

Preface

This book is about the common ground between two fields of inquiry: Argumentation Theory and Artificial Intelligence. On the one hand, formal models of argumentation are making significant and increasing contributions to Artificial Intelligence, from defining semantics of logic programs, to implementing persuasive medical diagnostic systems, to studying negotiation dialogues in multi-agent systems. On the other hand, Artificial Intelligence has also made an impact on Argumentation Theory and Practice, for example by providing formal tools for argument analysis, evaluation, and visualisation.

The field of Argumentation in Artificial Intelligence has grown significantly in the past few years resulting in a substantial body of work and well-established technical literature. A testimony to this is the appearance of several special issues in leading scientific journals in recent years, (*e.g.*, Springer's Journal of Autonomous Agents and Multiagent Systems 2006; Elsevier's Artificial Intelligence Journal 2007; IEEE Intelligent Systems 2007; Wiley's International Journal of Intelligent Systems 2007). Another evidence of the maturity of this area is the establishment of a new biannual international conference in 2006 (see www.commaconf.org). In addition, two series of workshops have been co-located with major AI conferences: the Argumentation in Multi-Agent Systems (ArgMAS) workshop series running annually alongside AAMAS since 2004, and the Computational Models of Natural Argument (CMNA) workshop running series alongside IJCAI and ECAI since 2001. Yet, although valuable survey papers exist, there is no comprehensive presentation of the major achievements in the field. This volume is a response to a growing need for an in-depth presentation of this fast-expanding area. As such it can be seen as a confluence of deep exposition and comprehensive exploration of the underlying themes in the various areas, done by leading researchers. While no single volume on Argumentation and Artificial Intelligence could cover the entire scope of this dynamic area, these selected writings will give the reader an insightful view of a landscape of stimulating ideas that drive forward the fundamental research and the creation of applications.

This book is aimed at new and current researchers in Argumentation Theory and in Artificial Intelligence interested in exploring the rich terrain at the intersection between these two fields. In particular, the book presents an overview of key concepts in Argumentation Theory and of formal models of Argumentation in AI. After laying a strong foundation by covering the fundamentals of argumentation and formal argument modeling, the book expands its focus to more specialised topics, such as algorithmic issues, argumentation in multi-agent systems, and strategic aspects of argumentation. Finally, as a coda, the book presents some practical applications of argumentation in AI and applications of AI in argumentation.

Although the book is an edited collection, the chapters' topics and order was done carefully to produce a highly organised text containing a progressive development of intuitions, ideas and techniques, starting from philosophical backgrounds, to abstract argument systems, to computing arguments, to the appearance of applications presenting innovative results. Authors had the chance to review each others'

work at various stages of writing in order to coordinate content, ensuring unified notation (when possible) and natural progression.

Readers of this book will acquire an appreciation of a wide range of topics in Argumentation and Artificial Intelligence covering, for the first time, a breadth of hot topics. Throughout the chapters the authors have provided extensive examples to ensure that readers develop the right intuitions before they move from one topic to another.

The primary audience is composed of researchers and graduate students working in Autonomous Agents, AI and Law, Logic in Computer Science, Electronic Governance, Multi-agent Systems, and the growing research represented by the interdisciplinary inquiry carried out in many areas such as Decision Support Systems. Given the scope and depth of the chapters of this book, its content provides an excellent foundation for several different graduate courses.

The book begins with an “Introduction to Argumentation Theory” by Douglas Walton, who was one of the argumentation theorists who pioneered joint work with AI researchers. The rest of the book’s twenty three chapters have been organised into four parts: “Abstract Argument Systems”, “Arguments with Structure”, “Argumentation in Multi-Agent Systems”, and “Applications”. Chapters in this book have been written by researchers that have helped shape the field. As such, we are confident that this book will be an essential resource for graduate students and researchers coming to the area.

The value of this book is in the ideas it presents. Thus we gratefully acknowledge efforts by all authors who shared their ideas and deep insights of this fertile area of research in such a clear manner. Furthermore, they also acted as peer reviewers of other chapters and helped to significantly improve the quality and the flow of the book. We would also like to thank all the contributions made by the different organisations that supported the authors of this book as they individually recognise in each chapter.

We are grateful to the Springer team, and in particular Melissa Fearon and Valerie Schofield, for supporting the creation of this book from early discussions right through to final editorial work.

Last but not least, we are always grateful to our families for their endless love and support.

Dubai, Edinburgh and Bahia Blanca,
December 2008

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<http://www.springer.com/978-0-387-98196-3>

Argumentation in Artificial Intelligence

Rahwan, I. (Ed.)

2009, XIII, 493 p., Hardcover

ISBN: 978-0-387-98196-3