

# RICHARD SUSSKIND

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# EXPERT SYSTEMS IN LAW

CLARENDON



PAPERBACKS

# Expert Systems in Law

*A Jurisprudential Inquiry*

RICHARD E. SUSSKIND

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I dedicate this book to the four people who encourage me the most,

my wife, Michelle,  
my brother, Alan,  
and my parents.

## Preface to Paperback Edition

Since late 1986, when the manuscript of this book was originally delivered, the field of expert systems in law has changed radically. No longer is this subject the fascination of just a handful of enthusiastic lawyers and computer scientists. It has now become the province of many investigators. Today it is at the core of major research projects, is hotly debated at conferences, and formally taught to students. What is more, serious commercial exploitation has begun.

I do not believe this rapid and international growth in interest and activity has affected the two central themes of this book: that analytical jurisprudence can guide those building expert systems in law; and it can expose with remarkable clarity the potential and limitations of this technology.

It is clear, however, that this book's review of current research in the field of artificial intelligence and legal reasoning, as presented in Appendix I, is no longer current. Indeed, as critics have astutely pointed out, that appraisal was probably out of date on the first day of publication. Accordingly, I would suggest that Appendix I is now mainly of historical interest, being an overview of the major research projects of the first 15 years of the field.

Personally, the lessons of this book equipped me for my own activities over the last two years; in seeking to bring expert systems out of the research laboratory and into the market-place. However, although my past research enabled me to negotiate the jurisprudential hurdles that confront all who seek to build expert systems in law, I have been faced with a new set of problems and challenges.<sup>1</sup>

Perhaps the major obstacle to the commercial exploitation of this technology is that human legal experts are rarely available for serious expert systems work. Indeed the would-be builder can come up against a panoply of human response on the part of experts, ranging from fear, scepticism and doubt through indifference and mild interest to principled commitment and even passionate enthusiasm.

<sup>1</sup> Susskind, R. E., 'Expert Systems in Law: Out of the Research Laboratory and into the Marketplace' (1987) *Proceedings of 1st International Conference on Artificial Intelligence and Law* (ACM Press, 1987).

However, whatever the emotional reaction, when asked to participate in the construction of a system experts are invariably too busy.

Nor is the human resource problem simply that of lack of experts. There is equally a dearth of appropriately qualified legal knowledge engineers—those who elicit the expertise from the legal experts and develop models of the law for implementation in systems. Ideally, these knowledge engineers should have strong backgrounds in computers and the law: in the former so that a reliable and robust system can be built; and the latter so as to maintain the interest and respect of the expert.

The development of fully operational systems is still further hindered by the absence of development methods to guide those building expert systems. As yet, for expert systems, there are no fully developed 'methodologies' (so-called) akin to those that are used—indeed that characterize the rigour brought to bear—in modern software engineering. Such a method would offer a well tested set of standards, guidelines and procedures to assist project managers, knowledge engineers and support staff in designing, developing, testing and implementing sound systems. In absence of such a method, systems will continue to be developed in an *ad hoc* fashion and reliability will, in turn, be prejudiced.

I have recently had the good fortune to be involved in a project in which we managed to overcome the problems outlined above. This was the project that led to the development of *The Latent Damage System*, a fully operational expert system in law. The system advises on the difficult issues of English law relating to the time periods within which claimants may start proceedings in the law of negligence if the damage or loss they have suffered was latent (that is, discovered some time after its occurrence).

The source of expertise for this project was Phillip Capper, the widely acknowledged authority in this field of law. His knowledge of the law, his background as a computing professional and his tireless devotion to the project combined to provide me with an ideal domain expert. For my task, as knowledge engineer, was to restructure his expertise into a model for implementation in an expert system. This required a penetrating and comprehensive legal analysis of latent damage law and a synthesis of this with Capper's conception of the field. And this was done in conformity with the jurisprudential method explicitly laid out in this book as well as with the lessons of

various embryonic expert systems development methods to which we had access.

