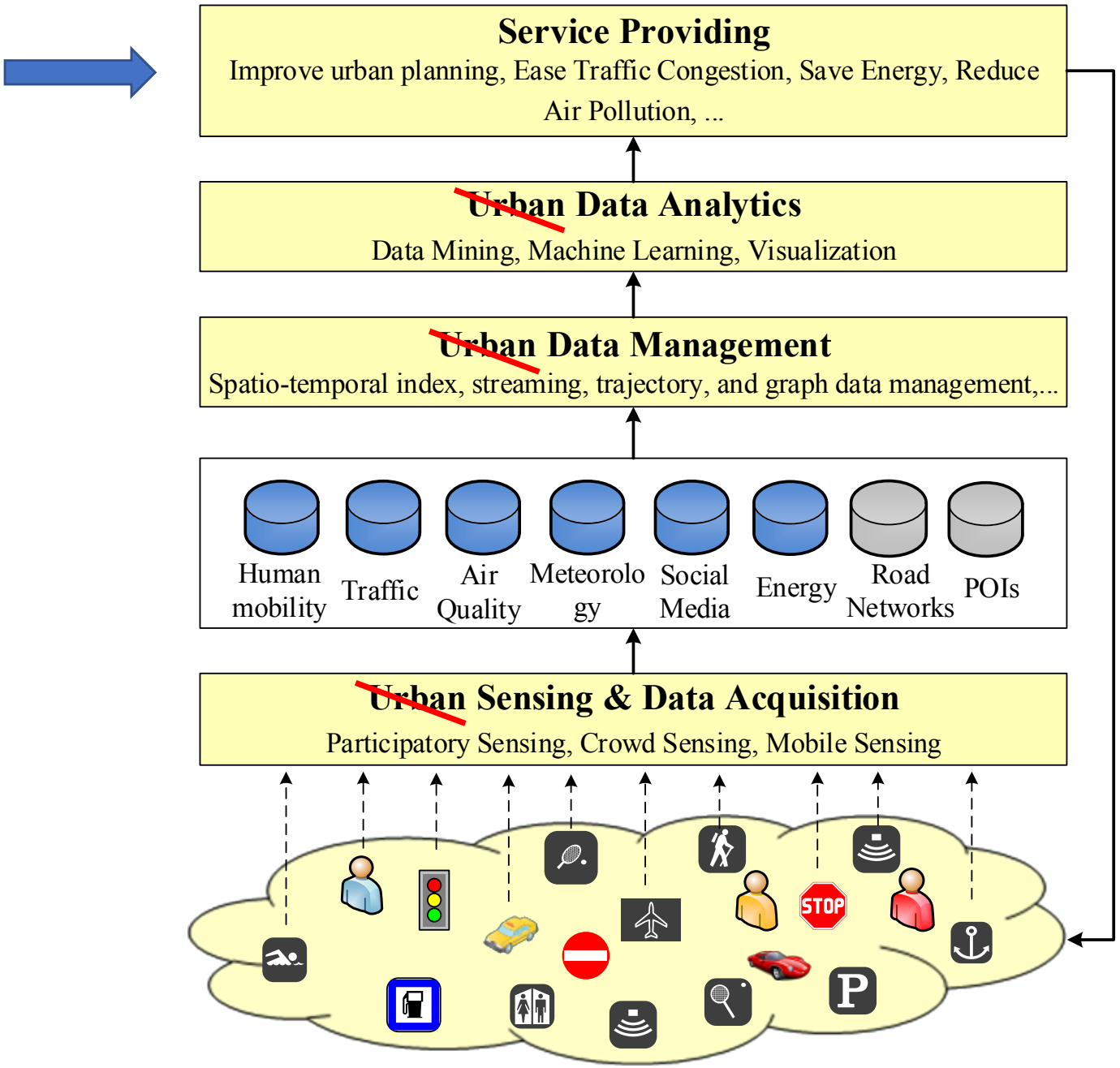
Welcome to

DS3010:
DS-III: Computational Data Intelligence
Reinforcement Learning

