Offline Reinforcement Learning with Simulated Trajectories in Latent Space

Submission ID 3000130

Submission Type Poster

Topic Artificial Intelligence

Status Submitted

Submitter Dane Corneil

Affiliation EPFL

SUBMISSION DETAILS

Presentation Type Either Poster or Oral Presentation

Presentation Abstract Summary Many animals, including humans, can rapidly adapt to changing rewards in well-known environments. While recent advances in machine learning have resulted in human-level performance on a variety of tasks, they rely on model-free paradigms, which fail to leverage the learned structure of the environment when the reward landscape changes. Here, we show how an agent with a variational autoencoder-based architecture can learn the transition structure of an environment. When the agent then observes a new reward location, it can quickly build up a new policy by sampling from random locations in the environment and simulating extended trajectories offline. Values are assigned to simulated episodes using a k-nearest neighbour method. These trajectories, resembling observed "replay" dynamics in the hippocampus, provide a functional link between episodic and model-based views of the role of the hippocampus in navigation.

Co-author Information

* Presenting Author

First Name	Last Name	Affiliation	E-mail
Dane *	Corneil *	EPFL	dane.corneil@epfl.ch
Wulfram	Gerstner	EPFL	wulfram.gerstner@epfl.ch

Keywords

Keywords
deep learning
Model-based Reinforcement Learning
episodic future thinking

Hippocampus