Case-Based Reasoning and its Implications for Legal Expert Systems

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Abstract. Reasoners compare problems to prior cases to draw conclusions about a problem and guide decision making. All Case-Based Reasoning (CBR) employs some methods for generalizing from cases to support indexing and relevance assessment and evidences two basic inference methods: constraining search by tracing a solution from a past case or evaluating a case by comparing it to past cases. Across domains and tasks, however, humans reason with cases in subtly different ways evidencing different mixes of and mechanisms for these components.

In recent CBR research in Artificial Intelligence (AI), five paradigmatic approaches have emerged: statistically-oriented, model-based, planning/design-oriented, exemplar-based, and adversarial or precedent-based. The paradigms differ in the assumptions they make about domain models, the extent to which they support symbolic case comparison, and the kinds of inferences for which they employ cases.

Reasoning with cases is important in legal practice of all kinds, and legal practice involves a wide variety of case-based tasks and methods. The paradigms' respective benefits and costs suggest different approaches for different legal tasks.

CBR research and development in the field of AI and Law should be pursued vigorously for several reasons. CBR can supplement rule-based expert systems, improving their abilities to reason about statutory predicates, solve problems efficiently, and explain their results. CBR can also contribute to the design of intelligent legal data retrieval systems and improve legal document assembly programs. Finally, in cognitive studies of various fields, it can model methods of transforming ill-structured problems into better structured ones through the use of case comparisons.

1. Introduction

Researchers in the Artificial Intelligence subfield of Case-Based Reasoning have accomplished a great deal in the last few years, and much of that work has significant ramifications for research in AI and Law. They have explored different domains and tasks, identified different modes of reasoning with cases and invented different designs and implementations. It is a good point in the intellectual development of the field to step back and compare their approaches and accomplishments and try to assess the implications for the development of legal expert systems.

Legal Expert Systems Discubion And Theoretical Abumptions

Dov M. Gabbay,John Woods

Legal Expert Systems Discubion And Theoretical Abumptions:

    Legal Expert Systems Martina Smith,Tina Smith,1994   **Legal Expert Systems** Tina Smith,1995   *Extending Deontic Logic for the Formalisation of Legal Rules* L.L. Royakkers,2013-04-17 This book describes extensions of deontic logic Deontic logic is a branch of philosophical logic involving reasoning with norms obligations prohibitions and permissions The extensions concern the logical structure of legal rules and legal reasoning Their function is to improve the representation of legal knowledge and enhance deontic logic through increased expressibility The resulting formulas acquire new meanings not expressible in standard deontic logic which are subject to fresh interpretations The author offers an extensive analysis of the representation of actors to whom the norms are directed and authorities who enact the norms Moreover a distinction is made between enactment and applicability A modality of enactment can be used to express inconsistent enacted norms in a consistent way An authority hierarchy is introduced to filter out the applicable norms from the set of enacted norms Some related philosophical questions will be discussed regarding the applications of formalisms that are intrinsic to practical science with respect to consistency and universality The formalisms and applications considered here are relevant for law philosophy and computer science with a special focus on the improvement of legal expert systems and intelligent support for legal professionals   **DiaLaw** A.R. Lodder,2013-12-01 This book is a revised version of my dissertation DiaLaw on legal th justification and dialog games that I defended on June 5 1998 at the Universiteit Maastricht The chapters 1 4 5 now 1 5 6 of my dissertation have remained largely unaltered In chapter 2 I added explicitly the distinction between constructing legal justification and reconstructing it and tried to elucidate the differences and similarities between the product and process of justification Chapter 3 is divided into two chapters one on the general characteristics of DiaLaw now chapter 3 and the other on specific legal characteristics of DiaLaw now chapter 4 In order to improve readability all rules in these chapters have been rewritten considerably The section on the implementation of DiaLaw is moved to the appendix In chapter 7 the former chapter 6 a discussion of the notions procedural and structural arguments is added and different layers in argumentation models are discussed Finally in chapter 8 the former chapter 7 is added a recapitulation of my view on legal justification and a discussion on the future use in legal practice of dialog models that represent argumentation in a natural way The main thesis has remained unaltered legal justification should be modeled as a procedural dialogical model in which not only products of argumentation are allowed but even in formal models rhetorical psychological aspects of argument are dealt with