Prof. Yanhua Li

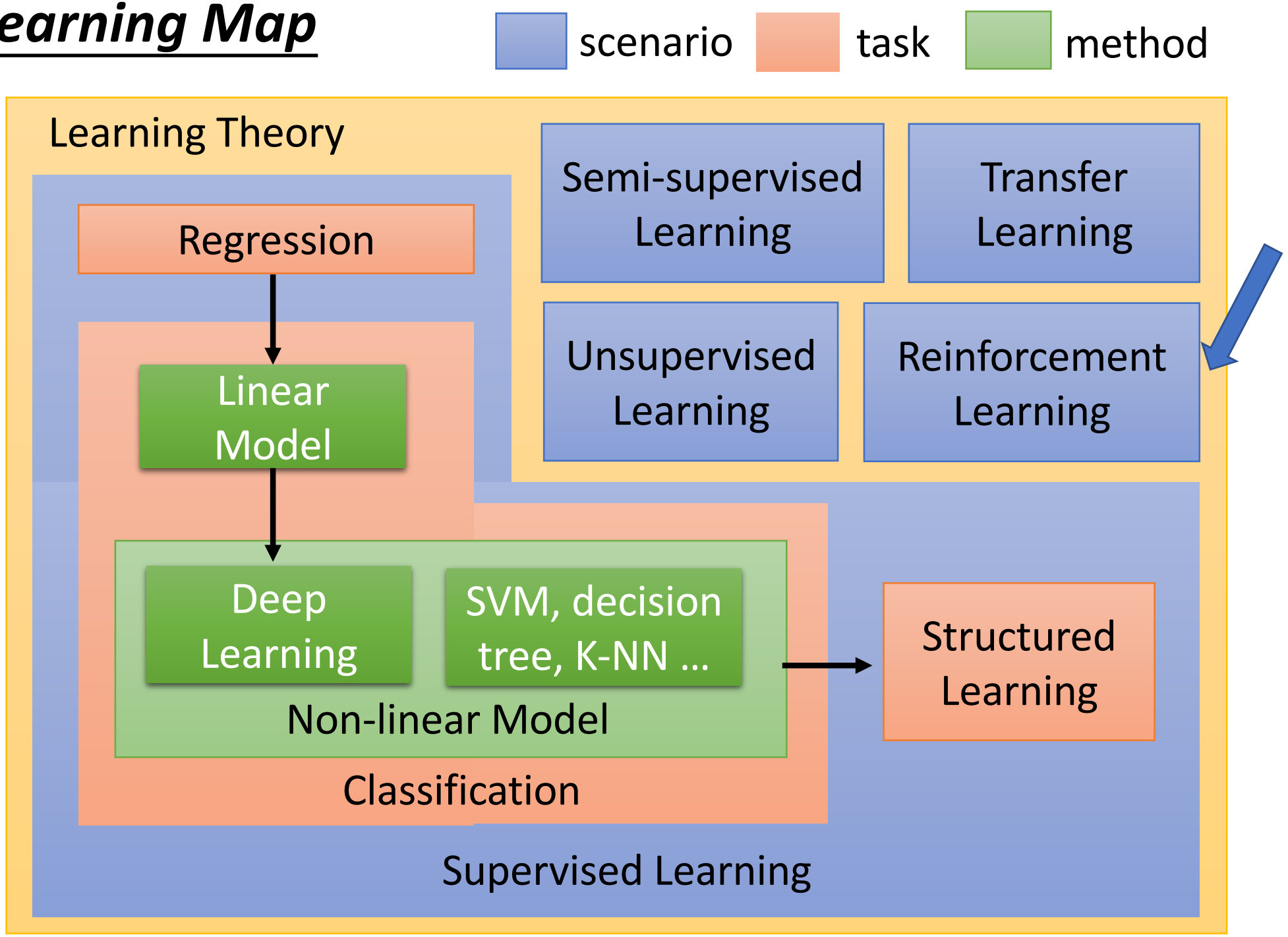
Time: 11:00am – 12:50pm M & R
Location: HL 114
D-term 2022

