

## BOOK REVIEWS

### AN ARTIFICIAL INTELLIGENCE APPROACH TO LEGAL REASONING

Anne von der Lieth Gardner

Cambridge, MA: MIT Press, 1987, xiii + 225 pp.

ISBN 0-262-07104-5; \$22.50 (hb)

*Reviewed by*

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This book provides an extremely well-written introduction to legal artificial intelligence combined with a highly original approach to problems of legal reasoning. Although this book is a revised version of her Ph.D. thesis, Gardner's ideas are mature and the exposition is designed to make both legal and computational problems clear to the general reader. These ideas are embodied in an automated system for solving offer and acceptance problems in contract law.

Chapter 1 provides an introduction to the problems of modeling legal reasoning. One major complication is the **open texture** or incomplete definition of many legal predicates. Another is that the program must be able to distinguish between problems it can handle and those that may well cause experts to disagree. The choice of offer and acceptance problems in contract law as a problem domain has the advantage that this area does not require a great deal of legal background. Also these problems make more use of case law than of statutes; thus they are **rule-guided** but not **rule-governed**.

Chapter 2 goes more deeply into the place of rules in legal reasoning. From the point of view of the expert system designer, the law has certain advantages. Lawyers have been known to write down explicit, if non-computational, rules for legal reasoning, although much of this work is controversial. Chapter 3 goes on to discuss the problem of applying rules to the stated facts of the case. Rules of commonsense knowledge are necessary here as well as heuristics for understanding cases and recognizing examples of patterns. Chapter 4 relates this research to other work in legal artificial intelligence.

Chapter 5 attacks problems of the representation of natural language text. The facts of a problem are translated into a set of logical formulas in the predicate-calculus syntax of Genesereth's MRS. The representation methodology pays particular attention to reported speech, an important feature of contract cases. Analysis of the predicate-calculus representation determines

whether any given speech act has the effective force of a declaration. Then declarations are further analyzed to see whether they are indeed legal acts.

Chapter 6 focuses on a different kind of representation problem, the problem of representing legal knowledge. Knowledge of the basic legal categories and the way elements of those categories may be ordered is represented in an augmented transition network with arcs labeled "offer", "acceptance", etc. Knowledge of the definitions of the major categories is expressed in "if . . . then" rules. Knowledge about undefined predicates is expressed in the representation system already developed for representing text in the previous chapter. Finally, Chapter 7 traces the operations of Dr Gardner's system on a number of illuminating example problems, annotated with insightful comments. Her program is written in a combination of MRS and MacLisp and runs on a DecSystem-20 at Stanford.

In summary, this book provides a fascinating computational framework for modeling legal reasoning, combining automated reasoning, concepts from legal theory, and techniques for representing legal knowledge and natural language text. For the computational linguist the most interesting sections are the discussion of speech acts and the methodology for representing reported speech in Chapter 5.

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### MATHEMATICS OF LANGUAGE

Alexis Manaster-Ramer (ed.)

(Wayne State University)

Amsterdam: John Benjamins, 1987, x + 401 pp.  
ISBN 1-55619-032-8 and 90-272-2049-2, Dfl 125.-,  
\$50.00 (hb)

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The editor takes the mathematics of language to mean "the mathematical properties that may—under certain assumptions about modeling—be attributed to human language and related symbolic systems, as well as the increasingly active and autonomous scholarly discipline