Neuroevolution of a Pac-Man Player

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Abstract—In this paper I show the results of different regression problems dealt with using neural networks as training models.

Several experiments were made to test up regression problems with neural networks, such as using appropriate preprocessing techniques, varying the networks' topologies (and so their parameters) and the activation functions used by their layers, testing different training algorithms and loss functions. A validation loop over some validation epochs was used to obtain a good training algorithm's parameter (learning rate) for the subsequent training loop, and external cross-validation was used to obtain the model's accuracy as the mean of the different test errors computed as mean absolute error.

1 INTRODUCTION

2 BACKGROUND

The following two subsections briefly describe what regression analysis and neural networks are and how they can be combined to make predictions.

2.1 Neuroevolution

2.2 Pac-Man Video Game

3 THEORETICAL MODEL

3.1 Initial Population

3.2 Parameters

3.3 Evolution

4 SIMULATIONS AND EXPERIMENTS

4.1 System architecture

I ran the simulations on my laptop, characterized by an Intel Core i7-6700HQ CPU, a Nvidia Geforce GTX 950M GPU and 8 GB RAM. The implemented algorithm uses every CPU core.

4.2 Implementation details

5 RESULTS

6 CONCLUSIONS

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