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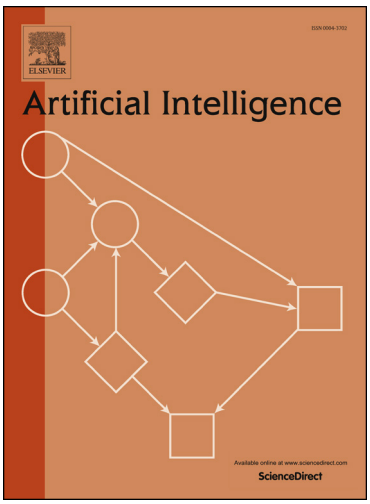

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Distributed First Order Logic[☆]

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Abstract

Distributed First Order Logic (DFOL) has been introduced more than ten years ago with the purpose of formalising distributed knowledge-based systems, where knowledge about heterogeneous domains is scattered into a set of interconnected modules. DFOL formalises the knowledge contained in each module by means of first-order theories, and the interconnections between modules by means of special inference rules called *bridge rules*. Despite their restricted form in the original DFOL formulation, bridge rules have influenced several works in the areas of heterogeneous knowledge integration, modular knowledge representation, and schema/ontology matching. This, in turn, has fostered extensions and modifications of the original DFOL that have never been systematically described and published. This paper tackles the lack of a comprehensive description of DFOL by providing a systematic account of a completely revised and extended version of the logic, together with a sound and complete axiomatisation of a general form of bridge rules based on Natural Deduction. The resulting DFOL framework is then proposed as a clear formal tool for the representation of and reasoning about distributed knowledge and bridge rules.

Keywords: Distributed knowledge representation, heterogeneous knowledge integration, contextual reasoning

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