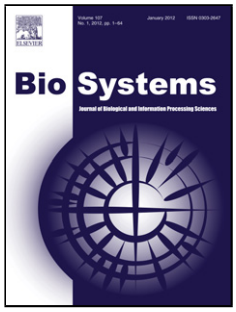

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Title:

Robotic Action Acquisition with Cognitive Biases in Coarse-grained State Space

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Keywords:

loosely symmetric model; Q-learning; acrobot; giant-swing robot; partially observable Markov decision process; biologically inspired cognitive architecture

Abstract:

Some of the authors have previously proposed a cognitively inspired reinforcement learning architecture (LS-Q) that mimics cognitive biases in humans. LS-Q adaptively learns under uniform, coarse-grained state division and performs well without parameter tuning in a giant-swing robot task. However, these results were shown only in simulations. In this study, we test the validity of the LS-Q implemented in a robot in a real environment. In addition, we analyze the learning process to elucidate the mechanism by which the LS-Q adaptively learns under the partially observable environment. We argue that the LS-Q may be a versatile reinforcement learning architecture, which is, despite its simplicity, easily applicable and does not require well-prepared settings.