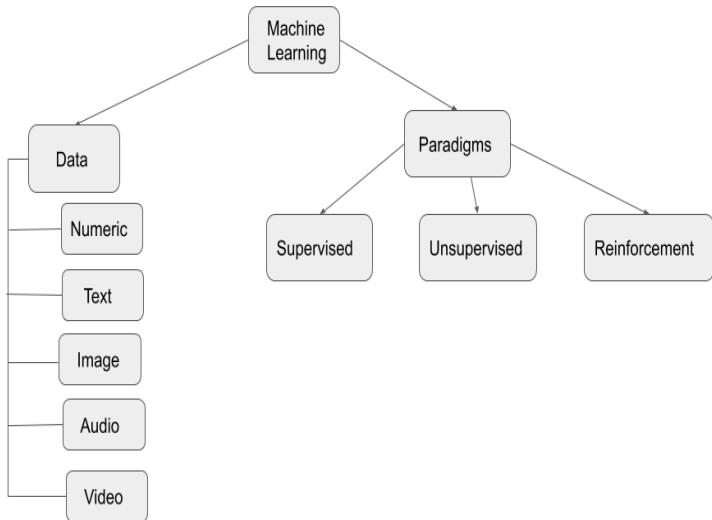


Machine Learning: Overview

July 7, 2023

Machine Learning

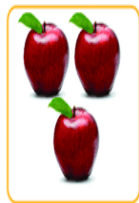


Traditional Programming vs Machine Learning



Supervised Learning

Input data



Annotations

These are
apples



Model

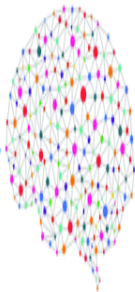


Prediction



Unsupervised Learning

Input data



Model



Reinforcement Learning



Supervised vs Reinforcement Learning

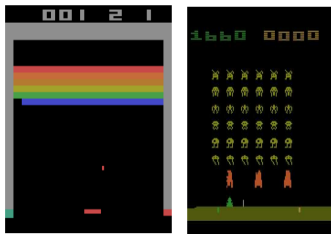
Supervised Learning

- Examples with target
- (images, labels)
- Instructive Feedback

Reinforcement Learning

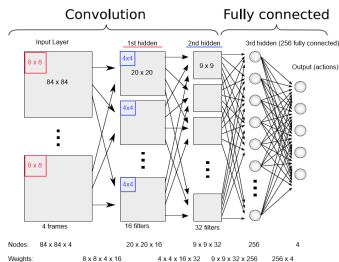
- Examples without target
- (states, actions, rewards)
- Evaluative Feedback

Deep Q-Networks



Breakout and Space Invaders, 2 of the 49 Atari games used in the paper

Break out and Space Invaders

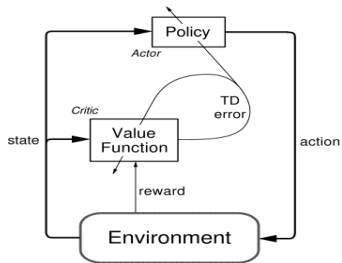


Deep Q-Network

Deep Deterministic Policy Gradient

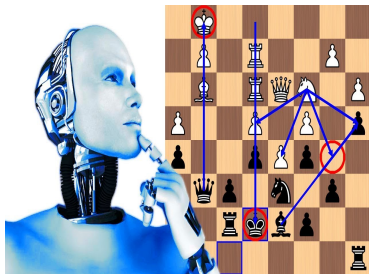


TORCS car simulation



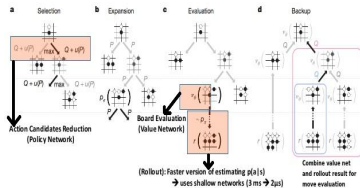
Actor-Critic Network

Upper Confidence Tree (UCT)



Alpha Zero

Looking ahead (w/ Monte Carlo Search Tree)



UCT algorithm

Reason for Success

Rule Based Methods



Feature Based Methods



Automatic Feature Based Methods

Reason for Success

Rule Based Methods



Feature Based Methods



Automatic Feature Based Methods

Reason for Success

Rule Based Methods



Feature Based Methods



Automatic Feature Based Methods

Questions

Thank you !