    Legal Knowledge Based Systems H. Prakken,1994   *Formal Models of Agents* John-Jules C. Meyer,Pierre-Yves Schobbens,2003-07-31 This volume provides a selection of strictly refereed papers first presented during a workshop held within the context of the ESPRIT ModelAge Project in Certosa di Pertignano Italy in 1997 The 15 revised full papers presented together with an introductory survey by the volume editors were carefully reviewed for inclusion in the book The book is devoted to the interdisciplinary study of formal models of agency and intelligent agents from the points of view of

artificial intelligence software engineering applied logic databases and organization theory Among the topics addressed are various types of agents and multi agent systems cooperation communication specification verification deontic logic diagnosis and decision making   *SHYSTER: A Pragmatic Legal Expert System* James Popple,1993-04-29 Most legal expert systems attempt to implement complex models of legal reasoning But the utility of a legal expert system lies not in the extent to which it simulates a lawyer s approach to a legal problem but in the quality of its predictions and of its arguments A complex model of legal reasoning is not necessary a successful legal expert system can be based upon a simplified model of legal reasoning Some researchers have based their systems upon a jurisprudential approach to the law yet lawyers are patently able to operate without any jurisprudential insight A useful legal expert system should be capable of producing advice similar to that which one might get from a lawyer so it should operate at the same pragmatic level of abstraction as does a lawyer not at the more philosophical level of jurisprudence A legal expert system called SHYSTER has been developed to demonstrate that a useful legal expert system can be based upon a pragmatic approach to the law SHYSTER has a simple representation structure which simplifies the problem of knowledge acquisition Yet this structure is complex enough for SHYSTER to produce useful advice SHYSTER is a case based legal expert system although it has been designed so that it can be linked with a rule based system to form a hybrid legal expert system Its advice is based upon an examination of and an argument about the similarities and differences between cases SHYSTER attempts to model the way in which lawyers argue with cases but it does not attempt to model the way in which lawyers decide which cases to use in those arguments Instead it employs statistical techniques to quantify the similarity between cases It decides which cases to use in argument and what prediction it will make on the basis of that similarity measure SHYSTER is of a general design it can provide advice in areas of case law that have been specified by a legal expert using a specification language Hence it can operate in different legal domains Four different and disparate areas of law have been specified for SHYSTER and its operation has been tested in each of those domains Testing of SHYSTER in these four domains indicates that it is exceptionally good at predicting results and fairly good at choosing cases with which to construct its arguments SHYSTER demonstrates the viability of a pragmatic approach to legal expert system design   *Knowledge Management in Electronic Government* Maria A. Wimmer,2003-08-03 The importance of Knowledge Management KM is increasingly recognized in business and public sector domains The latter is particularly suitable for KM implementations since it deals with information and knowledge resources at a large scale much of the work of public authorities deals with the elaboration of data information and knowledge on citizens businesses society markets the environment law politics etc Even most products of public administration and government work are delivered in the shape of information and knowledge themselves This especially applies to policies management and the regulation and monitoring of society markets and the environment Governments expect advanced support from KM concepts and tools to exploit these huge knowledge and information resources in an efficient way Not only does the trend towards a knowledge

society call for KM solutions but current e government developments also significantly influence the public sector Ample access to remote information and knowledge resources is needed in order to facilitate Citizen and businesses oriented service delivery including one stop service provision interorganizational co operation between governmental agencies cross border support for complex administrative decision making e government integration of dislocated information and knowledge sources into a fabric of global virtual knowledge **Electronic Government: Design, Applications and Management** Grönlund, Åke,2001-07-01 While not specifically defined Electronic Government has become a common term to describe all of the processes administrative and democratic that combine to constitute public sector operations Electronic Government Design Applications and Management examines the changes faced by the public sector as the use of IT significantly increases This book geared toward practitioners professionals decision makers and students strives to examine the challenges and opportunities involved in the implementation and use of IT into organizations **Logic and the Modalities in the Twentieth Century** Dov M. Gabbay,John Woods,2006-05-10 Logic and the Modalities in the Twentieth Century is an indispensable research tool for anyone interested in the development of logic including researchers graduate and senior undergraduate students in logic history of logic mathematics history of mathematics computer science and artificial intelligence linguistics cognitive science argumentation theory philosophy and the history of ideas This volume is number seven in the eleven volume Handbook of the History of Logic It concentrates on the development of modal logic in the 20th century one of the most important undertakings in logic s long history Written by the leading researchers and scholars in the field the volume explores the logics of necessity and possibility knowledge and belief obligation and permission time tense and change relevance and more Both this volume and the Handbook as a whole are definitive reference tools for students and researchers in the history of logic the history of philosophy and any discipline such as mathematics computer science artificial intelligence for whom the historical background of his or her work is a salient consideration Detailed and comprehensive chapters covering the entire range of modal logic Contains the latest scholarly discoveries and interpretative insights that answer many questions in the field of logic **Getting to :-)** Jelle van Veenen,2011 The potential of online communication to reduce the costs of dispute resolution has long been recognized Apart from cost reduction online applications may also improve the quality of dispute resolution Online communication can be limiting when offline processes are copied into an online environment However by designing processes specifically for the medium innovations are possible that are not available in offline dispute resolution In this book the limitations and benefits of using online communication for dispute resolution processes are investigated The book also explores the potential of online communication to support a specific dispute resolution process The focus is on tools to support integrative negotiation which is a common method for negotiating disputes used widely in legal practice and embedded in the formal system of many countries in the form of court annexed mediation The process is usually described in general terms In this research the

