IT&Law 6

INFORMATION TECHNOLOGY & LAW SERIES

Virtual Arguments

On the Design of Argument Assistants for Lawyers and Other Arguers

Bart Verheij

T·M·C·ASSER PRESS

INFORMATION TECHNOLOGY & LAW SERIES 6

VIRTUAL ARGUMENTS

On the Design of Argument Assistants for Lawyers and Other Arguers

Bart Verheij

Assistant Professor, Artificial Intelligence Department
University of Groningen

T·M·C·ASSER PRESS
The Hague

The *Information Technology & Law Series* is published
for IT*e*R by T·M·C·Asser press
P.O. Box 16163, 2500 BD The Hague, The Netherlands
<www.asserpress.nl>

T·M·C·Asser press English language books are distributed exclusively by:

Cambridge University Press, The Edinburgh Building, Shaftesbury Road,
Cambridge CB2 2RU, UK,
or
for customers in the USA, Canada and Mexico:
Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211, USA

<www.cambridge.org>

The *Information Technology & Law Series* is an initiative of IT*e*R, the National Programme for Information Technology and Law, which is a research programme set up by the Dutch government and the Netherlands Organisation for Scientific Research (NWO) in The Hague. Since 1995 IT*e*R has published all of its research results in its own book series. In 2002 IT*e*R launched the present internationally orientated and English language *Information Technology & Law Series*. This series deals with the implications of information technology for legal systems and institutions. It is not restricted to publishing IT*e*R's research results. Hence, authors are invited and encouraged to submit their manuscripts for inclusion. Manuscripts and related correspondence can be sent to the Series' Editorial Office, which will also gladly provide more information concerning editorial standards and procedures.

Editorial Office
NWO / IT*e*R
P.O. Box 93461
2509 AL The Hague, The Netherlands
Tel. +31(0)70-3440950; Fax +31(0)70-3832841
E-mail: <iter@nwo.nl>
Web site: <www.nwo.nl/iter>

Single copies or Standing Order
The books in the *Information Technology & Law Series* can either be purchased as single copies or through a standing order. For ordering information see the information on top of this page or visit the publisher's web site at <www.asserpress.nl/cata/itlaw6/fra.htm>.

ISBN 90-6704-190-4
ISSN 1570-2782

Cover and lay-out: Oasis Productions, Nieuwerkerk a/d IJssel, The Netherlands
Printing and binding: Koninklijke Wöhrmann BV, Zutphen, The Netherlands

Virtual Arguments

On the Design of Argument Assistants
for Lawyers and Other Arguers

For other titles in the Series see p. 162

PREFACE

This book provides an overview of research into the design of argumentation software. The focus is on defeasible argumentation as it occurs in the law. This book reports on interdisciplinary research, and I hope that not only researchers in the field of artificial intelligence and law, but also legal theorists, argumentation theorists and interested lawyers will be able to find their way through the material.

The research was funded by IT*e*R, the National Programme for Law and Information Technology (project numbers 014-37-112 and 014-38-708) and was carried out at the Faculty of Law of the Universiteit Maastricht. I would like to thank Jaap Hage and Bram Roth for their comments on a draft of this text. Earlier versions of much of the material in this book have been presented elsewhere, mostly in workshops and conferences (see the references in the text). An abridged and adapted version of the text, entitled 'Artificial argument assistants for defeasible argumentation', has been published in *Artificial Intelligence*, in a special issue on artificial intelligence and law (Verheij 2003b).

Groningen, September 2004 Bart VERHEIJ

TABLE OF CONTENTS

Chapter 1
Introduction

Chapter 1
Introduction

Computers can be used to support tasks that involve argumentation. Computer programs that can support argumentative tasks are called *argument assistants*. Just as word-processing software assists the process of writing, e.g., by making it easy to move text from one place to another and by providing automatic spelling checks, argument assistance software assists with argumentative tasks. Argument assistants can, for instance, help with the organization, visualization and evaluation of arguments.

In this book, no attempt is made to cover all aspects of argumentation. The focus in this book is on *defeasible argumentation*, especially as it occurs in the law. In defeasible argumentation, it may occur that a conclusion that is at first sight justified by an argument, is later withdrawn, for instance because there are new reasons against the conclusion. Since in legal argumentation defeasibility is omnipresent and often crucial, the law is chosen as the domain of application.

