

AUTOMATED ANALYSIS OF LEGAL TEXTS

Logic, Informatics, Law

Edited versions of selected papers from the
Second International Conference on 'Logic, Informatics, Law'
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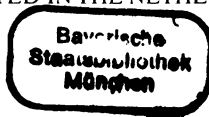
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USING AN EXPERT SYSTEM IN TESTING LEGAL RULES

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Every expert system has an inference machine that draws conclusions from a set of rules. Normally, the user of the expert system will be interested in a conclusion, not a rule, at least not at the beginning. However, you can also use the system the other way around: using conclusions to test rules. If a conclusion is to be rejected, at least one rule has to be rejected also.

Every expert system has to be used in this reverse way for as long as it is in progress. Only, with legal systems, this way of using it should be permanent.

First, the law is a set of rules that is constantly in the making. Lawmakers, courts, and legal scholars never stop constructing it.

Second, legal rules are more than instruments to produce decisions. They are also directives for human behaviour and as such have to be considered for rightness and also comprehensibility.

Considering this, I would like to suggest some postulates for legal expert systems.

(a) The set of rules should be strictly separated from the computer program. Such a separation is advisable anyway for an expert system but with a legal system it is imperative. Again, the reason is partly practical, partly ethical: you do not need to interfere with the computer program to alter the rule set, as will frequently be necessary. Also, the rule set is not as transparent as it should be if it is mixed up with the program.

(b) The people entering rules in a legal expert system should be the same people who handle these rules in their daily work. Ordinary lawyers should do this, not a few specialists. The need for specialists would hinder the profitability of a separate program and rule set.

(c) This means that the "normal form" in which a rule has to be put should be as plain as possible and as close to natural language as possible.

The Munich Legal Expert system MULE tries to match these postulates in the most simple way¹: its inference machine is restricted to propositional logic. To put a rule in its "normal form" only means to break it down to simple linguistic components

so that the computer can check them systematically. Even so it requires a certain amount of stubbornness to analyse legal rules. But the difficulties are legal ones. They become visible because the warm mist of common sense illusions about understanding what was said by the lawmaker must be blown away a little.

Who needs MULE? Anyone who wants to clarify his ideas about a set of rules or to improve on their formulation. This can be a legal drafter who wants his products to be comprehensible, a law student who wants to understand a rule, or a legal scholar whose job it is to systematise the law and to teach it.

Let me give an example. The German Civil Code provided for an assignment of a claim as follows.

§ 398. A claim may, by contract with another person, be assigned by the creditor to him (assignment). ...

§ 399. A claim is not assignable ... if assignment is excluded by agreement with the debtor.

§ 405. If the debtor has executed a document of indebtedness, and if the claim is assigned along with production of the document, he may not, as against the assignee maintain that the incurring or acknowledgement of the obligation was only a sham, or that the assignment was excluded by agreement with the assigner unless the assignee, at the time of the assignment, knew or should have known of the circumstances.

The translation by Ian Forrester et al matches letter and spirit or the original perfectly well. Do not believe that the German version is easier to understand.

To make a computer run on this, one has to clarify the statement considerably. A clarified version would be structured as follows:

- (a) Rule: A claim may, by contract with another person ... (assignment).
- (b) Exception to (a): ...if assignment is excluded by agreement with the debtor.
- (c) Counter-exception to (b): (Exception (b) will not work) if the debtor has executed a document of indebtedness.
- (d) Counter-counter-exception to (c): (The production of the document is inefficient if) the assignee, at the time of the assignment, knew or should have known of the circumstances.

We now see the gist: a sequence of rules and exceptions, surprisingly long but plain in its structure. With this in mind it is easy to formulate the statements in a way the computer can handle. It is also easy to teach or learn them or to compare them with other examples of the estoppel principle, be it in the German legal system or in another one.

MULE's computer program is written in FORTH. Therefore, the expert system shell is remarkably flexible (Expert2, Mountain View Press). Besides, FORTH runs on small micros that any student can afford. We run MULE on an ATARI 800XL as well as one an IBM

PC compatible.

Note

- (1) Mules have two features which I think are particular for MULE, too: (a) those animals are not too sophisticated and (b) they are useful.

APPENDIX

Here are two samples of a rule set (shortened) and a dialogue. Please note that the rules should be read starting from the end (Rule #20). Note that the order makes a big difference to the computer, which connects the rules logically, but if two entries are on the same logical level, the later one will be considered first. You would not change anything if you placed Rule #17 wherever else you like. Rule #17 is only logically completing Rule #18. But if you switched the order of Rule #11 and Rule #12, the computer would ask for the conditions of rule #11 - then the later one - first.

As for the dialogues, it is the computer that asks the questions. You can reply with Y, N, or W (Yes, No, Why). Following general practice in German jurisprudence, the debtor is called A, the creditor B, the assignee C.

Prove:

B CAN ENFORCE B->A

CLAIM B->A

?- Y,N,W: Y

CONTRACT OF ASSIGNMENT B,C

?- Y,N,W: Y

ASSIGNMENT IS EXCLUDED BY A,B

?- Y,N,W: Y

A HAS DOCUMENTED INDEBTEDNESS

?- Y,N,W: W

I'm trying to prove:

B CAN ENFORCE B->A

I'm testing rule #16:

If A HAS DOCUMENTED INDEBTEDNESS
If not EXCEPTION TO PRESUMPTION
then EXCEPTION TO EXCLUSION
because OF § 405

A HAS DOCUMENTED INDEBTEDNESS

?- Y,N,W: Y

C KNEW OF THE CIRCUMSTANCES

?- Y,N,W: N

C SHOULD HAVE KNOWN ...

