
Deep Q-Learning with Recurrent Neural Networks

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Abstract

Deep reinforcement learning models have proven to be successful at learning control policies image inputs. They have, however, struggled with learning policies that require longer term information. Recurrent neural network architectures have been used in tasks dealing with longer term dependencies between data points. We investigate these architectures to overcome the difficulties arising from learning policies with long term dependencies.

1 Introduction

Deep Q-Networks (DQNs) have had success playing Atari 2600 games [0] but have struggled with particular games involving policies that require longer term information. This is evident from the types of games that DQNs perform poorly at, near or below human-level, which includes Q*bert, Ms. Pac-Man, and in an extreme case Montezuma's Revenge.

Figure 1: Q*bert, Ms. Pac-Man and Montezuma's Revenge

Recurrent neural networks (RNNs) have been used in modeling longer sequences and is one way to overcome DQNs difficulties with learning policies that require longer term information. We investigate augmenting DQN architecture proposed in [0], utilizing a convolutional neural network (CNN), with an RNN.

2 Recurrent Deep Q-Learning

DQN

3 Experiments

Experiments.

References

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