In the latent damage project, therefore, we were not really fettered by the problems of lack of human resources and of method. To demonstrate the commercial potential of the technology we have documented our experiences of developing that system in a case study. And each copy of that book is packaged together with a copy of the system itself—on two floppy diskettes (to run on a standard microcomputer).<sup>2</sup> That case study reinforces and confirms the relevance and importance for expert systems in law of the fundamental jurisprudential issues discussed in this book. *The Latent Damage System* is a fully operational and commercial expert system in law; and it is perhaps the first of its kind in the world. And so I now gladly withdraw my claims in the text that there are no expert systems in law.

I should add immediately, however, that the development of *The Latent Damage System* represents but one small step along the road that will lead to the widespread exploitation of expert systems in the law. It is an example of what I call 'first generation' systems—the first wave of systems to emerge from the laboratory into the market-place. Inevitably, such a system does have limitations, one of which is that it assumes its users to have legal knowledge: its successful use depends on the user applying his general knowledge of the law during any consultation. The system communicates as a legal expert would do with a general legal practitioner. The system is not for the layman: it is designed to enhance lawyers' performance.

The need for any user to be a lawyer or legally informed person has its roots in jurisprudence. The system is 'rule-based' and so any user must be sensitive to those occasions on which rule guidance in legal problem-solving is either insufficient or unacceptable. Furthermore, as is established in this text, the most testing cases that rule-based systems can solve are 'clear cases of the expert domain'—problems that for experts are relatively straightforward although for non-experts may seem impenetrably complex. Only a lawyer or legally informed person is sufficiently knowledgeable to be able to understand the limitations of rule-based systems and use that understanding during any consultation.

<sup>2</sup> Capper, P. N. and Susskind, R. E., *Latent Damage Law – The Expert System* (Butterworths, 1988).

Yet this explanation will not satisfy all workers in the field; an observation which itself is significant. For there have emerged two schools of thought in expert systems in law. I have called these the 'pragmatists' and the 'purists'.<sup>3</sup> The overriding aim of the former is to build working systems, with little regard for their propriety from the perspectives of legal theory or expert systems technology. The purists, on the other hand, hanker after clarification of the central concepts of jurisprudence, artificial intelligence and cognitive science. Pragmatists are generally found in the commercial world whereas purists tend to gather in research establishments. Pragmatists are happy with my arguments; purists are less content. I believe the way ahead is for pragmatism to flourish within a conceptual framework established by purists. And so I would urge purists to examine the arguments in this book—they will in fact find them purist in orientation. But they surely also establish the jurisprudential propriety of building and using first generation expert systems in law.

In any event, I am currently preparing a second edition of this book. So much has happened in the field since 1986 that further analysis is required. The move of systems from the research laboratory to the market-place, the polarization of pragmatists and purists, and the proliferation of new projects and initiatives: all these themes will be brought together and subjected to jurisprudential scrutiny. And a sustained jurisprudential analysis of the development and use of *The Latent Damage System* will also be undertaken. The second edition should be published in 1991. In the meantime, I hope this book is found useful by scholars, students, practitioners and enthusiasts alike.

Finally, and most importantly, I have one acknowledgement to add: and that is to my little son, Daniel, who has added a wonderful new dimension to my life.

25 January, 1989  
Bushey Heath

R. E. S.

<sup>3</sup> Susskind, R. E. 'Pragmatism and Purism in Artificial Intelligence and Legal Reasoning' (1989) 3 *AI & Society*.



## Preface

This book is a general inquiry into expert systems in law. It is a revised and updated version of a doctoral thesis submitted in the University of Oxford in May 1986. The conclusions, arguments, and recommendations are based largely on the legally orientated findings of a collaborative research project in expert systems in law that involved the Law Faculty and the Programming Research Group of the University of Oxford. The project ran from 1983 until 1986 and is referred to throughout the book as the 'Oxford project'.

Although the book is intimately concerned with one branch of computer science, it was, nevertheless, not written from a computational perspective. Nor was it conceived as a rigorous, formal, and directly implementable specification of an expert system in law. Rather, it was composed from the point of view of jurisprudence (legal theory).

My central argument is that there are no theoretical obstacles, from the point of view of jurisprudence, to the development of rule-based expert systems in law of limited scope. I support this claim throughout the text not only by jurisprudential argumentation, but also by reference to the prototype system in Scottish divorce law that was developed in the course of the Oxford project. I articulate the underlying computational theories of law and legal reasoning upon which the system was designed and in so doing state the jurisprudential and practical limitations of expert systems in law. The theories themselves are shown to be derived from consensus located in many contemporary, yet often thought to be radically incompatible, works of analytical jurisprudence.

