

BOOK REVIEW

MacCrimmon, M. & Tillers, P. (eds.) (2002). *The Dynamics of Judicial Proof. Computation, Logic, and Common Sense*. Physica-Verlag, Heidelberg. xx + 494 pages. ISBN 3-7908-1459-8.

Research on legal evidence addresses topics like burden of proof, permissible types of evidence, witness testimonies, the role of probability estimates, justification and the law of evidence. What can be learnt about the process of judicial proof using artificial intelligence techniques? Peter Tillers wanted to find answers to this question when he started to organize a workshop on Artificial Intelligence and Proof (as part of the Second World Conference on New Trends in Criminal Investigation and Evidence). It took place in Amsterdam in December 1999 and attracted researchers with a variety of backgrounds. In April 2000, Peter Tillers organized a similar event in cooperation with Marilyn MacCrimmon, the Artificial Intelligence and Judicial Proof Symposium in New York. The book under review here is the result of these academic meetings. It fits in nicely with the recent attention for legal evidence in the field of artificial intelligence and law, as exemplified by the special issue of *Artificial Intelligence and Law* (2001, Volume 9, Nos. 2-3) and the ICAIL 2001 workshop on legal evidence.

1 Structure of the book

The book's introduction does a good job in explaining why and how it came into being. The book also contains information on the contributors, which is especially useful given their widely varying backgrounds, e.g., the law (Tillers, Allen, Shapira, Walker), computer science (Barnden, Zadeh, Pawlak), logic (Van Benthem, Poole). The editors did not provide an introduction to the papers in the book. The papers have been arranged in eight parts:

- Common Sense Reasoning;

- Fuzzy and Rough Logic;
- The Structure of Factual Inference in Judicial Settings;
- Dynamic Inference and Choice in Dynamic Environments;
- Abductive Inference;
- From Theory to Practice: “Intelligent” Procedures for Drawing Inferences in Static and Dynamic Legal Environments;
- Judicial Proof and Economic Rationality;
- and Causality.

In the following section an overview of the papers is provided. Evaluating remarks are postponed to section 3.

2 Overview

Part One on Common Sense Reasoning starts with a paper by John Barnden and Donald Peterson. It focuses on common sense reasoning about the mental states of other people. The authors speak of ‘mindreading’. The authors have developed a system for this kind of reasoning (ATT-Meta), but do not give much detail about it. In another paper in this part by Ronald Allen, the concept of common sense is characterized as a mix of folk psychology and naïve realism. Allen surprises his audience - the paper is the transcript of a lunch lecture - by claiming that the single most cited authority for an argument in legal cases is common sense. Allen reports that in Westlaw terms like ‘common sense’ used as an argument get more than 70.000 citations (but he points out that the number is based on crude sampling), Wright and Miller (authors of a handbook on the law of evidence) get 35.000 and Wigmore 22.000, ‘and then things fall like a rock’ (p. 52). The ‘high theorists’ - as Allen calls them - get relatively few citations in cases: e.g., Posner’s academic work (excluding his judicial opinions) 628, Dworkin 87. Allen notes that the high theorists are cited much more often in law reviews, and comes to the following thought-provoking conclusion:

‘[T]he high theorists have mismodeled the phenomenon they are supposedly exploring. They have modeled the law as an integrated formal system or process amenable to top down theorizing [...]. Thus, I suspect it is not that the high theory is too obscure for the legal practitioners to understand the short shrift given it in the real world. Rather, it is that those very astute, but commonsensical, practitioners realize its irrelevancy, as do the judges that decline to cite it.’ (p. 53)

The part on common sense reasoning ends with a text by MacCrimmon who argues that the enhancement of the practice of judicial proof requires interdisciplinary research.

The second part discusses fuzzy and rough logic. It contains introductions on these topics by Zadeh and Pawlak. Apart from Shapira’s thoughts about fuzzy logic from the perspective of historical Jewish law, the part does not address judicial proof or its dynamics.

Part three deals with the structure of factual inference. In the contribution by Schum, Wigmore’s evidence charts (dating from 1913-14) are discussed in relation with other, more recent approaches. Schum claims for instance that the ingredients of Toulmin’s influential argument scheme are virtually identical to Wigmore’s (p. 149). For instance, both address the relevance and probative force of evidence as support for hypothetical claims. Walker’s paper in this part discusses the need for systematic analyses of possible errors of particular types of argument. He baptizes such analyses ‘theories of uncertainty’ and distinguishes a linguistic, a logical and a causal dimension of such theories. It could be interesting to compare his approach with the argumentation schemes that currently receive much attention in the field of argumentation theory.

The fourth part on dynamic inference contains a paper by Van Benthem on a logical perspective on dynamics and a comment by Howard on decision analysis in the context of law.

Part five deals with abductive inference. Van Andel and Bourcier present legal examples of serendipity, i.e., a correct abduction of a surprising observation. Josephson discusses previous research on the computational modeling of abduction in a non-technical paper. He illustrates his strategy, called EFLI, in terms of a legal case, and summarizes the ways in which an abductive argument can be undercut or supported. There is also a paper by Schum on abduction. He discusses work by Eco and Thagard, who both distinguish four types of abduction. Eco distinguishes overcoded, undercoded, creative and meta abduction, while Thagard has simple, existential, analogical and rule-forming abduction. According to Schum, the two taxonomies are orthogonal ways of categorizing abduction.