Data pipeline



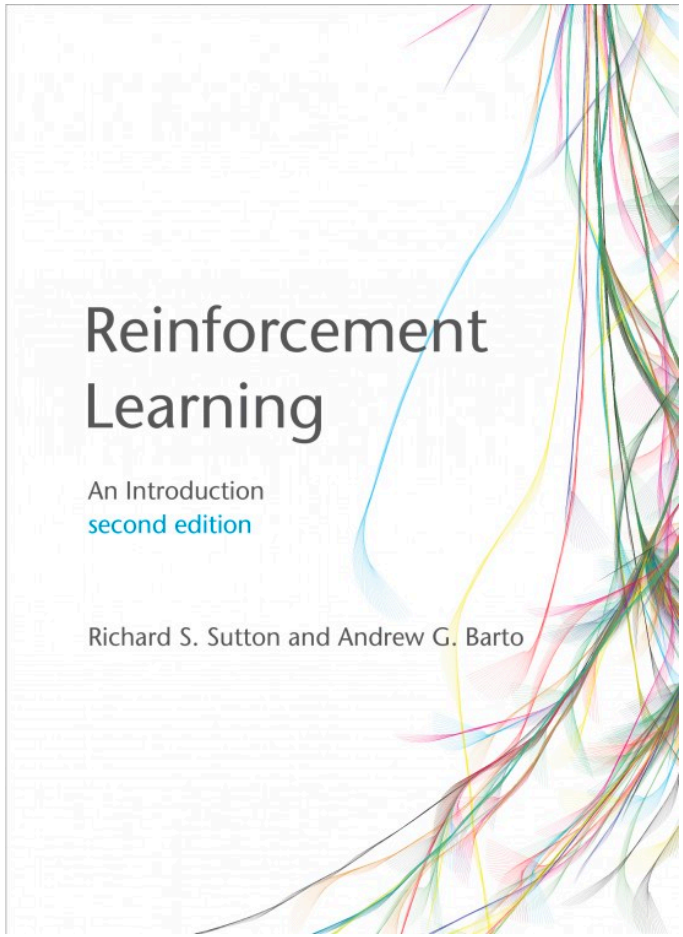
Urban Computing: concepts, methodologies, and applications.
Zheng, Y., et al. *ACM transactions on Intelligent Systems and Technology*.

