

Introduction: Theoretical and Technological Perspectives on Online Arguments

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Argumentation has been a topic of interest for philosophy since its very inception—no surprisingly, given that philosophical inquiry is first and foremost about the articulation of cogent arguments. Aristotle’s *Sophistical Refutations* offered the first in a long list of taxonomies of fallacious arguments throughout the history of philosophy, either with a focus on rhetorical aspects (Cicero’s *On invention* and *Rhetoric to Herennius*, Quintilian’s *Ars Oratoria*, Schopenhauer’s sarcastic pamphlet *The Art of Being Right: Thirty-Eight Ways to Win an Argument*, just to name a few specimens) or looking at their logical and dialectical underpinnings (besides Aristotle’s own work, Locke’s treatment of *ad fallacies* in *An Essay Concerning Human Understanding*, book III of Whately’s *Elements of Logic* and book V of Mill’s *A System of Logic, Ratiocinative and Inductive* are all key references). Nor has this interest abated in recent times—quite the opposite, in fact. Since Hamblin’s seminal monograph *Fallacies* (1970), there has been a resurgence of studies on fallacious reasoning over the last few decades, with important contributions from all the main scholars in argumentation theory (e.g., Johnson and Blair 1977; Hintikka 1987; Woods and Walton 1989; Walton 1995; Tindale 2007; van Eemeren 2010); for a critical overview of these recent developments, Woods’s *Errors of Reasoning* (2013) is the best current source (see also Boudry et al. 2015 for a more focused critique of some of its outcomes, and van Eemeren et al. 2014 for a bird-eye view of various strands of argumentation research). Clearly, philosophical interest has not been limited to the dark side of (bad) arguments: the quest for a definition of argument quality sound enough to be satisfactory, yet flexible enough to be applicable to real-life arguments has preoccupied scholars for millennia, and it is still

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far from being solved—indeed, much of the friction between mainstream logic and so called informal logic hinges on what standard of argument quality one is willing to endorse, and on what grounds. Even more fundamentally, Aristotle’s distinction between logic, dialectic, and rhetoric has shaped (and is still shaping) the whole debate on argumentation. As for practical applications, some of Plato’s thesis in the *Republic* can be seen with modern eyes as a (grim) outlook on the prospects of deliberative democracy, given the argumentative skills and mindsets of its participants. In a similar vein, the value and pitfalls of political argumentation has been a matter of philosophical concern at least since Bentham’s *Handbook of Political Fallacies*, and arguably even well before that.

More recently, argumentation has become an important topic also in computer science and in the development and management of new technologies. Initially, argumentation was mostly appreciated as an effective technical solution to handle some key challenges in Artificial Intelligence, such as the modeling of non-monotonic reasoning and the design of robust coordination protocols among large numbers of autonomous agents. Seminal contributions in this vein included, but were not limited to, Dung’s abstract argumentation (1995), Pollock’s work on defeaters (1995), and the range of proposals for multi-agent argumentation systems (for a comprehensive survey, see Rahwan and Simari 2009). In parallel, there has been growing interest on how the newly developed argumentation technologies might impact education (Andriessen et al. 2003), which naturally complemented the long-standing debate on how to promote critical thinking education (whose main current outcomes are included in Davies and Barnett 2015) and the value of argumentation for learning, especially with respect to scientific inquiry (Driver et al. 2000). It is interesting to note that such a variety of approaches led to the blossoming of multiple series of scholarly workshops and seminars (e.g., CMNA, Computational Models of Natural Argument, <http://www.cmna.info/>; ArgMAS, Argumentation in Multi-Agent Systems, <http://www.mit.edu/~irahwan/argmas/>), which since 2006 coalesced in the biennial international conference on Computational Models of Argument, COMMA (<http://comma.csc.liv.ac.uk/>), even though most of those workshops are still very much alive and well. More recently, all of these interconnected lines of research have shifted towards a specific array of technologies—namely, *online technologies*. Given the impressive volume and dubious quality of online dialogical interactions people experience everyday, it is no surprise that understanding how online technologies impact our social life has become a pressing concern. This is certainly true for people looking mostly at the benefits of such transformations, e.g., how it might allow better harnessing Surowiecki’s alleged “wisdom of crowds” (2004); but the topic is equally urgent, if not more, for those who are worried by the shortcomings and bottlenecks online argumentation is likely to exhibit—e.g., the dubious value of Facebook as a learning platform (Kirschner 2015) and the current outcry against the spreading of false information online (Del Vicario et al. 2016), typically attributed to the filtering effect of being selectively exposed to the views of like-minded peers (so called echo chambers, see Sunstein 2001). Regardless of whether one is optimistic or pessimistic on the current status quo, the impact of online technology on the quality of social interaction poses key challenges that we need to collectively address: as some commentators recently put it, “too many mechanisms for online interaction hamper and discourage debate, facilitating poor-quality argument and fuzzy thinking. Needed are

