

Axon

Visual Doom AI Competition @ CIG2017

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1 Overview

We mainly employ reinforcement learning with A3C framework to train Axon agent for ViZDoom.

2 Details

First, to improve RL sampling efficiency and avoid wasting electricity, we trained the policy network on a small data set generated from human's game – playing. It is a procedural of supervised training with image and limited inputs pair. The main part of policy net consists of 2 CNNs, 2 Poolings, and 1 LSTM. As for inputs, we utilize totally 5 images: 1 for original, 3 for covering the middle area, and 1 for zooming pixels around cross hair. As F1, we use 6 outputs: Turn_Left, Turn_Right, Forward, Move_Left, Move_Right, and Attack.

Then, we tried to explore more potential policies via A3C. It is not easy to achieve even a small progress above the supervised model. We pay more attention on the reward function, and design special maps to make our agent get improved in specific skills.

Furthermore, based on UNREAL code, we develop a set of training and testing platforms. For fully exploiting the powerful computation of GPU/CPU cluster on the cloud, we adapted our code to support distributed training. And we continuously make it to compete with F1. Meanwhile, in term of testing result, we keep on modifying the reward function, tweaking learning rate, discount factor, changing testing map to avoid sliding into abyss.

3 Summary

After about 1 month, an acceptable agent - Axon come out. Looking forward, we hope Axon would become more and more powerful in next 2 months.

4 References

<https://arxiv.org/pdf/1602.01783.pdf>

<https://arxiv.org/pdf/1611.05397.pdf>

<https://arxiv.org/abs/1611.06256>

<https://openreview.net/pdf?id=Hk3mPK5gg>

<https://github.com/miyosuda/unreal>

<https://github.com/NoobFang/multi-process-UNREAL>