

# Reinforcement Learning (concept and terms)

- Reinforcement learning (RL) is a type of ML where an agent learns to make decisions by interacting with an environment to maximize rewards over time

• Learning Technique: Try something  $\rightarrow$  see result  $\rightarrow$  Adjust Behavior  $\rightarrow$  repeat

## Components of RL

### 1) Agent

• The Decision maker (ex: robot, self driving car)

### 2) Environment

• The world the agent interacts with (eg maze, game)

### 3) State (s)

• a snapshot of the environment at a given time (ex: chess board layout)

### 4) Action (a)

• A choice the agent makes (ex a move in chess, brake car)

### 5) Reward (r)

• Feedback from the environment after an action (ex +1 for win -1 for loss 0 for tie)

### 6) Policy ( $\pi$ )

• The agent's strategy: a mapping from states  $\rightarrow$  action (ex if ball is too close move the paddle up)

### 7) Value function (V or Q)

• predicts how good a state or action is in terms of expected future reward

## RL Cycle (How it works)

1) Agent observes states 2) it picks an action using policy

3) The environment updates and returns a reward and a new state

4) agent updates its strategy to 99 maximize long term reward 5) repeat until task ends