new tools, systems, and standards engineered into the heart of the Web to encourage debate, facilitate good argument, and promote a new online critical literacy” (Bex et al. 2013, p. 66). Such need is also attested by the booming interest in *argument mining*, that is, the use of Machine Learning and Natural Language Processing techniques to automatically analyze, categorize, and retrieve argument structures within online texts (e.g., next September the fourth edition of the successful ArgMining workshop will be held in Copenhagen, showcasing new advances in this field; <https://argmining2017.wordpress.com/>).

Thus, the current debate on online technologies provides a natural outlet in which millennia of philosophical reflection on what argumentation is and how it works are likely to bear important fruits. Indeed, philosophers of argument may even be said to have a duty to make their collective voice heard in this crucial debate, lest the proposed solutions are constrained only by technical and socio-political considerations, with little appreciation for the nuances of argumentation. This special issue is intended as a first step in the right direction, striving to bring together, as the title states, both theoretical and technological perspectives on online arguments.

The first paper in this collection is authored by Chris Reed, Katarzyna Budzynska, Rory Duthie, Mathilde Janier, Barbara Konat, John Lawrence, Alison Pease, and Mark Snaith: it focuses on “The Argument Web: An online ecosystem of tools, systems and services for argumentation”, and it provides an excellent gateway to the rich and vastly diverse landscape of argument technologies, especially those designed to analyze and support online argumentation. In particular, Reed and collaborators elaborate on the so called Argument Web, which can be seen both as a platform built upon a synthesis of many contemporary theories of argumentation in philosophy and as an ecosystem in which various applications and application components are contributed by different research groups around the world. Their paper summarizes the key foundations, advances and ambitions of the Argument Web, with a particular focus on demonstrating the relevance to, and roots in, philosophical argumentation theory.

Iyad Rahwan, in his “Towards Scalable Governance: Sensemaking and Cooperation in the Age of Social Media”, proposes to look at human societies as cybernetic (i.e., self-governing) entities, and focuses on two resulting “scalability” problems: scaling up a group’s ability to make sense of an increasingly complex world, and to cooperate in increasingly larger groups. He argues that standard political solutions to governance (most notably, representative democracy) fall short of addressing these challenges in contemporary societies. As an alternative way of facing the problem of scalability, Rahwan looks at recent efforts with crowdsourcing and computer-supported argumentation: he then extrapolates some lessons from those efforts about the limits of technology and suggests research directions more likely to bear fruit.

Daniel Cohen, in his article “The Virtuous Troll: Argumentative Virtues in the Age of (Technologically Enhanced) Argumentative Pluralism”, looks at what philosophical reflection may offer on a specific problem of online arguments—namely, the existence of trolls. Cohen begins by emphasizing how technology has made argumentation both ubiquitous and more varied in format, since nowadays it is possible to argue either in carefully reasoned, article-length expositions, real-time exchanges, or 140-character polemics. This calls for, according to Cohen, a reconsideration of some key concepts in argumentation theory, such as what it means to argue, to argue well, and even to be an arguer. He addresses these theoretical complications from the standpoint of virtue

argumentation theory (for a current overview, see also Aberdein and Cohen 2016), and then applies this approach to trolls: this gives him the theoretical tools to articulate why trolls' contribution to arguments are not very good, not really contributions, and, ultimately, not genuine argumentation.

