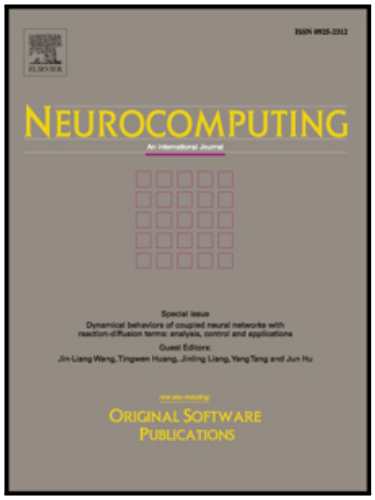
Communicated by Dr Ding Wang

Accepted Manuscript



Epoch-incremental Dyna-learning and prioritized sweeping algorithms

Roman Zajdel

PII: S0925-2312(18)31031-2
DOI: https://doi.org/10.1016/j.neucom.2018.08.068
Reference: NEUCOM 19916

To appear in: *Neurocomputing*

Received date: 27 June 2017
Revised date: 7 August 2018
Accepted date: 29 August 2018

Please cite this article as: Roman Zajdel, Epoch-incremental Dyna-learning and prioritized sweeping algorithms, *Neurocomputing* (2018), doi: https://doi.org/10.1016/j.neucom.2018.08.068

Epoch-incremental Dyna-learning and prioritized sweeping algorithms

Roman Zajdel

Faculty of Electrical and Computer Engineering, Rzeszow University of Technology, W. Pola 2, 35-959 Rzeszow, Poland

Abstract

Dyna-learning and prioritized sweeping (PS in short) are the most commonly used reinforcement learning algorithms which use the model of the environment. In this paper, the modified versions of these algorithms are presented. The modification exploits the breadth-first search (BFS) to conduct additional modifications of the policy in the epoch mode. The experiments, which are performed in the dynamic grid world and in the ball-beam system, showed that the proposed modifications improved the efficiency of the reinforcement learning algorithms.

Keywords: Breadth-first search, Dyna-learning, Epoch-incremental mode, Prioritized sweeping, Reinforcement learning

1. Introduction

The episodic tasks are an important sub-class of reinforcement learning problems where the interaction between an agent and an environment are composed of a series of independent trials called episodes. In each episode, the agent interacts with the environment. The number of such interactions are not known a priori. Reaching some particular state, called terminal state, is related to the end of the episode. The number of episodes required to reach the optimal policy can be a measure of efficiency of the reinforcement learning algorithm.

*Corresponding author
Email address: rzajdel@prz.edu.pl (Roman Zajdel)