

Supporting MAS complex service modelling through capabilities validation*

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Abstract

A Multi-Agent System (MAS) is the architectural infrastructure enabling the practical use of the behaviour-driven agent paradigm. MASs represent the necessary physical environment in which agents interact in order to achieve their goals, in compliance with their life-cycle. In sensitive real-world domains the underlying information system is asked to provide a behaviour that match with highly-changeable plans guidelines. Such is the case of health-care contexts, in which patients treatment can be highly customized to subject's requirements. Even in these e-Health scenarios MASs are showing a rapid increase, thanks to their ability to manage complex tasks and adapt gracefully to unexpected events. The definition of agents capabilities receives a consistent semantical design support by the use of an ontological description level. Nevertheless, the necessity of modelling run-time personalized and complex services often leads the user to update ontology-based skills of an agent, running the risk to conceptualize inconsistent or unavailable services. This is mainly due to the lack of a validation level in the process of agent capabilities retrieval from the ontology.

This paper proposes a general approach in assisting the modelling of complex agent services, as e-Health ones for instance, by validating agents at a knowledge level and by proposing an Agent Replacement Methodology (ARM). The most important aspects of the latter can be summarized in a principle of behavioural equivalence and in the minimalization of cost components (such as communications, read-write operations, or expected inputs) inherent to this.

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