Learning Map



References

Reinforcement Learning

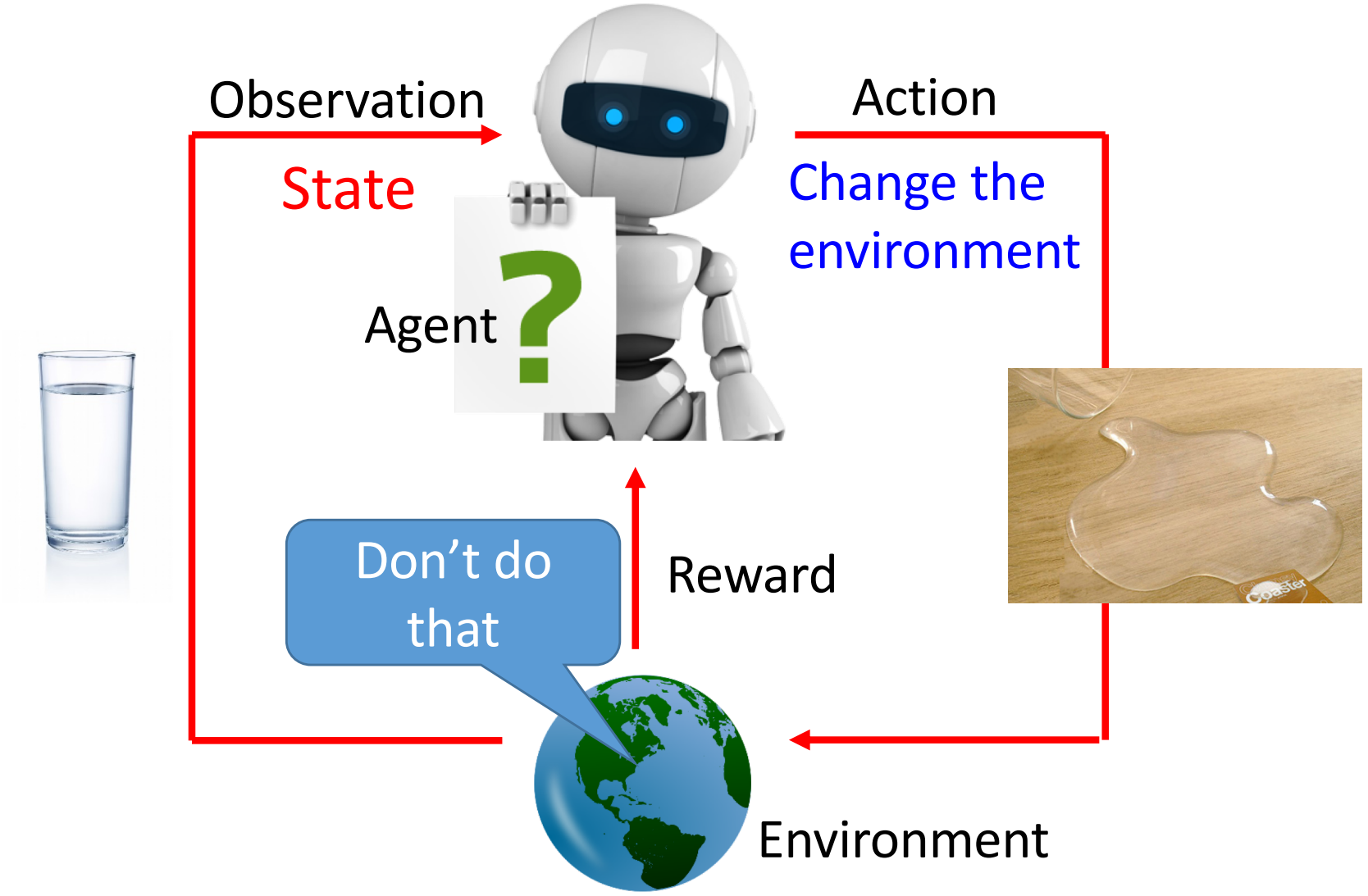


Brief Introduction of Reinforcement Learning

