

Accepted Manuscript

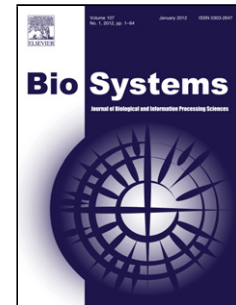
Title: Robotic Action Acquisition with Cognitive Biases in Coarse-grained State Space

Author: Daisuke Uragami Yu Kohno Tatsuji Takahashi

PII: S0303-2647(16)30070-3
DOI: <http://dx.doi.org/doi:10.1016/j.biosystems.2016.05.007>
Reference: BIO 3666

To appear in: *BioSystems*

Received date: 29-3-2016
Revised date: 14-5-2016
Accepted date: 15-5-2016



Please cite this article as: Uragami, Daisuke, Kohno, Yu, Takahashi, Tatsuji, Robotic Action Acquisition with Cognitive Biases in Coarse-grained State Space. *BioSystems* <http://dx.doi.org/10.1016/j.biosystems.2016.05.007>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Title:

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

Authors:

Daisuke Uragami^{*1}

Yu Kohno^{*2}

Tatsuji Takahashi^{*3}

^{*1} College of Industrial Technology, Nihon University,

1-2-1, Izumi, Narashino, Chiba, 275-8575, JAPAN.

dduragami@gmail.com

^{*2} Graduate School of Advanced Science and Technology, Tokyo Denki University,

Hatoyama, Hiki, Saitama, 350-0394, JAPAN

yu.kohno02@gmail.com

^{*3} School of Science and Technology, Tokyo Denki University,

Hatoyama, Hiki, Saitama, 350-0394, JAPAN

tatsuji.takahashi@gmail.com

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.

Download English Version:

<https://daneshyari.com/en/article/8406794>

Download Persian Version:

<https://daneshyari.com/article/8406794>

[Daneshyari.com](https://daneshyari.com)