

Maze

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Machine and Reinforcement Learning in Control Applications

May 23, 2022

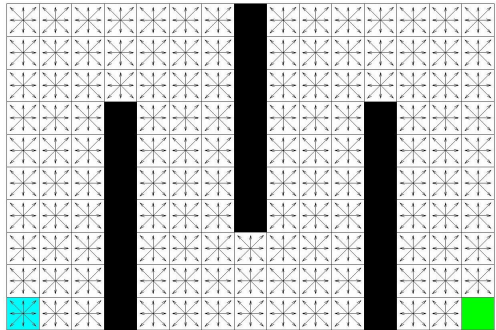
Problem



Learn to get out of a maze

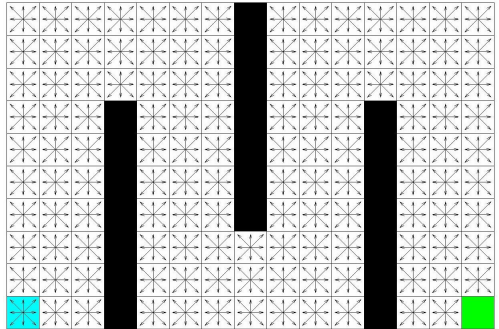
Problem formulation

- Consider the grid world on the right;
- The goal is to reach the green box;
- A waterfall pushes the agent toward the bottom of the grid



Problem formulation

- 8 possible directions:
**N, S, E, W, NE,
NW, SE, SW;**
- Reward:
 - -1 for each step



Model

- The **state** is the position in the Gridworld
 - we have $X \cdot Y$ states.
- The **action** is the direction of the movement
 - we have 8 actions.

Indirect reinforcement learning

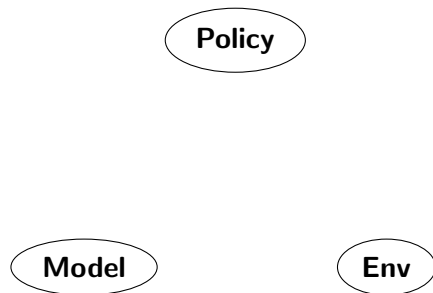


Figure: Planning

Figure: Learning

Indirect reinforcement learning

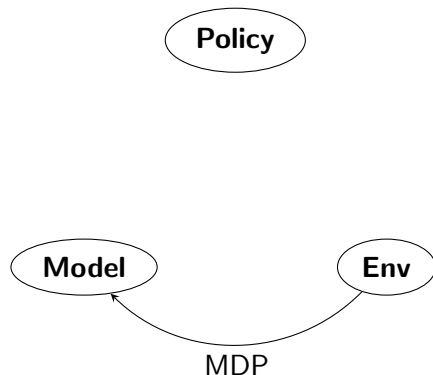


Figure: Planning

Figure: Learning

Indirect reinforcement learning

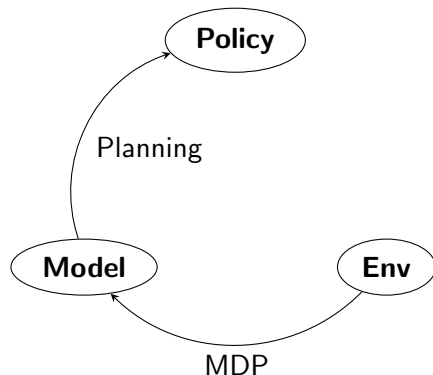


Figure: Planning

Figure: Learning

Indirect reinforcement learning

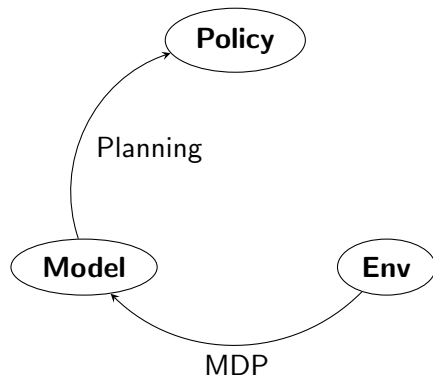


Figure: Planning

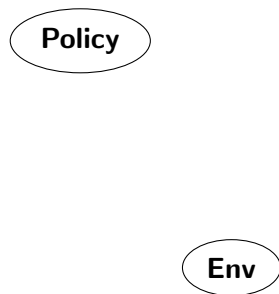


Figure: Learning

Indirect reinforcement learning

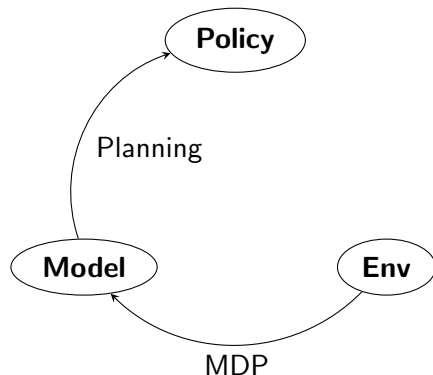


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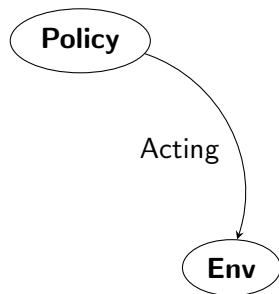