Deep Reinforcement Learning

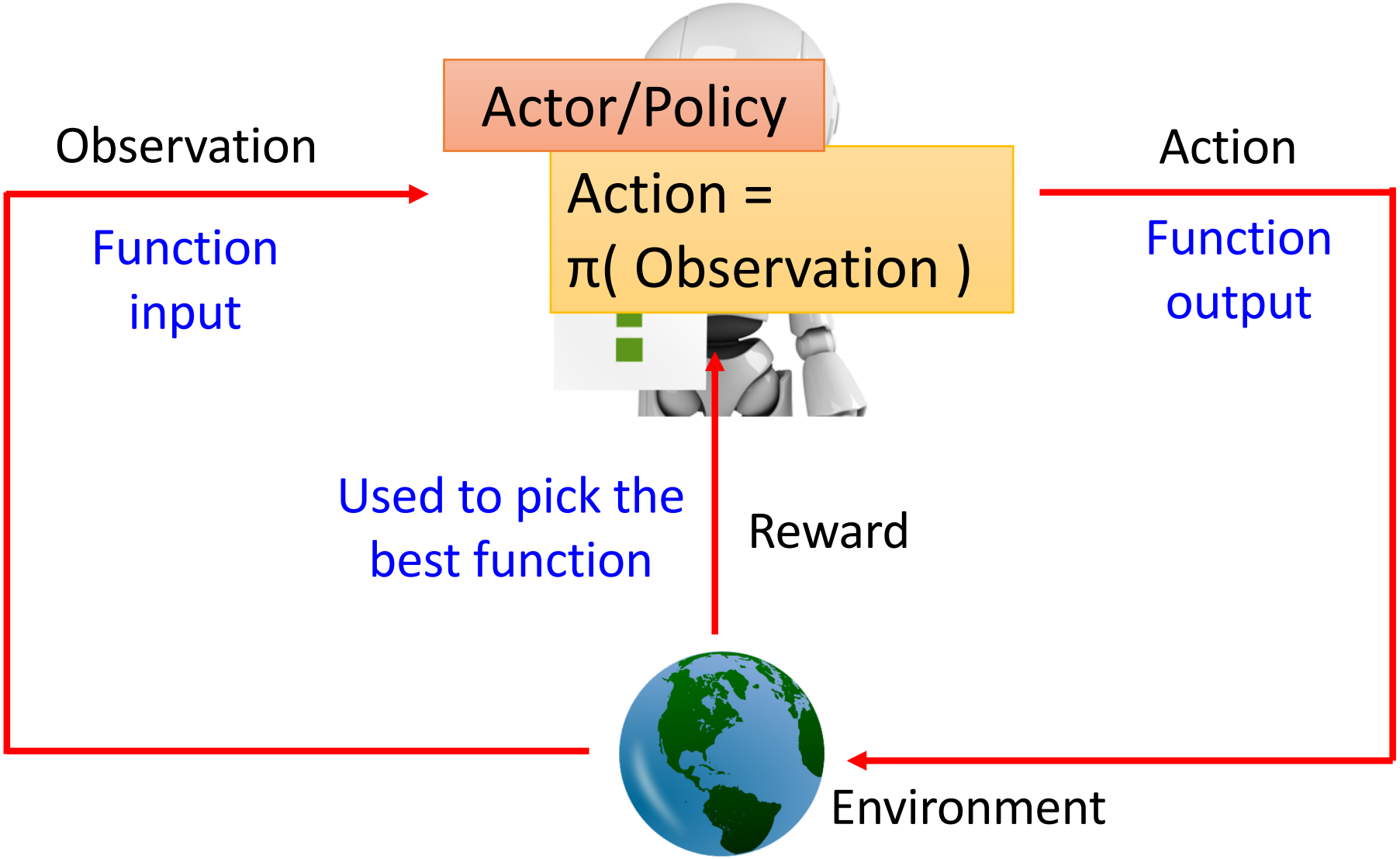
Deep Reinforcement Learning: AI = RL + DL

