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Formal specification of beliefs in multi-agent systems. (English) Zbl 0937.68113
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Summary: The goal of this paper is to present a logical framework for the formalization of agents' mutual beliefs in a multi agent system. The approach is based on a combination of extensional specifications of beliefs and context-based (finite) presentation of the specifications by employing a particular class of multi context systems. The extensional specification provides a set-theoretic characterization of beliefs in terms of sets closed under certain conditions. Its finite presentation is provided by using as constructors inference rules inside a multi context system. The resulting framework allows for capturing many relevant cases of real (not omniscient) agents, which are very common in multi-agent scenarios embedded in real world environments. In order to substantiate this claim, two multi agent scenarios are formally specified in detail in the specification framework.

MSC:

68T15 Theorem proving (deduction, resolution, etc.) (MSC2010)

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References:

- [1] Cohen, *Artificial Intelligence* 42 pp 213– (1990)
- [2] ; In 2nd International Conference on Principle of Knowledge Representation and Reasoning, ; ; Eds.; Morgan Kaufmann Publishers, 1991.
- [3] ; 1st Int Conference on Multi-Agent Systems (ICMAS-95); 1996, pp 254-260.
- [4] *Knowledge and Belief*; Cornell University Press: Ithaca, NY, 1962.
- [5] Fagin, *Artificial Intelligence* 34 pp 39– (1988)
- [6] Giunchiglia, *Artificial Intelligence* 65 pp 29– (1994)
- [7] ; ; ; 13th International Joint Conference on Artificial Intelligence, Chambéry, France, 1993, pp 548-554. Also IRST-Technical Report 9206-03, IRST: Trento, Italy.
- [8] ; MAAMAW'96, number 1038 in *Lecture Notes in Artificial Intelligence*, Springer-Verlag, 1996, pp 1-12.
- [9] ; In *Intelligent Agents: Proceedings of 1994 Workshop on Agent Theories, Architectures, and Languages*, and Eds., number 890 in *Lecture Notes in Computer Science*; Springer Verlag, 1995, pp 71-85. Also IRST-Technical Report 9312-01, IRST, Trento, Italy.
- [10] ; 1st Int. Conference on Multi-Agent Systems (ICMAS-95), 1996, pp 57-64. Also IRST-Technical Report 9412-09, IRST: Trento, Italy. Commonsense-96, Third Symposium on Logical Formalizations of Commonsense Reasoning, Stanford University, 1996.
- [11] *AAAI Spring Symposium on Logical Formalizations of Commonsense Reasoning*, 1991. Also IRST-Technical Report 9011-17, IRST, Trento, Italy.
- [12] *Notes on Formalizing Context*. Unpublished, 1991.
- [13] Lansky, *Computational Intelligence* 4 pp 319– (1988)
- [14] *A deduction model of belief*; Pitman: London, 1986. · [Zbl 0683.68080](#)
- [15] *Natural Deduction? A proof theoretical study*; Almqvist and Wiksell: Stockholm, 1965.
- [16] In *Formalizing Common Sense? Papers by John McCarthy*; Ed.; Ablex Publishing Corporation, 1990, pp 158-166.
- [17] ; ; ; *Reasoning about knowledge*. MIT Press, 1995. · [Zbl 0839.68095](#)
- [18] ; *A Local Models Semantics for Modal Logics*. Technical Report 9607-13; IRST: Trento, Italy, 1996.
- [19] ; 1st Int Conference on Multi-Agent Systems (ICMAS-95), 1996, pp 312-319.
- [20] *AAAI-84*, 1984, pp 198-202.
- [21] In *Formal Theories of the Commonsense World*; ; Eds.; Ablex Publishing Corporation, 1985, pp 359-403.
- [22] ; *Computational Methods of Beliefs and the Semantic of Belief Sentences*. Technical Note, SRI International: Menlo Park, CA, 1979.

- [23] IJCAI'93 Workshop on Using Knowledge in its Context, Chambéry, France, 1993, pp 39-49. Also IRST-Technical Report 9211-20, IRST: Trento, Italy.
- [24] Third Conference on Theoretical Aspects of Reasoning about Knowledge; 1990, pp 85-96.

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