More specifically, the focus is on the following four aspects of argumentation: arguing with pros and cons, arguing with warrants, argument evaluation, and theory construction. These aspects of argumentation are all common in the domain of law. The argument assistants discussed in this book provide assistance with these four aspects of argumentation.

After a general introduction to argument assistants (section 1.1), the defeasibility of argumentation in the field of law is discussed (section 1.2). This leads to a view of the application of the law to concrete cases in terms of theory construction (section 1.3). An important question is then how information technology, and especially artificial intelligence research, can deal with argumentation. The question is addressed in section 1.4, where argument assistance is distinguished from automated reasoning. In section 1.5, the experimental argument assistants presented in this book are introduced: ARGUE! and the systems in the ARGUMED family. In section 1.6, pointers are given to related research. The chapter concludes with a legal case that is used as an example throughout the book (section 1.7).

B. Verheij, Virtual Arguments

1.1 Argument Assistants

Argument assistants are computer programs that assist users with argumentative tasks. Argumentative tasks occur in many kinds of situations. For instance, people draft argumentative texts, try to justify points of view, take part in debates between opponents or in opinion forming discussions, they must make decisions, and try to choose rationally between several options.

A domain in which argumentation plays a dominant role is the law. The following observations exemplify the mentioned argumentative tasks in a legal setting:

- Lawyers routinely *produce argumentative texts*, such as court pleadings.
- A legal opinion is worth as much as the *justification* that is given to support it.
- In the courtroom, *debate between opponents* has been institutionalized.
- *Opinion formation* concerning matters of law is an important task of legal research.
- Judges are authoritative *decision makers*.
- Lawyers must try to *choose rationally* between different courses of action, for instance when giving advice to a client or determining whether or not to prosecute a suspect.

All these situations involve argumentation. There are issues to be settled, and for that purpose arguments are produced. These arguments are based on assumptions and contain reasons for and against the issues involved.

In these terms, argument assistance software can for instance help with argumentative tasks by

- keeping track of the issues that are raised and the assumptions that are made,
- keeping track of the reasons that have been adduced for and against a conclusion,
- keeping track of the issues that have been settled or remain open,
- providing means to organize the statements made,
- providing tools for argument evaluation,

- providing argument templates, and
- checking constraints that must be obeyed.

The research presented in this book originated in the interdisciplinary field of artificial intelligence and law. The law is of course a fruitful source of examples of argumentation. Moreover, many – if not all – of the most difficult questions with respect to argumentation occur within the law in a real-life context. As a result, many examples in the book will be taken from the legal domain. The general reader will however discover that most of what is said is relevant in a context which is wider than the law.

1.2 Defeasible Argumentation in the Field of Law

Argumentation is a vast topic. As a result, the software described in this book was developed with a restricted perspective on argumentation in mind. The selection of focal points has been made with an eye on legal reasoning. Especially, defeasibility of argumentation lies at the heart of the research in this book.

In all argumentation software to be discussed in this book, the argumentation involves statements that are not only supported by arguments for them, but they are also attacked by arguments against. In short, the focus is on *arguing with pros and cons*.

One natural context in which to study arguing with pros and cons, is that of dialogues in which two or more arguers exchange arguments for and against the statements made. For instance, it can be the case that in a particular dialogue two arguers have dedicated roles: one arguer tries to defend a claim by giving reasons for it, while another tries to raise doubts by providing reasons against the claim.

In the present book, argumentation is however not studied in a dialogue context. Instead, argumentation is treated as a process of finding satisfactory assumptions to settle one or more issues. In other words, argumentation is regarded as a kind of *theory construction*: the assumptions determined in the process of argumentation provide a theory to settle the issues.

For instance, a judge uses his knowledge of the law and of the world in general, the available evidence and the court proceedings in order to settle the issue as to whether a criminal suspect is innocent or guilty. It regularly

occurs that the available information contains conflicting material (for instance, contradictory witness testimonies) and does not suffice to settle the issue. As a result, the judge will have to form an acceptable theory of the case. A first selection of reasonable hypotheses can for instance provide an initial theory with respect to the suspect's innocence. By subsequent critical scrutiny and adaptation of the theory, e.g., by arguing for and against its elements and consequences, the theory is developed until it provides a satisfactory account of the case and the suspect's innocence. The theory construction view on argumentation is especially relevant when it is acknowledged that argumentation is defeasible, since in that case the status of an issue can change throughout the process.

