Distributed RL Background: *Actor-Learner*

Reinforcement Learning

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Actor-Learner

Actor: An agent that interacts w environment, taking actions and having experiences (s, a, r, s')

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Learner: Central entity receiving data from actors and updating gradients, and ultimately the policy

Actor-Learner

Actor-learner is a distributed architecture which separates action taking from learning

Benefits:

- Parallelism can improve training speed and sample efficiency

- Scalability: Actors can be deployed across threads, nodes for large scale
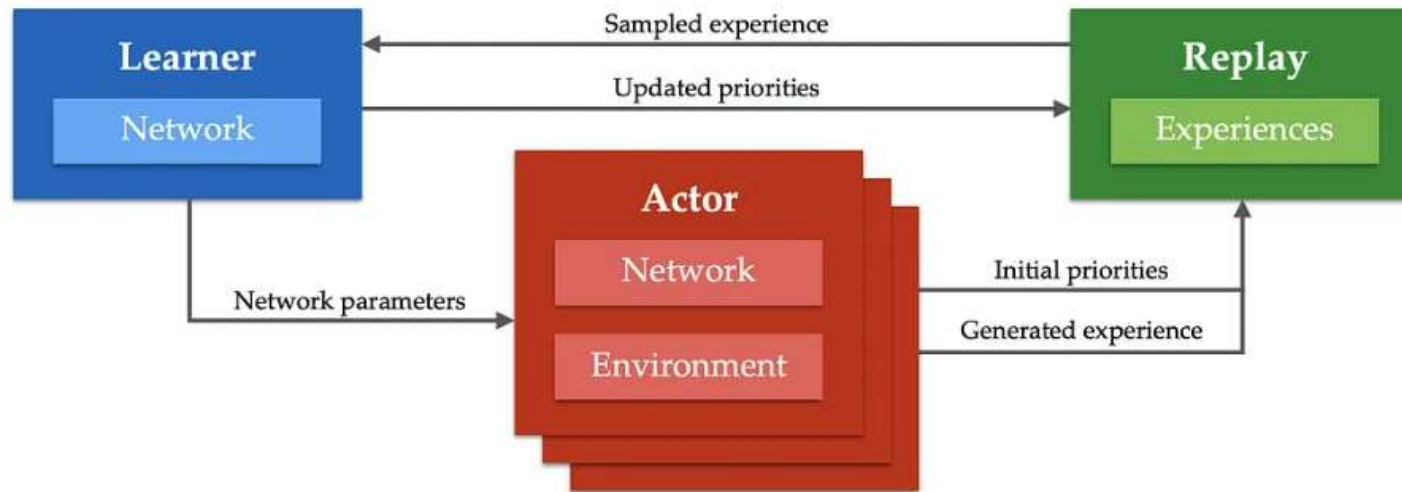
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Example: Ape-X

Figure 1: The Ape-X architecture in a nutshell: multiple actors, each with its own instance of the environment, generate experience, add it to a shared experience replay memory, and compute initial priorities for the data. The (single) learner samples from this memory and updates the network and the priorities of the experience in the memory. The actors' networks are periodically updated with the latest network parameters from the learner.

Ape-X architecture

Source: Distributed Prioritized Experience Replay. https://arxiv.org/abs/1803.00933