An Actor Critic with an Internal Model

Submission ID   3000145

Submission Type   Poster

Topic   Cognitive Science

Status   Submitted

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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

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Keywords

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