A topic requiring special attention when considering argumentation with pros and cons is *argument evaluation*. The standard view on argument evaluation is provided by classical logic in terms of logical validity (whether in a semantic, proof-theoretic or procedural guise). For instance, an argument is regarded as valid when the truth of its conclusion follows from the truth of its premises. This standard view requires adaptation, however, since arguing with pros and cons is defeasible: a conclusion that is justified given a particular set of arguments can cease to be justified when arguments are added. This can, for instance, occur when a reason against a conclusion is introduced. When there are only reasons for punishing someone, it seems to be justified to conclude that he must be punished. However, when sufficient counter-reasons become available it may occur that it is no longer justified to draw that conclusion. It can even happen that it is justified to draw the opposite conclusion, that he must not be punished.

The result of the defeasibility of argumentation with pros and cons is that a corresponding argument evaluation function cannot be monotonic. An argument evaluation function is monotonic when adding information can only extend the set of justified conclusions and never leads to a smaller set of justified conclusions. Since evaluation in terms of standard logical validity is monotonic, the notion of argument evaluation must be revised. The defeasibility of reasoning and the corresponding nonmonotonicity of consequence relations has received a great deal of research attention since the 1980s and has turned out to be a difficult and subtle subject.

A perspective on argumentation is not complete without a discussion of *warrants*, in the way that Toulmin (1958) used the term, viz., as generic inference licences. For Toulmin, warrants are rule-like statements warrant-

ing that some reason supports its conclusion. For instance, the statement that murderers should be imprisoned for twenty years can warrant the argument that a particular suspect should be imprisoned for twenty years since he is a murderer. Dealing with warrants is especially intricate in the context of defeasible argumentation, since it is often the case that warrants have exceptions. For instance, even when in general the warrant obtains that murderers should be imprisoned for twenty years, it can occur that a specific murderer should *not* be imprisoned, e.g., when he is considered to be mentally ill.

Especially in an account of legal argumentation, warrants cannot be missed. Many of the issues in legal reasoning concern the question whether a particular warrant is justified. This occurs for instance in a debate on the interpretation of a particular statutory article. From an argumentation-theoretic point of view, such a debate concerns settling the issue of which warrant (or warrants) are backed by the article.

Summarizing, the argumentation perspective in this book consists of four points of focus:

- Arguing with pros and cons
- Theory construction
- Argument evaluation
- Arguing with warrants

All four are of central relevance for defeasible argumentation in the law.

1.3 Theory Construction and the Application of Law to Cases

Theory construction provides a view on the application of law to cases. A somewhat naïve conception of the application of the law to concrete cases is that it consists of strictly following the given rules of law that match the given case facts – a conception by which a judge is turned into a *bouche de la loi* (Figure 1.1).

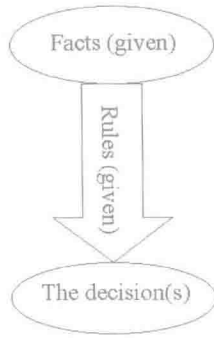

Figure 1.1: A naïve view of applying the law to a case

The main problem with this view (which has become a mock image of law application that mainly serves as a take-off point from which to move away) is that it assumes that the rules of law and the case facts are somehow readily available. Obviously, this is not the case. The available material is simply not sufficiently precise and unambiguous to allow the straightforward application of rules to facts. And even if the rules and facts were given in an adequate manner, following the rules that match the case facts can be problematic. First, following the rules may not be appropriate, e.g., when a rule is not applicable because of an exception. Second, it may be that the case is not solved at all, e.g., when no relevant result follows. Third, there may be several possibilities, perhaps ones which even conflict.

The first can occur since legal rules are generally *defeasible*. There can be exclusionary reasons or reasons against their application, for instance when applying the rule would be against its purpose.

The second is the case when there is a legal *gap*: the applicable law does not have an answer to the current case. This not only occurs on the advent of new legally relevant phenomena (such as the new legal problems as they are encountered by the rise of the internet), but also when the law only (and often deliberately) provides a partial answer, as for instance by the use of open rule conditions, such as grievous bodily harm or fairness. An adjudicator will have to fill the gap, for instance by making new rules of classification.

The third is the case when there is a legal *ambiguity*: the applicable law provides several possible answers. This can occur by accident, for instance, when there is an unforeseen and unwanted conflict of rules. In a complex,