Scenario of Reinforcement Learning

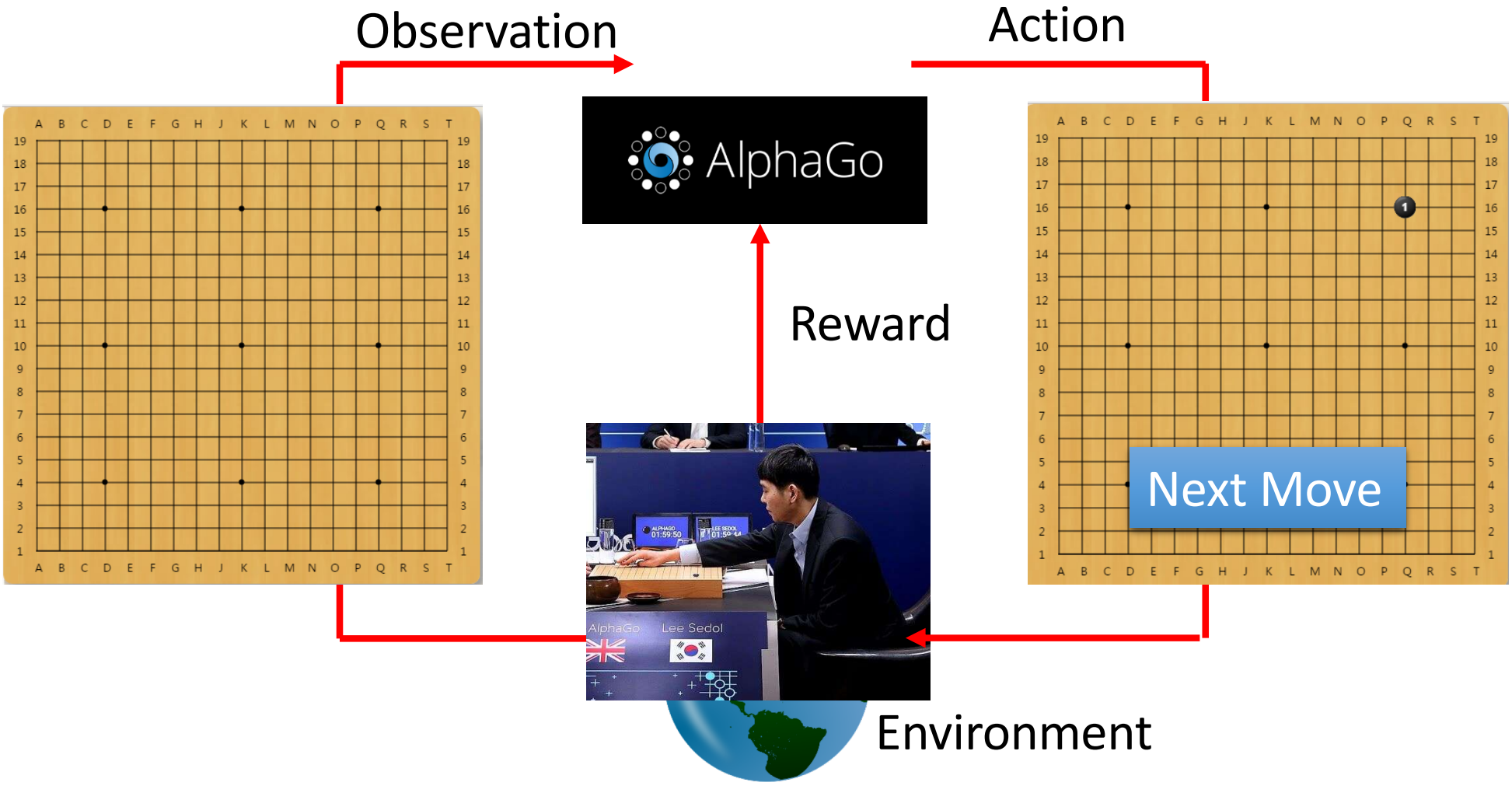


Scenario of Reinforcement Learning

Machine Learning
≈ Looking for a Function

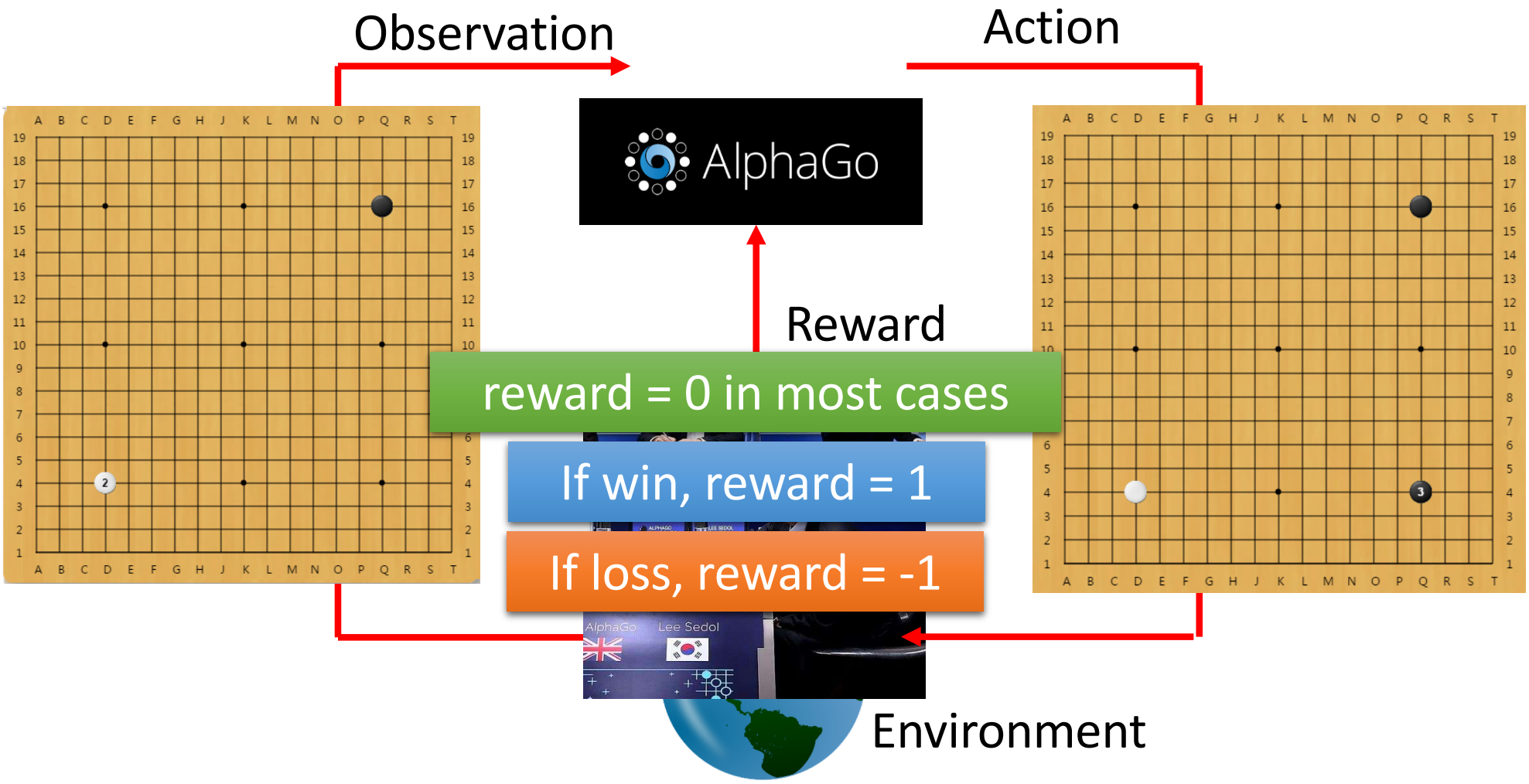


Learning to play Go



Learning to play Go

Agent learns to take actions maximizing expected reward.



Learning to play Go

- Supervised: Learning from teacher

Next move: "5-5"

Next move: "3-3"

- Reinforcement Learning Learning from experience

First move → …… many moves …… → Win!

