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EDITORIAL

Introducing *Argument & Computation*

1. Motivation

The motivation for inaugurating a new journal is simple: a community of increasing size is working in a remarkably fertile area and hitherto has not had a journal dedicated to publication of its results.

Over the past decade or so, a new interdisciplinary field has emerged in the ground between, on the one hand, computer science – and artificial intelligence in particular – and, on the other, the area of philosophy concentrating on the language and structure of argument. There are now hundreds of researchers worldwide who would consider themselves a part of this nascent community. Various terms have been proposed for the area, including "Computational Dialectics," "Argumentation Technology" and "Argument-based Computing," but the term that has stuck is simply *Argument & Computation*. It encompasses several specific strands of research, such as:

- the use of theories of argument, and of dialectic in particular, in the design and implementation of protocols for multi-agent action and communication;
- the application of theories of argument and rhetoric in natural language processing and affective computing;
- the use of argument-based structures for autonomous reasoning in artificial intelligence, and in particular, for defeasible reasoning;
- computer supported collaborative argumentation – the implementation of software tools for enabling online argument in domains such as education and e-government.

These strands come together to form the core of a research field that covers parts of artificial intelligence (AI), philosophy, linguistics and cognitive science, but, increasingly, is building an identity of its own.

An increasing number of events and fora dedicated to the area (including now two annual international workshop series and a biennial international conference) suggest that there is an opportunity for a new journal to consolidate and support the new field as it grows.

Our aim is to address the fact that there is currently no publication venue dedicated to research in argument and computation, and to develop a high profile journal that has a reputation as the place to publish work in the area, providing both a high-quality target for authors, and a reliable resource for readers.

2. A Potted History of the Field

The year 2000 represents one good point at which to mark the rise of the interdisciplinary area between computing (specifically, artificial intelligence) and argumentation. Before that, there were occasional conferences such as *Formal and Applied Practical Reasoning* (one in 1996, one in 1997, with proceedings edited by Gabbay and colleagues, and published in LNAI series by Springer) and workshops, such as those on Computational Dialectics in the mid 90's organised by Loui, Gordon et al. But otherwise little else.

In 2000, the *Symposium on Argument and Computation* brought together philosophers, AI researchers, linguistics, psychologists, lawyers and rhetoricians in a structured way to collaborate on a book project which turned out very successfully as the *Argumentation Machines* book published in Kluwer's Argumentation Library (Reed and Norman 2004). Independently, the Computer Supported Cooperative Work (CSCW) community was developing links with practical reasoning philosophers and educators in developing visualisation and group-working systems (see, e.g., the CSCA workshops organised by Buckingham-Shum). Philosophers of argument were also starting to interact with AI independently (e.g. Walton with multi-agent systems, Hitchcock with defeasible reasoning, and Jackson with AI and education, amongst many others).

Over the following few years, there has been steady growth. The Computational Models of Natural Argument (CMNA[1]) workshops organised by Grasso, Reed and latterly, Carenini, Kibble and Green have attracted more submissions each year, sustaining the series into what is now its tenth year (following 2001 with ICCS in San Francisco; 2002 with ECAI in Lyon; 2003 with IJCAI in Acapulco; 2004 with ECAI in Valencia; 2005 with IJCAI in Edinburgh; 2006 with ECAI in Riva del Garda; 2007 with IJCAI in Hyderabad; 2008 with ECAI in Patras; and most recently in 2009 with IJCAI in Pasadena). The view of the organising committee has been that CMNA functions to provide a forum of discussion and succor to an emerging community. As a result, although reviewing has been rigorous and detailed, this reviewing has served primarily as a starting point for discussion, with relatively few papers being rejected. Of course, in taking this decision, it was clear that the submitted papers themselves should not be published. Through the series of workshops, it has become clear that this was the right decision, since attendees have enjoyed the opportunity to discuss and explore new collaborations without the pressures and restrictions of producing publishable quality material. As the work has matured, venues with more rigorous reviewing to establish publishable results is required.