The book is divided into three parts. Part One is devoted to various preliminary matters concerning expert systems in law. Its purpose is to offer a comprehensive introduction to the field of artificial intelligence and legal reasoning: current projects in the field are assessed, central concepts are analysed and clarified, and basic features of systems are considered. Drawing extensively from

modern analytical jurisprudence, Part Two identifies the types of legal knowledge that will need to be stored in an expert system in law, and recommends a particular way of organising and representing that knowledge. Finally, in Part Three, through examination and evaluation of many classical jurisprudential arguments in opposition to deductive legal reasoning, an account of logical legal inference is developed, and the limitations of the kind of expert system being recommended are identified.

I hope the book will be of interest to four classes of person. First, it is intended as a text of fresh perspective for workers in the field of artificial intelligence and legal reasoning. Secondly, the book is for all those professional advisers—particularly lawyers—who administer and reason with the law and are eager to know of technological developments within their professions. Thirdly, this inquiry is for jurists (legal theorists and philosophers), who will find in it both an intensely practical application for their subject and a new range of problems over which I would very much like debate to ensue. Finally, the book is directed at computer and artificial intelligence scientists who find in law a suitable domain of application for expert systems work: I have sought to provide coherent but nevertheless informal models of law and legal reasoning, together with an accompanying commentary, which will be of guidance to those wishing to build expert systems in law.

The terminology of the book is firmly rooted in the tradition of analytical jurisprudence. Accordingly, it will be relatively foreign to more than half of my projected readership. However, I urge those averse to the language of legal theory to persevere: new terms and concepts are introduced and explained during the course of the book. With any luck, computer persons will find use for the novel vocabulary while practising lawyers will be encouraged to re-examine—or commence study of—the world of legal philosophy.

I am extremely grateful to many individuals and institutions for encouraging me, and allowing me the opportunity, to pursue the research that led to this book.

I am indebted particularly to Colin Tapper, who with enormous patience, exceedingly good humour, and unparalleled knowledge of computers and law, supervised my doctoral research and advised on its revision for publication. His guidance and support were invaluable.

The examiners of my thesis, Neil MacCormick and Jon Bing, also made many useful suggestions and I am very grateful to them for their advice and encouragement.

My interest in the field of artificial intelligence and legal reasoning dates to 1981 when I worked in the field as a student of jurisprudence in the University of Glasgow. I would like to express my thanks to the Department of Jurisprudence there for introducing me to the subject.

I have benefited greatly from the advice of my oldest friend, David Gold, who, as the other major part of the Oxford project, implemented many of the ideas of this book in a computer program. His detailed comments on succeeding drafts of the computationally orientated parts of my thesis continually kept me aware of the rigorous demands of the programmer.

Having read drafts of my work, many other individuals offered me invaluable advice, criticism, and encouragement during the course of my research and my preparation of this book: most notably, Robin Downie, Donald Harris, Anthony Kenny, Alan Paterson, and Joseph Raz. I am very grateful to all of them.

With his characteristic fly's eye for detail, my good friend Howard Beach purged an earlier draft of this book of more errors, slips, and impurities than I would care to discuss. Thank you, H. And in correction of the final proofs, my wife Michelle patiently read the book in a last elimination of all manner of mistakes: the book is as much hers as mine.

Thanks are also due to those of the Oxford University Computing Laboratory who for three years allowed me the use of the facilities of the Programming Research Group. It was a pleasure to work in such a congenial atmosphere. Within the Laboratory, Jeremy Jacob deserves particular mention for tirelessly teaching me about the intricacies and idiosyncrasies of the text editor, QED, and for introducing me to the ZIP family, which processed my manuscript.

The bulk of the funding for my project was provided by the Scottish Education Department and the Snell Trust.

An earlier version of part of Chapter 1 of this book appeared in *The Modern Law Review* in March 1986.

My editor at OUP, Richard Hart, directed the book through the publishing process with great efficiency: his advice and effort are very much appreciated.

Penultimately, at Ernst & Whinney, I would like to thank John

Barney, Nick Land, Andrew Pawlowicz, and James Tucker for encouraging me to bring expert systems in law out of the research laboratory and into the marketplace.

