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Hybrid POMDP-BDI Agent Architecture with Online Stochastic Planning and Desires with Changing Intensity Levels

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Abstract:

The authors propose an agent architecture which combines Partially observable Markov decision processes (POMDPs) and the belief-desire-intention (BDI) framework have several complementary strengths. The authors propose an agent architecture, which combines these two powerful approaches to capitalize on their strengths. Their architecture introduces the notion of intensity of the desire for a goal's achievement. We also define an update rule for goals' desire levels. When to select a new goal to focus on is also defined. To verify that the proposed architecture works, experiments were run with an agent based on the architecture, in a domain where multiple goals must continually be achieved. The results show that (i) while the agent is pursuing goals, it can concurrently perform rewarding actions not directly related to its goals, (ii) the trade-off between goals and preferences can be set effectively and (iii) goals and preferences can be satisfied even while dealing with stochastic actions and perceptions. They believe that the proposed architecture furthers the theory of high-level autonomous agent reasoning.