?- Y,N,W: Y

I deduce

EXCEPTION TO PRESUMPTION

I deduce

EXCEPTION TO ASSIGNMENT

PERFORMANCE A=>C
?- Y,N,W: W

I'm trying to prove:
B CAN ENFORCE B->A

I'm testing rule # 3:

If PERFORMANCE A=>C
If B NOTIFIED A OF ASSIGNMENT
then DEFENCE TO B->A
because OF § 409

PERFORMANCE A=>C
?- Y,N,W: Y

B NOTIFIED A OF ASSIGNMENT
?- Y,N,W: N

B DOCUMENTED ASSIGNMENT TO C
?- Y,N,W: W

I'm trying to prove:
B CAN ENFORCE B->A

I'm testing rule # 2:

If PERFORMANCE A=>C
If B DOCUMENTED ASSIGNMENT TO C
then DEFENCE TO B->A
because OF § 409

B DOCUMENTED ASSIGNMENT TO C
?- Y,N,W: N

OTHER DEFENCES TO B->A
?- Y,N,W: N

I deduce
B CAN ENFORCE B->A

I deduce
B ->>A

I conclude
B CAN ENFORCE B->A

- Rule # 0:
 If B->A IS AQUIRED BY C
 then C->B (DOC. OF ASSIGNMENT)
 then DOC.
 then C->>B
 then C SHALL BEAR THE COSTS
 then AND THIS IN ADVANCE
 because OF \$ 403
- Rule # 1:
 If A DEMANDS *DOC. OF ASSIGNMENT
 If not C PRODUCES THE DOCUMENT
 If not B NOTIFIED A IN WRITING
 then DEFENCE TO C->A
 because OF \$ 410
- Rule # 2:
 If PERFORMANCE A=>C
 If B DOCUMENTED ASSIGNMENT TO C
 then DEFENCE TO B->A
 because OF \$ 409
- Rule # 3:
 If PERFORMANCE A=>C
 If B NOTIFIED A OF ASSIGNMENT
 then DEFENCE TO B->A
 because OF \$ 409
- Rule # 4:
 If CLAIM B->A
 If not B->A IS ASSIGNED TO C
 If not DEFENCE TO B->A
 If not OTHER DEFENCES TO B->A
 then B CAN ENFORCE TO B->A
 then B->>A
 because (B->> IS ABBREVIATION)
- Rule # 5:
 If B->A IS REASSIGNED TO D
 If PERFORMANCE A=>D
 If not A KNEW OF ASSIGNMENT TO C
 then DEFENCE TO C->A
 because OF \$ 408
- Rule # 6:
 If PERFORMANCE A=>B
 If not A KNEW OF ASSIGNMENT TO C
 then DEFENCE TO C->A
 because OF \$ 407
- Rule # 7:
 If A->B IS DUE LATER THAN C->A
 then DEFENCE TO SET OFF
 because OF \$ 406
- Rule # 8:
 If A KNEW OF ASSIGNMENT
 If WHEN HE AQUIRED A->B
 then DEFENCE TO SET OFF

because OF § 406

- Rule # 9:
If A SETS OFF A->B AGAINST C
If not A DEFENCE TO SET OFF
then DEFENCE TO C->A
because OF § 406
- Rule # 10:
If "ORIGINAL" DEFENCE TO B->A
then DEFENCE TO C->A
because OF § 404
- Rule # 11:
If CLAIM CANNOT BE ATTACHED
then EXCEPTION TO ASSIGNMENT
because OF § 400
- Rule # 12:
If ASSIGNMENT WOULD ALTER CLAIM
then EXCEPTION TO ASSIGNMENT
because OF § 309
- Rule # 13:
If A'S DEBT WAS ONLY A SHAM
If not EXCEPTION TO EXCLUSION
then EXCEPTION TO ASSIGNMENT
because OF §§ 117, 405
- Rule # 14:
If C SHOULD HAVE KNOWN ...
then EXCEPTION TO PRESUMPTION
because OF § 405
- Rule # 15:
If C KNEW OF THE CIRCUMSTANCES
then EXCEPTION TO PRESUMPTION
because OF § 405
- Rule # 16:
If A HAS DOCUMENTED INDEBTEDNESS
If not EXCEPTION TO PRESUMPTION
then EXCEPTION TO EXCLUSION
because OF § 405
- Rule # 17:
If ASSIGNMENT IS EXCLUDED BY A,B
If not EXCEPTION TO EXCLUSION
then EXCEPTION TO ASSIGNMENT
because OF § 399
- Rule # 18:
If CLAIM B->A
If CONTRACT OF ASSIGNMENT B,C
If not EXCEPTION TO ASSIGNMENT
then B->A IS ASSIGNED TO C
because OF § 398
- Rule # 19:
If B->A IS ASSIGNED TO C

then CLAIM C->A

Rule # 20:
If CLAIM C->A
If not DEFENCE TO C->A
then C CAN ENFORCE C->A
then C->>A
because (C->>A IS ABBREVIATION)

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