process is broken down into 14 concrete tasks Additionally several chapters describe how online applications may support users in dealing with communication issues miscommunication distrust and strong emotions in uncovering interests and in developing creative outcomes Examples from three applications demonstrate how these methods are being used in practice

Law Books Published ,1995   **Information Technology and the Law** ,1996   *AI Approaches to the Complexity of Legal Systems* Ugo Pagallo,Monica Palmirani,Pompeu Casanovas,Giovanni Sartor,Serena Villata,2018-10-22 This book includes revised selected papers from five International Workshops on Artificial Intelligence Approaches to the Complexity of Legal Systems AICOL VI to AICOL X held during 2015 2017 AICOL VI in Braga Portugal in December 2015 as part of JURIX 2015 AICOL VII at EKAW 2016 in Bologna Italy in November 2016 AICOL VIII in Sophia Antipolis France in December 2016 AICOL IX at ICAIL 2017 in London UK in June 2017 and AICOL X as part of JURIX 2017 in Luxembourg in December 2017 The 37 revised full papers included in this volume were carefully reviewed and selected form 69 submissions They represent a comprehensive picture of the state of the art in legal informatics The papers are organized in six main sections legal philosophy conceptual analysis and epistemic approaches rules and norms analysis and representation legal vocabularies and natural language processing legal ontologies and semantic annotation legal argumentation and courts adjudication and dispute resolution   **Knowledge Specification** Pepijn Visser,1995-09-19 This book provides a methodological background For The development of legal knowledge systems it describes a composite method that comprises three existing methods CommonKADs The de facto standard For The development of knowledge systems Van Kralingen s theory of frame based conceptual models of statute law Van Kralingen s book Frame based Conceptual Models of Statute Law is also published in the Computer Law series KANT a method to determine the primitive entities and their relations in legal domains The composite method reduces the dependency between a knowledge specification And The purpose for which the specification is created This dependency is often perceived to be a problem since it can prevent the specification from being reused for other purposes this is known as the interaction problem The composite method allows knowledge specifications to be reused for other purposes The author applies the method To The Dutch Unemployment Benefits Act and shows that both an assessment and a planning task can be performed using the same knowledge specification   *Information Polity* ,2002   The Cambridge Lectures, 1987 Canadian Institute for Advanced Legal Studies. Conference,1989   **Modelling the Legal Decision Process for Information Technology Applications in Law** Georgios Yannopoulos,1998-01-01 In this book Georgios N Yannopoulos appropriately relates the developing field of knowledge based systems in law with the basis in classic philosophy explicating relations which too often are not properly understood The decision model developed by the author is important as it integrates and explains arguments which often have been seen as imcompatible The use of the theoretical foundation in describing and in giving a critical analysis of the construction of real knowledge bases systems becomes therefore very valuable and Jon Bing Norwegian Research Center for Computers and Law and Expert systems in law

have not been as easily achieved as was originally envisaged because too many thought the task to be trivial and ignored the complex issues involved Yannopoulosand work is valuable because he attempts to detail these issues and overcome them and Philip Leith Queenand s University of Belfast and Yannopoulosand book addresses some of the most crucial problems in the field of information technology and law The development of more advanced IT solutions for the legal sector will always be closely related to our ability to model and understand the legal reasoning process In his analysis Yannopoulos elegantly integrates knowledge from many different areas and in this respect the book reflects an all too seldom seen broadness and Pete Wahlgren The Swedish Law and Informatics Research Institute IRI and There has been an abundance of recent research on developing intelligent support systems Dr Yannopoulosand work is especially significant because it examines the necessary legal background for building such systems It will be an essential reference for the prospective builders of intelligent legal support systems and John Zeleznikow La Trobe University Bundoora Australia   *Automated Analysis of Legal Texts* Antonio Anselmo Martino,Fiorenza Socci Natali,Simona Binazzi,1986   Proceedings of the Conference ,1987

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