In the sixth part of the book, three approaches to evidential reasoning are discussed. Levitt and Laskey describe computational techniques to represent and perform evidential reasoning using Bayesian networks. Poole presents his Independent Choice Logic, in which logic programming and probability theory are combined. Snow and Belis discuss an approach to deliberation about evidence in terms of the gradual analysis of evidence in graph structures. Each paper in this section pays attention to legal cases.

The seventh part contains two papers reflecting on Posner's discussion of the law of evidence in terms of economic principles (in his paper 'An Economic Approach to the Law of Evidence' published in the *Stanford Law Review* in 1999). One of Posner's points is that the rules of evidence law can in part make sure that the scarce resources that are available to find and address evidence are efficiently used. Shapira argues that Posner's views do not do justice to the fact that there can be genuine dilemmas underlying the rules of evidence law, which cannot be explained away by an

economic analysis. Callen responds to Shipara and emphasizes that our cognitive constraints obstruct the possibility of economic optimization by decision makers.

The eighth and last part of the book deals with causality. Shafer discusses his theory of predictive causality and applies it to the connection between causality and responsibility in the law of torts. Leslie comments on Shafer's proposal from a lawyer's point of view. The two papers show in an exemplary way how different the perspective of lawyers and non-lawyers can be. In this case, both sides can benefit from the interaction.

3 Evaluation

As becomes clear from the summary of its contents, the book touches on a wide variety of topics, not all very relevant for the book's main theme, some not relevant at all. In his introduction, Tillers admits that some of the texts are off-topic. He did not expect otherwise since, in Tillers' words, 'academics are an unruly lot' (p. 10)! And he is right in his judgment that interestingness is more important than relevance.

Tillers did try to steer the contributors (of the Amsterdam workshop) by providing a list of characteristics of dynamic proof (p. 12-13). He is overly modest by commenting that his list may be too disordered for AI people and too abstract for lawyers. It is a nice list that can be an inspiration for future research. It gives several possible directions that could be explored further. The list shows that Tillers view of proof is not limited to the role of proof in legal justification. Consider for instance the first item on the list:

'1. Proof is a process. This process includes, not only the process of evidentiary demonstration and persuasion, but also the process of preparation for the process of evidentiary demonstration and persuasion.' (p. 12)

Tillers' broad perspective on proof is also revealed by the hypothetical case that was given to the participants of the New York event. It is about the first conversation between a possible client and a lawyer who works on a contingent fee basis. It was a surprise to me that the case focuses on what the lawyer should *do*, thus entering the topic of what philosopher's call practical reasoning.¹ Should he take the case? Should he believe the possible client? What further evidence should he look for before deciding? I had expected a focus on the role of evidence in court, but Tillers rightly extends the topic to the pre-trial situation.

The quality of the papers varies. Some are very insightful and well-written, e.g., Tillers' introduction, Allen's paper (in fact a lecture) on common sense and Shafer's paper on causality and responsibility, others appear to be rather hasty products. The style of the papers is also very diverse (ranging from the heavily technical to the overtly conversational), as can be expected from authors with such different backgrounds. The main strength of the book is that it brings together ideas on judicial proof from a wide variety of sources. In this way, everyone will be able to find inspiration in some paper or other. What one might hope to find in the book is unfortunately not there: a comprehensive view on the dynamics of judicial proof, or at least the start of that. The book surely contains elements of such a view, but as yet there is too little integration of these elements. At the end of his nice introduction, Tillers puts it this way:

¹ For a discussion of practical reasoning both from a philosophical and an artificial intelligence perspective, see Girle, R., Hitchcock, D.L., McBurney, P. & Verheij, B. (2003). Decision Support for Practical Reasoning: a theoretical and computational perspective. *Argumentation Machines. New Frontiers in Argument and Computation* (eds. C. Reed & T.J. Norman), pp. 55-84. Kluwer Academic Publishers, Dordrecht.

‘In the life of the mind there are no endings. There are only beginnings. This collection of papers on AI and judicial proof is a beginning - but it is an important beginning.’ (p. 11)

I must admit that when ordering the book I had expected more than this modest beginning. I had hoped to find an ordered perspective on the field in developments, its main achievements and its central questions. The book did not provide me with that. An open challenge! Perhaps the conferences that have led to the book have sown the seeds for the development of a view on the dynamics of judicial proof that is informed by insights from all relevant fields. Tillers and MacCrimmon deserve praise for having organized them.

Let me end this review by recommending the reader to pay a visit to Tillers’ web site (tillers.net), that is almost fully dedicated to legal evidence. I have only just begun to find my way in this miniature cosmos. I would not be surprised when it turns out to be the locus for the development of an integrated view on the dynamics of judicial proof.

Bart Verheij

Department of Metajuridica, Universiteit Maastricht
P.O. Box 616, 6200 MD Maastricht, The Netherlands
bart.verheij@metajur.unimaas.nl,
www.rechten.unimaas.nl/metajuridica/verheij/