries a sequence of hypos to an extreme in small steps, in what is known as "sliding down the slippery slope", in order to show how a doctrine, legal rule or personal bias can allow results that are clearly undesirable, "false" or, at least, controversial. This approach resembles the "reductio ad absurdum" familiar to all mathematicians.

From empirical data on hypos, one can distinguish several broad types of constraints:

1. general constraints, like those affecting time, place, actor, or generality;
2. rhetorical constraints, like those affecting salience and order in hypos;
3. pedagogical constraints, like those on extreme cases;
4. commonsense constraints, like those about people, occupations, property ownership;
5. domain-specific doctrinal constraints on the legal content, like intentional torts or in personem jurisdiction.

Which constraints are placed on the hypo clearly depends on the goal of the teacher or the arguer, as well as on the context in which it is to be used. The intertwining of proposition and example in legal argument and dialog is very like that in mathematics proofs and refutation and in other domains (Swartout and Balzer 1982). How the constraints are determined is a subject of current research.

V IMPLEMENTING CEG FOR LEGAL HYPOS

To apply the CEG model and use the existing CEG system for generating legal hypos, one must describe the following domain-specific knowledge:

1. the structure of the examples;
2. The attributes of the examples to be constrained and modified;
3. the criteria for judging satisfaction of the constraints;
4. the modification procedures.

We use a frame-based representation for the examples with slots and attached procedures for describing an example's attributes, LISP functions to specify judgment criteria and modification procedures. The judgment and modification routines are very domain-specific, and in the legal applications they relate to doctrinal considerations.

We have experimented with generating hypos using CEG in simple contract law cases. We are currently implementing and experimenting with hypos in the domain of intentional torts. This area is trickier to implement because the legal topic itself is trickier.

Our goal is to produce hypos of the kinds found in the Restatements and classroom discussions, which are typically two or three sentences long. Currently we produce the hypo either by filling in a natural language template, or by accepting the frame representation as output. Clearly, eventually one must interface with sophisticated natural language generation mechanisms like McDonald's MUMBLE (McDonald 1983).

VI CONCLUSION

In this paper,.we have discussed the problem of generating examples, specifically hypotheticals, in the law. We have broken this problem into two components: one of generating the constraints on the examples from consideration of contextual factors such as the propostion being argued; and one of then generating the example that satisfies the constraints. For the second, we have applied our previous work on constrained example generation. Here we have found that our model and analysis can be used for generating hypos in standard legal subjects like torts and contracts; we believe that it will be useful in others as well. We have also noted that there are many similarities among, and some interesting differences between, the use of example generation in the law and other fields like mathematics.

ACKNOWLEDGMENTS

The author thanks her colleagues at the Harvard Law School for their valuable interactions, Oliver G. Selfridge for his insightful discussions, and Olivia whose imminent arrival in January acted as a catalyst for this paper.

REFERENCES

Cound, J.J., J.H. Friedenthal, and A.R. Miller, Civil Procedure: Cases and Materials, Third Edition. West Publishing Co., Minn., 1980.

Davis, P.J., "Fidelity in Mathematical Discourse: Is one and one really two?" American Mathematical Monthly, 79, pp. 252-263, 1972.

Gregory, CO., H. Kalven, and R.A. Epstein, Cases and Materials on Torts. Little, Brown and Co., Boston, 1977.

Kuhn, T.S., The Structure of Scientific Revolutions. Second Edition. University of Chicago Press, 1970.

Lakatos, I., Proofs and Refutations. Cambridge University Press, London, 1976.

McDonald, D.D., "Natural Language Generation as a Computational Problem: An Introduction". In Brady (ed.), Computational Theories of Discourse. MIT Press, 1983.

Rissland, E.L., "Example Generation". In Proceedings Third National Conference of the Canadian Society for Computationala Studies of Intelligence. "Ticotria, B.C., May 1980.

_____, Constrained Ex ample Generation. Technical Report 81-24, Department of Computer and Information Science, University of Massachusetts, Amherst, MA 1981. Also to appear in Cognitive Science.

_____/'Understanding Understanding Mathematics". Cognitive Science, Vol. 2, No. 4, 1978.

Rissland, E.L., and E.M. Soloway, "Generating Examples in LISP: Data and Programs". In Proceedings International Workshop on Program Construction. Bonas, France, September, 1980a.

_____/'Overview of an Example Generation System". In Proceedings First National Conference on Artificial Intelligence (AAAI-80). Stanford University, August 1980b.

Swartout, W., and R. Balzer, "On the Inevitable Intertwining of Specification and Programming". CACM Vol. 25, No.7, July 1982.

Wall, R.S., and E.L. Rissland, "Scenarios as an Aid to Planning". In Proceedings of the National Conference on Artificial Intelligence (AAAI-82), Carnegie-Mellon University, Pittsburgh, PA, August 1982.