The year 2004 witnessed the introduction of a workshop series focusing specifically on argumentation in multi-agent systems, ArgMAS[2] run with the AAMAS conference in New York. This workshop, co-organised by Rahwan, Moraitis and Reed, published its papers with Springer. ArgMAS is now established as an annual event, with LNCS proceedings from each of the meetings: 2005 in Utrecht, 2006 in Hakodate, 2007 in Hawaii, 2008 in Estoril and 2009 in Budapest.

The 2006 saw the inauguration of the new international conference series on Computational Models of Argument, COMMA[3], with yet stricter acceptance criteria imposed by the chairs, Dunne, Bench-Capon. Proceedings from both 2006 in Liverpool and 2008 in Toulouse have been published with IOS Press, with 2010 in Brescia set to follow suit. COMMA is now the natural conference home for work in the area, and provides the field with an identity and a common forum for presentation and discussion. There is naturally a strong link between COMMA and the journal of *Argument & Computation*. For authors, the journal will seek to solicit extended and revised versions of papers from the conference for publication in the journal. For readers, the journal will offer very heavily discounted subscription for conference attendees, and will distribute complementary copies at the conference. For everyone in the community, Taylor and Francis have pledged to support the conference in practical ways to help it to grow and prosper.

Further demonstration of the development of the vitality of the research community over the past decade is offered by an increasing number of journal special issues dedicated to various computational applications of argument including:

- Artificial Intelligence, Elsevier, 2007 (Bench-Capon and Dunne 2007).
- IEEE Intelligent Systems, IEEE, 2007 (Rahwan and McBurney 2007).

- International Journal of Intelligent Systems, World Scientific, 2007 (Reed and Grasso 2007).
- Argumentation, Springer, 2005 (Hitchcock and Verheij 2005).
- Autonomous Agents and Multi-Agent Systems, Springer, 2005 (Rahwan 2005).
- Artificial Intelligence and Law, Springer, 2005 (Bench-Capon and Dunne 2005).
- Journal of Logic and Computation, OUP, 2003 (Brewka et al. 2003).
- Informal Logic Journal, OJS, 2002 (Gilbert 2002).
- Computational Intelligence, Blackwell, 2002 (Chaib-Draa and Dignum 2002).

Finally, there has also been a concomitant increase in funders' recognition of the importance of the area with a variety of major projects each worth over $1m across Europe and worldwide, including, for example:

- ASPIC (EU funded, 2004-7)
- ArguGRID (EU funded, 2006-8)
- AMI and AMIDA (EU funded, 2004-9)
- IMPACT (EU funded, 2010-2)
- Argumentation Factory (EPSRC funded, 2006-9)
- DAM (EPSRC funded 2009-12)
- ITA (DARPA funded, 2006-16)

Most recently, two books appeared, one authored by Besnard and Hunter (2008), a reference book for the formalization of argumentation in AI. The other volume, containing a collection of introductory chapters to the field by key authors, was edited by Rahwan and Simari (2009), and provides a comprehensive account of the various perspectives of argumentation and computation.

As the body of research in the area as a whole continues to grow, it becomes increasingly important to have archival publication venues that represent the field's definitive home. The journal of *Argument & Computation* aims to fulfil this role.

3. The Inaugural Papers

We are delighted to launch the inaugural issue of *Argument & Computation* with a collection of varied and interesting papers from some of the leading figures in the field, which collectively testify to the richness and scope of the research area.

We open the inaugural issue with a paper by one of the early pioneers in the field, John L. Pollock, who sadly passed away in 2009 shortly after submitting the paper. In "*Defeasible Reasoning and Degrees of Justification*," Pollock addresses the important issue of whether and how models of defeasible reasoning should account for varying degrees of justification. Pollock argues that the computation of defeat statuses is a "subdoxastic process," in that the process of computing degrees of justification is "a black box that operates in the background as we construct arguments in the foreground." This claim is analyzed in the context of "inference graphs," which represent the current state of a reasoner. After discussing the relationship between degrees of justification and probabilistic reasoning, Pollock discusses how they affect computation and semantics in defeasible reasoning. The author then analyzes implications of justification degrees on reasoning from multiple premises, reasoning from multiple arguments, and the nature and effect of weak defeaters (or so-called diminishers). All in all, the paper makes a strong case for taking a more fine-grained of the relationship between arguments, beyond the classical (binary) notion of attack and justification.

