Paper review: Back to Basics: Benchmarking Canonical Evolution Strategies for Playing Atari[1]

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This paper is about game playing agent that are capable of exploring unforeseen territories. This paper is about the new trend of Evolution Strategy (ES) opposed to Reinforcement Learning (RL) and seems to be opening the horizon to a large set of improvement in the state of the art.
This work demonstrates that ES achieves comparable performance on RL benchmarks, while offering significant benefits related to code complexity, speed of training and ease of scaling to large-scale distributed settings.
This paper explains first the state of the art of RL and Natural Evolution (subclass of ES) for playing Atari. The Canonical ES is presented, it is a very basic algorithm that does not require backpropagation and is highly serializable. The experiments consist of testing the performance of the proposed algorithm on a wide variety of Atari Games (8 games form all kind of level). It was found significant behavior difference comparing the RL and ES agents. Some interesting finding from that paper are around the Qbert game. In the first case (https://www.youtube.com/watch?v=-p7VhdTXA0k), the agent gathers some points at the beginning of the game and then stops showing interest in completing the level. Instead, it starts to bait an enemy that follows it to kill itself. Specifically, the agent learns that it can jump off the platform when the enemy is right next to it, because the enemy will follow: although the agent loses a life, killing the enemy yields enough points to gain an extra life again. The agent repeats this cycle of suicide and killing the opponent over and over again.
In the second interesting solution (https://www.youtube.com/watch?v=meE5aaRJ0Zs), the agent discovers an in-game bug.
For some other games the agent got stuck in local minima but overall the simple algorithm presented is on-par with other more sophisticate state of the art algorithms like Open AI NES and some RL.

[1]: https://arxiv.org/abs/1802.08842