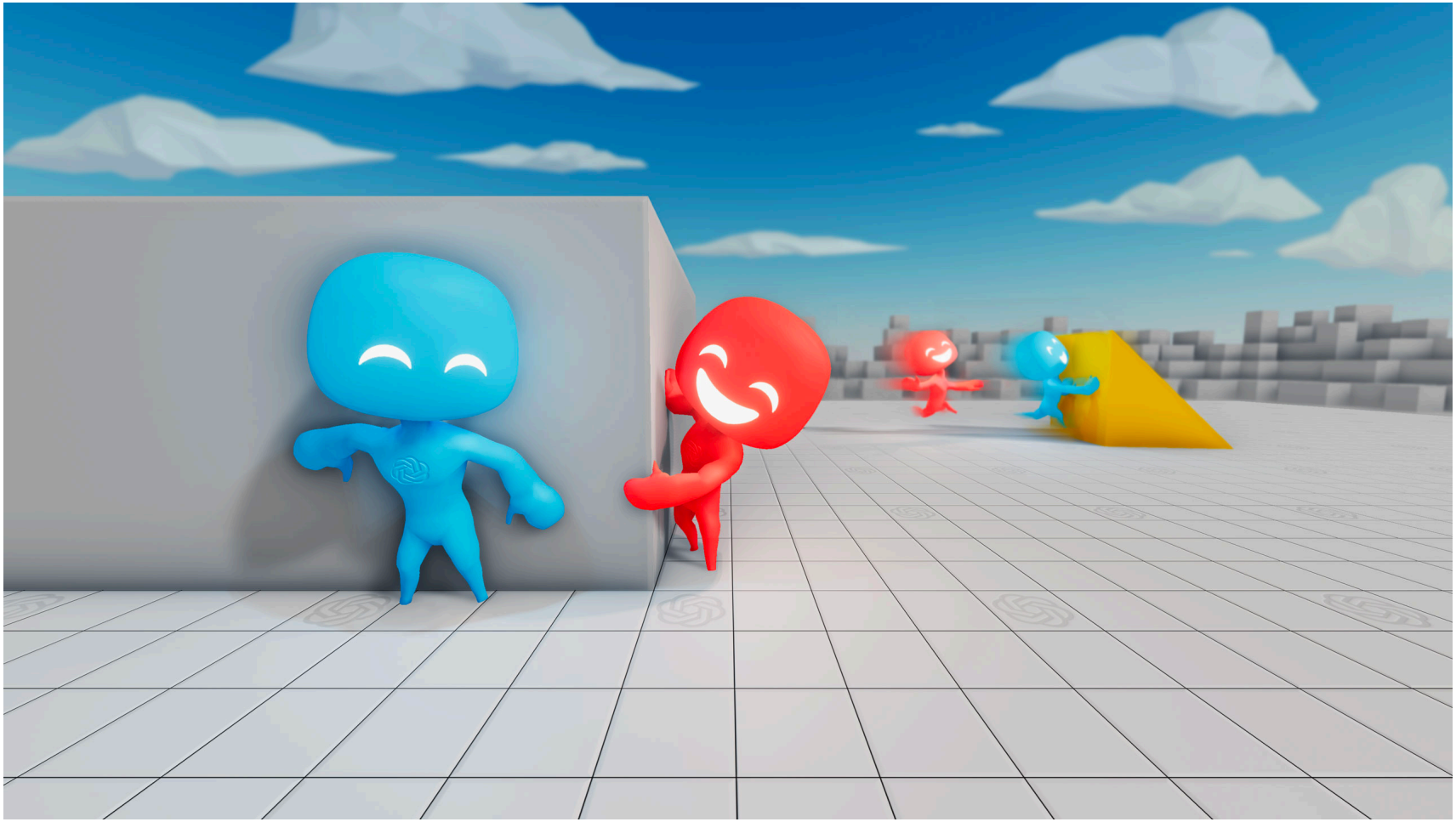
(Two agents play with each other.)

Alpha Go is supervised learning + reinforcement learning.

Examples: OpenAI Five

https://openai.com/blog/openai-five/
https://www.youtube.com/watch?v=eHipy_j29Xw

Examples



https://openai.com/blog/emergent-tool-use/
https://www.youtube.com/watch?v=kopoLzvh5jY&t=21s

More RL materials

- Textbook: Reinforcement Learning: An Introduction
  - http://incompleteideas.net/book/the-book-2nd.html
- Lectures of David Silver
  - http://www0.cs.ucl.ac.uk/staff/D.Silver/web/Teaching.html (10 lectures)
  - http://videolectures.net/rldm2015_silver_reinforcement_learning/ (Deep Reinforcement Learning)
- Lecture of Emma Brunskill, Stanford University, 2019
  - https://www.youtube.com/watch?v=FgzM3zpZ55o&list=PLoROMvodv4rOSOPzutgyCTapiGlY2Nd8u
- Lectures of John Schulman
  - https://youtu.be/aUrX-rP_ss4

Questions