Introduction

Artificial Intelligence

To define the goals and methods of Artificial Intelligence (AI), we first need to define what is *intelligence*. Though there is no consensus on the exact definition of intelligence, here we adopt the definition by John McCarthy:

> Intelligence is the computational part of the ability to achieve goals in the world.

The goal of AI is to develop computer algorithms that can solve problems and achieve goals in complex environments. A diverse range of methods are designed as AI algorithms since the term has been coined. *... A simple list of AI algorithms, such as A*, symbolic ...*

Machine Learning

Machine learning is a branch of AI that emphasizes learning patterns from data. Even though

Deep Learning

Deep learning (DL) takes the learning of statistical patterns from data to another level.

Reinforcement Learning

Markov Decision Process (MDP) is a common used problem formulation for reinforcement learning algorithms. A MDP is a tuple of four elements (S, A, P, R) where:

- S a set of states that forms the *state space*
- A a set of actions that forms the *action space*
- $P(s, a, s') = Pr[s_{t+1} = s' \mid s_t = s, a_t = a]$ the transition probability function
- $R(s, a) = r(s, a)$ the reward function

Agent-Environment Interface

Game Artificial Intelligence

Perfect vs in-Perfect information

Planning

lookahead search: A*, DFS, BFS

Distributed System for AI

IMPALA, SEED