In "*A Dialog Model of Belief*," the Journal is pleased to be able to offer, from one of the foremost philosophers in the area, a new account of one of the most slippery relationships underlying

many dialogical models of argument in both philosophy and AI: the relationship between belief and commitment. Walton returns to Peirce's original exploration of the notion of belief for both an understanding of how belief should function in agentive settings, and how such functioning might be achieved abductively. Walton goes on to develop an account that builds on his results from three decades. He uses his dialogue theory of logical games from the early 1980s as a basis for exploring the critical role of implicit commitment in establishing the link between commitment and belief. His research on argumentation schemes begun in the late 1990s and continuing still is used as the engine for enacting that link. And finally, his most recent work on dialogue games that involve schemes is used to tie the framework together using a new model dialogue game in ASDV. The result argues, for the first time, for a way of building computational agents in which the concepts of belief and commitment work together harmoniously.

The article "*Modular Argumentation for Modeling Legal Doctrines of Performance Relief*," by Phan Minh Dung, Phan Minh Thang and Nguyen Duy Hung, presents a development in the Artificial Intelligence and Law area. Interaction between parties needed to interpret a contract can be abstractly perceived as the exchange of arguments in support or against a given interpretation of the contract. Following this view, the main contribution of the work is an argument-based formalism that handles contract dispute resolution where the court will play the role of resolving the ongoing contract dispute by enforcing an interpretation of the contract that could be considered as representing the mutual intention of the involved parties in a fair manner. The formalism is based on modular argumentation, a recently proposed extension of assumption-based argumentation for modelling contract dispute resolution, and the appropriateness of the this formalism is demonstrated by applying it to common laws. An example is developed using the system called MoDiSo (MOdular Argumentation for DIspute ReSOlution) that consists of three doctrines here modelled.

A perfect complement to the inaugural issue, the paper by Fabio Paglieri and Cristiano Castelfranchi provides a cognitive perspective to argumentation. In "*Why argue? Towards a cost-benefit analysis of argumentation*," the authors focus on the strategic dimension of the argumentation activity, rooted in natural argumentation but with clear implications for the design of argumentation technologies. The paper challenges a common assumption in argumentation theories that argumentation is always beneficial to the ecosystem consisting of the arguers and the claim, as, no matter the outcome, some "feature" of the system will be improved, such as the credibility of the conclusion or the position of one of the arguer. If one concedes that argumentation might actually be pejorative with respect to the initial situation, then it makes perfect sense to talk about a cost-benefit analysis of the argumentation process. Paglieri and Castelfranchi provide an insightful and innovative account of how the economy of argumentation can be conceived, and convincingly argue that the analysis of an argumentative process should not be limited to the dialogical dimension, but should be put in the broader context of the agents' practical reasoning.

4. Conclusion and Acknowledgements

As editors, we are greatly indebted with the advisory and editorial board members for their support and encouragement. We are grateful to Taylor and Francis for their endorsement and advice at all phases preceding the inception of the journal. We especially owe profound gratitude to the family of John Pollock for making the inclusion of John's precious contribution to this inaugural issue possible.

Ultimately, the success of any journal is determined by the support and commitment of its academic community. We hope that *Argument & Computation* will serve as the main venue

for new and exciting research in this area, and as an engaging starting point for anyone new to the field. We look forward to receiving your submissions.

Notes

1. http://www.cmna.info/
2. http://homepages.inf.ed.ac.uk/irahwan/argmas/
3. http://www.comma-conf.org/

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