

Summary/Review

Reinforcement Learning

In Reinforcement Learning, Agents interact with an Environment

They choose from a set of available Actions

The actions impact the Environment, which impacts agents via Rewards

Rewards are generally unknown and must be estimated by the agent

The process repeats dynamically, so agents learn how to estimate rewards over time

Advances in deep learning have led to many recent RL developments:

- In 2013, researchers from DeepMind developed a system to play Atari games
- In 2017, the AlphaGo system defeated the world champion in Go

In general, RL algorithms have been limited due to significant data and computational requirements.

As a result, many well-known use cases involve learning to play games. More recently, progress has been made in areas with more direct business applications.

Reinforcement Learning Architecture

The main components of reinforcement learning are: Policy, Agents, Actions, State, and Reward.

- Solutions represents a Policy by which Agents choose Actions in response to the State
- Agents typically maximize expected rewards over time
- In Python, the most common library for RL is Open AI GYM

This differs from typical Machine Learning Problems:

- Unlike labels, rewards are not known and are often highly uncertain
- As actions impact the environment, the state changes, which changes the problem
- Agents face a tradeoff between rewards in different periods

Examples of everyday applications of Reinforcement Learning include recommendation engines, marketing, and automated bidding.