Figure: Learning

Indirect reinforcement learning

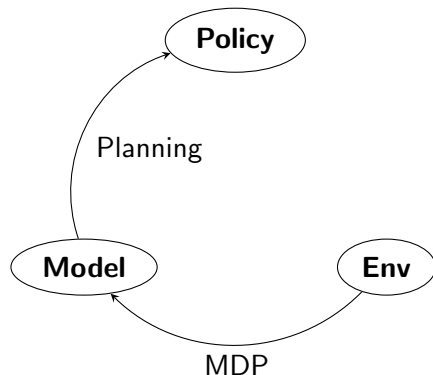


Figure: Planning

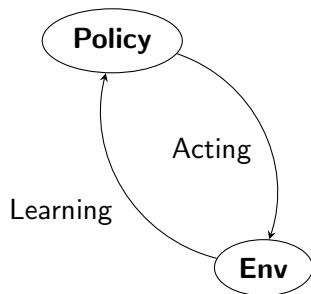


Figure: Learning

Indirect reinforcement learning

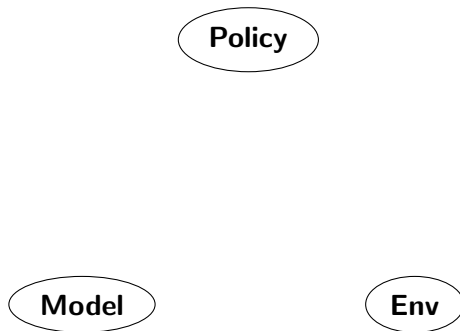


Figure: Planning-Learning

Indirect reinforcement learning

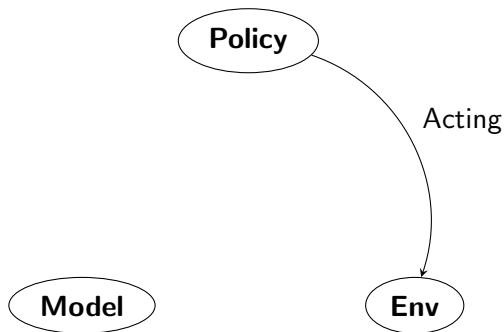


Figure: Planning-Learning

Indirect reinforcement learning

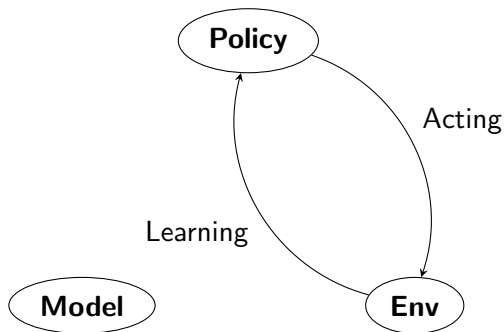


Figure: Planning-Learning

Indirect reinforcement learning

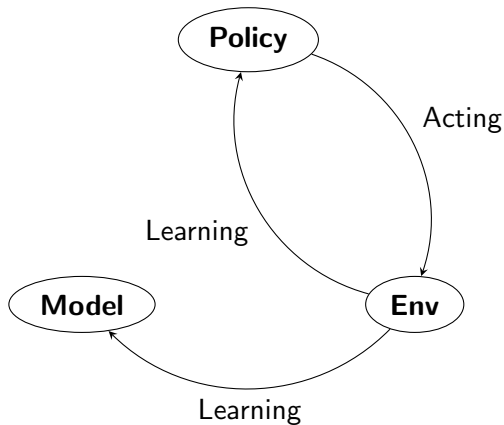


Figure: Planning-Learning

Indirect reinforcement learning

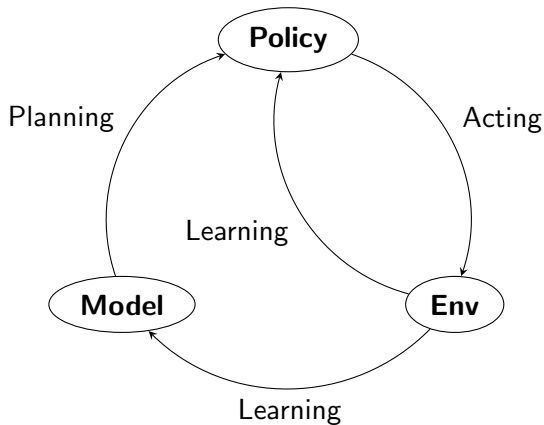


Figure: Planning-Learning