

An Actor Critic with an Internal Model

Submission ID 3000145
Submission Type Poster
Topic Cognitive Science
Status Submitted
Submitter Farzaneh S. Fard
Affiliation Dalhousie University, Faculty of Computer Science

SUBMISSION DETAILS

Presentation Type Either Poster or Oral Presentation

Presentation Abstract Summary Current evidence suggests that the brain uses multiple systems for instrumental control; these systems are known as model-based and model-free. The former predicts action-outcomes using an internal model of the agent's environment, while the latter learns to repeat previously rewarded actions. This paper proposes a neural architecture comprised of both model-free and model-based reinforcement learning systems, and tests this model's ability to perform target-reaching with a simulated biarticulate robotic arm. Target-reaching conditions included (A) both static and dynamic target properties, (B) slowly changing robotic arm kinematics, and (C) absence of visual inputs. The proposed model rapidly learns an internal model of environmental dynamics, shows target-reaching performance superior to an existing state of the art model, and successfully performs target-reaching without visual input.

Paper Upload (PDF) [ccn2017-An_actor_critic_with_an_internal_model_2.pdf](#)

Co-author Information

* Presenting Author

First Name	Last Name	Affiliation	E-mail
Farzaneh *	S. Fard *	Dalhousie University, Faculty of Computer Science	fard@cs.dal.ca

Abraham	Nunes	Department of Psychiatry, Dalhousie University, Halifax, Nova Scotia, Canada, Faculty of Computer Science, Dalhousie University, Halifax, Nova Scotia, Canada	nunes@dal.ca
Thomas	Trappenberg	Dalhousie University, Faculty of Computer science	tt@cs.dal.ca

Keywords

Keywords
Machine Learning
Deep Reinforcement Learning
Model-based Reinforcement Learning
Model-free Reinforcement Learning
Predictive Learning