THE UNIVERSITY OF EDINBURGH

INFORMATICS HONORS PROJECT

Generative Adversarial Networks Generating Novel Reinforcement Learning Policies

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THE UNIVERSITY OF EDINBURGH

Abstract

College of Science & Engineering

Bachelor's of Engineering

Generative Adversarial Networks Generating Novel Reinforcement Learning Policies

by Giovanni ALCANTARA

The Thesis Abstract is written here (and usually kept to just this page). The page is kept centered vertically so can expand into the blank space above the title too...

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Introduction

- 1.1 Motivation
- 1.2 Structure of the report
- 1.3 Main contributions

Background

2.1	Reinforcement	Learning

- 2.1.1 Markov Decision Processes
- 2.1.2 Q-learning
- 2.1.3 Exploration/Exploitation
- 2.1.4 Deep Reinforcement Learning

DQGAN

- 2.1.5 Problems with reinforcement learning techniques
- 2.1.6 Actor critic
- 2.2 Generative Adversarial Networks
- 2.2.1 Architecture of GANs
- 2.2.2 Successes

DCGAN

- 2.2.3 Conditional GANs
- 2.3 Existing related work
- 2.3.1 Generative Adversarial Imitation Learning

Environment

- 3.1 OpenAI Gym
- 3.1.1 Motivation
- 3.1.2 Algorithmic environments
- 3.1.3 MuJoCo and physics environments
- 3.1.4 Other environments
- 3.2 Baseline: FrozenLake-v0
- 3.2.1 Description of the task
- 3.2.2 Motivation
- 3.2.3 Shortcomings
- 3.3 Extended baseline: Randomised Frozen Lake

Dataset creation

4.1 MapReduce job

Adversarial Networks Training

Generative Adversarial Q-learning

- 6.1 Using the trained Generator
- 6.1.1 Initialisation
- 6.1.2 Exploration
- 6.2 Using the trained Discriminator
- 6.2.1 Speeding up Q-learning on unseen maps

Scaling up to more complex tasks

- 7.1 Larger Frozen Lakes
- 7.2 Physics environments

Conclusion