Lecture Overview

- What is Artificial Intelligence?
- Agents acting in an environment

What is Artificial Intelligence?

- Artificial Intelligence is the synthesis and analysis of computational agents that act intelligently.
- An agent is something that acts in an environment.
- An agent acts intelligently if:
  - its actions are appropriate for its goals and circumstances
  - it is flexible to changing environments and goals
  - it learns from experience
  - it makes appropriate choices given perceptual and computational limitations

Goals of Artificial Intelligence

- <mark>Scientific goal:</mark> to understand the principles that make intelligent behavior possible in natural or artificial systems.
  - ▸ analyze natural and artificial agents
  - ▸ formulate and test hypotheses about what it takes to construct intelligent agents
  - ▸ design, build, and experiment with computational systems that perform tasks that require intelligence
- <mark>Engineering goal:</mark> design useful, intelligent artifacts.
- Analogy between studying flying machines and thinking machines.

Agents acting in an environment
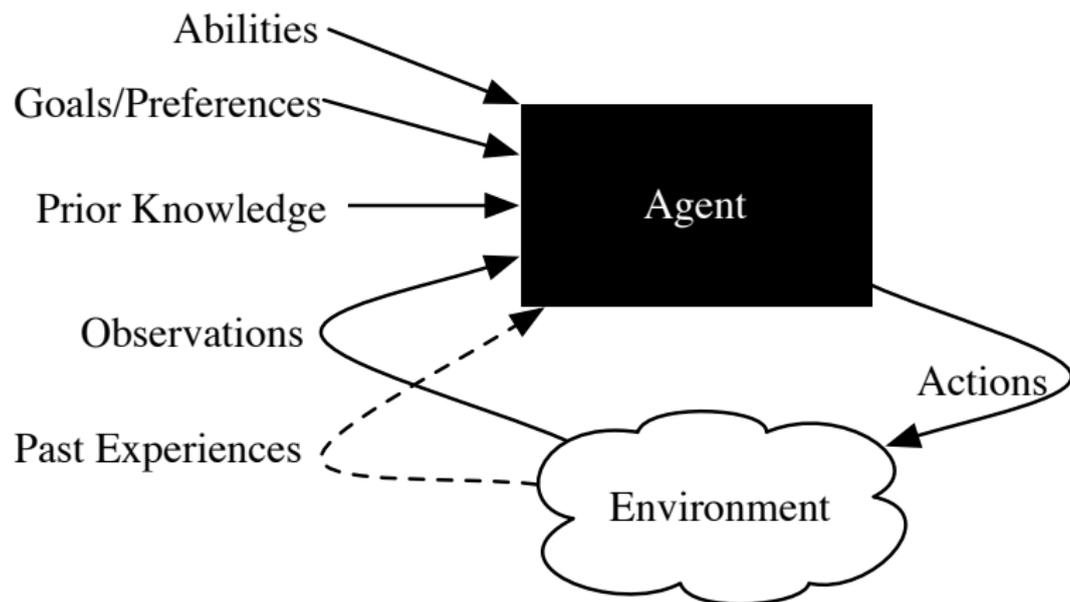
Example agent: robot

- **abilities:** movement, grippers, speech, facial expressions,...
- **observations:** vision, sonar, sound, speech recognition, gesture recognition,...
- **goals:** deliver food, rescue people, score goals, explore,...
- **past experiences:** effect of steering, slipperiness, how people move,...
- **prior knowledge:** what is important feature, categories of objects, what a sensor tell us,...

Example agent: teacher

- **abilities:** present new concept, drill, give test, explain concept,...
- **observations:** test results, facial expressions, errors, focus,...
- **goals:** particular knowledge, skills, inquisitiveness, social skills,...
- **past experiences:** prior test results, effects of teaching strategies, ...
- **prior knowledge:** subject material, teaching strategies,...

Example agent: medical doctor

- **abilities:** operate, test, prescribe drugs, explain instructions,. . .
- **observations:** verbal symptoms, test results, visual appearance. . .
- **goals:** remove disease, relieve pain, increase life expectancy, reduce costs,. . .
- **past experiences:** treatment outcomes, effects of drugs, test results given symptoms. . .
- **prior knowledge:** possible diseases, symptoms, possible causal relationships. . .

Example agent: user interface

- **abilities:** present information, ask user, find another information source, filter information, interrupt,. . .
- **observations:** users request, information retrieved, user feedback, facial expressions. . .
- **goals:** present information, maximize useful information, minimize irrelevant information, privacy,. . .
- **past experiences:** effect of presentation modes, reliability of information sources,. . .
- **prior knowledge:** information sources, presentation modalities. . .