Mark Aakhus instead looks at how large-scale organizations communicate (mostly online), to discuss how this creates and molds new argumentative contexts. In his "The Communicative Work of Organizations in Shaping Argumentative Realities", Aakhus argues that large-scale organization and networked computing enable new divisions of communicative work aimed at shaping the content, direction, and outcomes of societal conversations. This poses a crucial challenge for argumentation theory, if it is to understand how these new divisions of communicative work affect contemporary argumentative realities. Aakhus leverages Goffman's (1981) conceptualization of participation frameworks and production formats to articulate the communicative work of organizations afforded by networked computing. This in turn scaffolds argumentative contexts and practices that are quite different than what has constituted past argumentative realities. In particular, the cases and examples examined by Aakhus suggest that argument practice is evolving around the logic of conversation and the principle of personalization. As a consequence, argumentation theory is tasked with integrating a design perspective on argument with insights from organizational and information systems theory, to better understand how argumentation unfolds and evolves in an era of large-scale organization and computerization.

In the final contribution, Fabio Paglieri makes "A Plea for Ecological Argument Technologies", which provides a partial counterpoint to the rest of the issue. While still being very much a proponent of argument technologies for the improvement of online social interactions, Paglieri argues that past efforts in this direction have produced only limited results. The article discusses what obstacles bar the way to more widespread success of argument technologies and venture some suggestions on how to circumvent such difficulties. These suggestions hinge on an appreciation of the strengths and weaknesses of human arguers: building upon Mercier and Sperber's (2011) argumentative theory of reasoning, Paglieri claims that people are relatively bad at analyzing the structure of arguments, whereas they tend to excel in the interactive practice of argumentation. Insofar as argument technologies will continue to be more closely tailored to the former type of activity than to the latter, their success with the general public will be limited. Instead, according to Paglieri we should commit to ecological argument technologies: that is, technologies designed to support real-time, engaging and meaningful argumentative interactions performed by laypeople in their ordinary life, which takes into serious account the cognitive underpinnings of their intended users.

Many people were instrumental in putting together this issue: the accepted contributions were selected from a pool of 24 papers presented at the workshop on "Arguing on the Web 2.0," held in Amsterdam on June 30 and July 1, 2014, and later complemented with a second call for papers. The event was chaired by the guest editors of this issue, with Ulle Endriss acting as local organizer: we are very grateful to the University of Amsterdam for hosting the workshop, to the International Society for the Study of Argumentation (ISSA) for allowing it to be scheduled back-to-back with the ISSA 2014 conference, and to all the sponsors for their essential support—the European Network for Social Intelligence (SINTELNET, <https://ec.europa.eu/digital-single-market/en/news/sintelnet-european-network-social-intelligence>), the Center for

Argumentative Technology of the University of Dundee, UK (ARG-tech, <http://www.arg-tech.org/>), and the Institute of Cognitive Sciences and Technologies of the National Research Council, Rome (ISTC-CNR, <http://istc.cnr.it/>). Most of the papers that could not be included in this collection, due to length limitations, together with other related material will soon appear in the volume *Argument Technologies: Theory, Analysis, and Applications*, edited by Floris Bex, Floriana Grasso, Nancy Green, Fabio Paglieri and Chris Reed, within the “Studies in Logic and Argumentation” series published by College Publications. As for the current issue, it would have never been possible without the generous efforts of all authors and reviewers, as well as the unwavering support of the editorial staff of *Philosophy & Technology*—most notably, Luciano Floridi, Giuseppe Primiero, and Cherry Ann Calosor. To all these people we offer our sincere gratitude, in the hope that the contributions presented here will do justice to their expectations, by highlighting the multifaceted role of philosophy in shaping the nature and quality of our online argumentative interactions.

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