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Editorial

This special issue contains revised and expanded versions of a number of papers that were originally presented at DEON 2006, the 8th International Workshop on Deontic Logic in Computer Science, held in Utrecht, The Netherlands, 12–14 July 2006. These biennial DEON (more properly, ΔEON) workshops are designed to promote international cooperation among scholars across disciplines who are interested in deontic logic and its use in computer science. These workshops support research that links the formal-logical study of normative concepts and normative systems with computer science, artificial intelligence, philosophy, organization theory, and law.

The 2006 edition of the workshop was devoted to a special theme, viz. Artificial Normative Systems. These are computer-based systems in which norms and normative behavior play a role. One can think of such systems for legal automation, authorization mechanisms, or electronic contracting, amongst other applications (cf. [1]). Recently one form of artificial normative system that has gained a lot of attention lies in the field of distributed artificial intelligence, and multi-agent systems (MAS) in particular. Agents are software entities that display a degree of autonomy by design. To co-ordinate a number of them in a MAS (or agent society, as it is sometimes also called when there is some social structure imposed on the system, such as roles of agents and power hierarchies between agents), it is necessary to establish some constraints or norms that the agents should abide by. Interesting issues then arise about how to achieve such systems in which agents abide by the rules, so to speak. One way to establish that is to force agents to follow certain protocols so that they will never violate any norms. On the other hand, one can also imagine more advanced agents that may decide their actions on their own, and if they violate any norms, the system (or rather a part of it, called an electronic institution) will detect those violations and will then take proper action, such as enforcing sanctions on the violators, etc. In order to specify this kind of system one may use logic, and, naturally, deontic logic in particular. Moreover, if the agent in such a system is sufficiently advanced, it may also be endowed with reasoning capabilities to reason itself about norms and normative behavior, in order to stay within the boundaries of the law, i.e., the norms imposed. Of course, if an artificial agent is supposed to reason using some logical formalism, this will have to have consequences regarding the computational properties of that formalism.

The seven papers selected for inclusion here all address aspects of this special theme of Artificial Normative Systems. In particular:

- Atkinson and Bench-Capon, in their paper "Addressing moral problems through practical reasoning", consider moral reasoning as reasoning about what ought to be done in a particular situation, with a view to making it properly computational so that autonomous software agents can engage in this form of reasoning.
- The paper "Substantive and procedural norms in normative multiagent systems" by Boella and van der Torre introduces a logical framework based on input/output logic that is used for studying the relation between substantive and procedural norms. This framework is applied to explain Castelfranchi's notion of mutual empowerment and also how agents are delegated normative goals from a system. Together these form a mechanism whereby agents come to be in charge of recognizing which institutional facts follow from brute facts.
- In "Agent strands in the action language $n\mathcal{C}+$" by Craven and Sergot the action language $\mathcal{C}+$ of Giunchiglia et al. is extended to the language $n\mathcal{C}+$, designed to represent normative and institutional aspects of (human or computer) societies. In particular, it provides the possibility of specifying the permitted or legal states of a transition system associated with an action description in the language and its permitted or legal transitions.

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- Grossi, Meyer and Dignum propose in "The many faces of count-as: A formal analysis of constitutive rules" a logical systematization of the notion of 'counts-as', and disentangle three semantically different readings of "X counts as Y in context C", from the weaker notion of contextual classification to the stronger notion of constitutive rule.
- In their paper "The normative aspect of signalling and the distinction between performative and constantive", Jones and Kimbrough outline an approach to the formal representation of signalling conventions, emphasizing the prominent role played therein by a particular type of normative modality. They then discuss how this modality can be used to provide a criterion for distinguishing J.L. Austin's concepts of constantives and performatives and how it is important for reasoning about trust in communication scenarios.
- In Lindahl and Odelstad's paper "Intermediaries and intervenients in normative systems" an algebraic representation of normative systems is used to analyze and clarify the role of legal concepts, such as 'ownership', 'citizenship' and 'being in a relation similar to marriage', that serve as intermediaries between statements of legal grounds on the one hand, and legal consequences, on the other.
- In "Living up to one's commitments: agency, strategies and trust", Müller proposes a general branching-time-based framework for commitment and trust, where the emphasis is on the notion of living up to one's commitments rather than actual fulfillment. How well one lives up to one's commitments depends on the relative stringency of one's strategies of action.

Finally, we would like to express our appreciation and gratitude to all who contributed to the success of the DEON workshop as well as to this subsequent special issue of the *Journal of Applied Logic*, especially to the authors and referees of the papers presented here, and to the editors and publisher of the journal.

References

[1] R.J. Wieringa, J.-J.Ch. Meyer, Applications of deontic logic in computer science: A concise overview, in: J.-J.Ch. Meyer, R.J. Wieringa (Eds.), Deontic Logic in Computer Science, Normative System Specification, Wiley, Chichester, 1993, pp. 17–40.

Lou Goble *
Willamette University
Salem, OR, USA
E-mail address: lgoble@willamette.edu

John-Jules Ch. Meyer
Utrecht University
Utrecht, The Netherlands
E-mail address: jj@cs.uu.nl

* Corresponding author.