

Machine Learning Project : Teach a Quadcopter How to Fly



Introduction

The quadcopter project is a domain example of complex tasks of sensory input. This means, we are working with continuous and high-dimensional action spaces.

The quadcopter shall autonomously achieve the control about one task – takeoff or landing. To reach this goal a reinforcement learning concept is implemented, called actor-critic method using a deep Q-learning neural network.

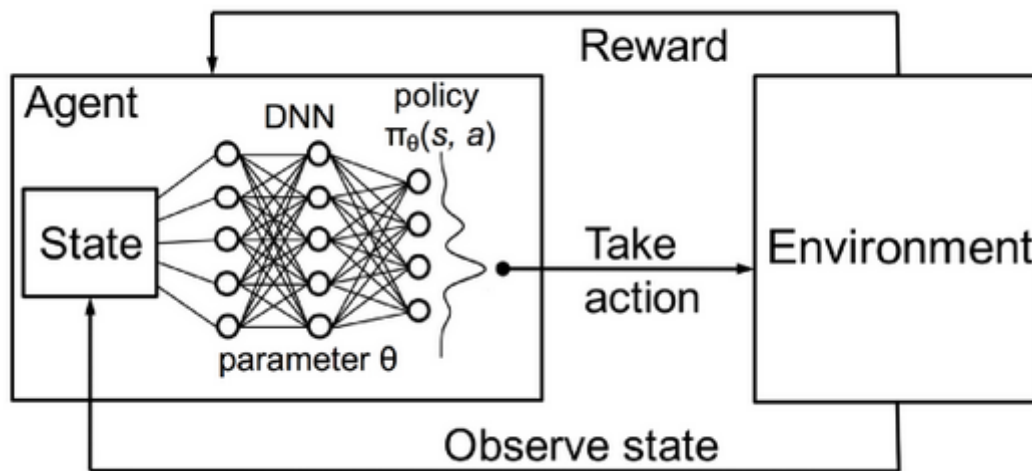


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<http://people.csail.mit.edu/hongzi/content/publications/DeepRM-HotNets16.pdf>

Actor-Critic Architectur

To solve the simulated physics task and to find a high performant policy, as a solution such model-free, off-policy actor-critic method using deep function approximators is chosen, because it can learn policies in such high-dimensional, continuous action spaces.

The algorithm is based on the 'Deep Deterministic Policy Gradient' and modified by having a deep Q-network as an Agent component.

The general schema of the actor-critic method with advantage (estimated by the TD error) looks like

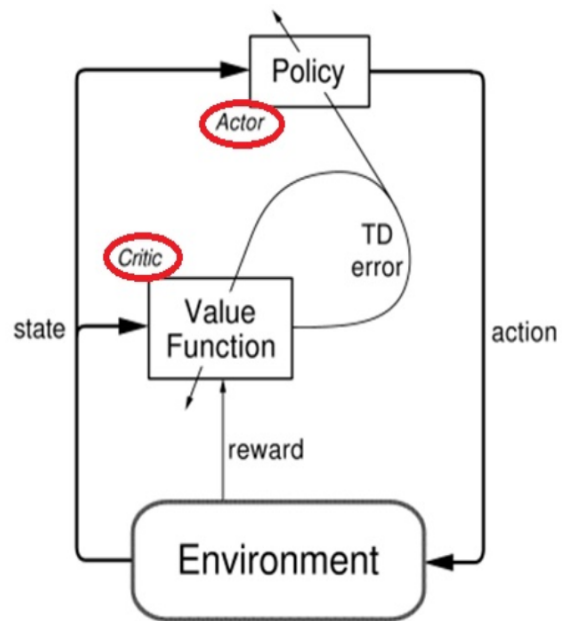


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<https://www.groundai.com/project/a-brandom-ian-view-of-reinforcement-learning-towards-strong-ai/>