Centre For Innovation

Introduction to AI and Reinforcement Learning

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Description

In the world of AI, where we are constantly creating machines that can replicate human behaviour, we aim to introduce one such concept of Reinforcement Learning. It is a type of machine learning where agents are self-trained on reward and punishment mechanisms. We will look at basic concepts of AI, ML and Reinforcement Learning through introduction and interactive hands-on sessions.

Abstract

Session 1	Introduction to AI, RL basics, developing an RL-based solution using MDPs, Q-Learning along with a demo
Session 2	Limitations of Q-Learning, Deep Q-Networks with a demo, Introducing Policy Gradients, Actor Critic with a demo

Relevant for:

- An introductory level workshop for those enthusiastic about Artificial Intelligence and Reinforcement Learning.

Talk Overview (Session - 1, 3hrs):

- Introduction to AI and RL fundamentals
  - What is AI? Clearing various buzzwords (AI vs ML vs DL vs RL) and some real-life applications.
  - RL-related terminology - Agent, Environment, Action, Reward, State

- Developing an RL-based solution
  - Markov Decision Processes, examples, defining your own MDP for a task
  - Concepts of Return, Policy, Value, solution approach to RL (exploration vs exploitation, etc)
  - Model Free algorithms
  - Q-Learning along with a Demo (An interesting one!)

Talk Overview (Session - 2, 3hrs):

Phase 2 - Hands On

- Limitations of Q-Learning
- Deep Q-Networks
  - DQNs, how they work (explain from scratch), along with a DQN demo
  - Policy Gradients - our first policy-based Deep Learning algo, exploration in policy gradients
  - Actor Critic with a demo (maybe Lunar Lander example)

Prerequisites (Download):

Python programming, no downloads needed (we'll use google colab along with Open AI Gym for demos)

Outcomes:

- Working knowledge of RL
- Hands-on experience due with a fun code-along experience, implementing RL algorithms for real-life examples
- Working with various Python libraries