Finally, and most importantly, my family and friends deserve endless thanks for their endless support. My parents, in the past few years, as they always have done, have lovingly encouraged and helped me in my activities: their contribution to my work cannot be overestimated. And Michelle, as devoted girlfriend, fiancée, and now wife, more than anyone has both tolerantly endured my fascination with my work and has, with love, offered unflagging support in the writing of this book.

14 June 1987

Bushey Heath

R.E.S.

# Abbreviations

AGES	Waterman, <i>A Guide to Expert Systems</i> (1986)
AI	Winston, <i>Artificial Intelligence</i> (1984)
AILIS	Ciampi (ed.), <i>Artificial Intelligence and Legal Information Systems</i> (1982)
AINM	Boden, <i>Artificial Intelligence and Natural Man</i> (1977)
AL	Raz, <i>The Authority of Law</i> (1979)
BES	Hayes-Roth et al. (eds.), <i>Building Expert Systems</i> (1983)
BL	Lemmon, <i>Beginning Logic</i> (1977)
CATL	Tapper, <i>Computers and the Law</i> (1973)
CC	Michie and Johnston, <i>The Creative Computer</i> (1984)
CL	Hart, <i>The Concept of Law</i> (1961)
CLS	Raz, <i>The Concept of a Legal System</i> (1980)
DA	Clive, <i>The Divorce (Scotland) Act 1976</i> (1976)
DLISR	Hilpinen (ed.), <i>Deontic Logic: Introductory and Systematic Readings</i> (1981)
DN	Ross, <i>Directives and Norms</i> (1968)
EJP	Hart, <i>Essays in Jurisprudence and Philosophy</i> (1983)
ELMP	Kelsen, <i>Essays in Legal and Moral Philosophy</i> (1973)
EOB	Hart, <i>Essays on Bentham</i> (1982)
FG	Feigenbaum and McCorduck, <i>The Fifth Generation</i> (1983)
GTLS	Kelsen, <i>General Theory of Law and State</i> (1945)
HLAH	MacCormick, <i>H. L. A. Hart</i> (1981)
IJ	Lloyd and Freeman, <i>Lloyd's Introduction to Jurisprudence</i> (1985)
IS	Hayes and Michie (eds.), <i>Intelligent Systems</i> (1983)
JD	Wasserstrom, <i>The Judicial Decision</i> (1961)
LC	Gottlieb, <i>The Logic of Choice</i> (1968)
LDIS	Bing and Harvold, <i>Legal Decisions and Information Systems</i> (1977)
LL	Horovitz, <i>Law and Logic</i> (1972)
LLS	Harris, <i>Law and Legal Science</i> (1979)
LMS	Hacker and Raz (eds.), <i>Law, Morality and Society</i> (1977)
LP	Harris, <i>Legal Philosophies</i> (1980)
LRLT	MacCormick, <i>Legal Reasoning and Legal Theory</i> (1978)
LRSD	MacCormick, <i>Legal Right and Social Democracy</i> (1982)
LSLR	Stone, <i>Legal System and Lawyers' Reasonings</i> (1964)
MELP	Summers (ed.), <i>More Essays in Legal Philosophy</i> (1971)

- NA* von Wright, *Norm and Action* (1963)  
*NLNR* Finnis, *Natural Law and Natural Rights* (1980)  
*NS* Alchourron and Bulygin, *Normative Systems* (1971)  
*OLG* Bentham, *Of Laws in General* (1970)  
*PAI* Nilsson, *Principles of Artificial Intelligence* (1982)  
*PL* Haack, *Philosophy of Logics* (1978)  
*PLP* Castberg, *Problems of Legal Philosophy* (1957)  
 'PPL' Hart, 'Problems of the Philosophy of Law' (1967)  
 'PSLM' Hart, 'Positivism and the Separation of Law and Morals' (1958)  
*PTL* Kelsen, *The Pure Theory of Law* (1967)  
*PRBES* Buchanan and Duda, *Principles of Rule-Based Expert Systems* (1982)  
*SLS* Walker, *The Scottish Legal System* (1981)  
*TRS* Dworkin, *Taking Rights Seriously* (1977)

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