Lecture Overview

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

Learning objectives: at the end of the class, you should be able to

- describe what an intelligent agent is
- identify the goals of Artificial Intelligence
- classify the inputs and the outputs of various agents

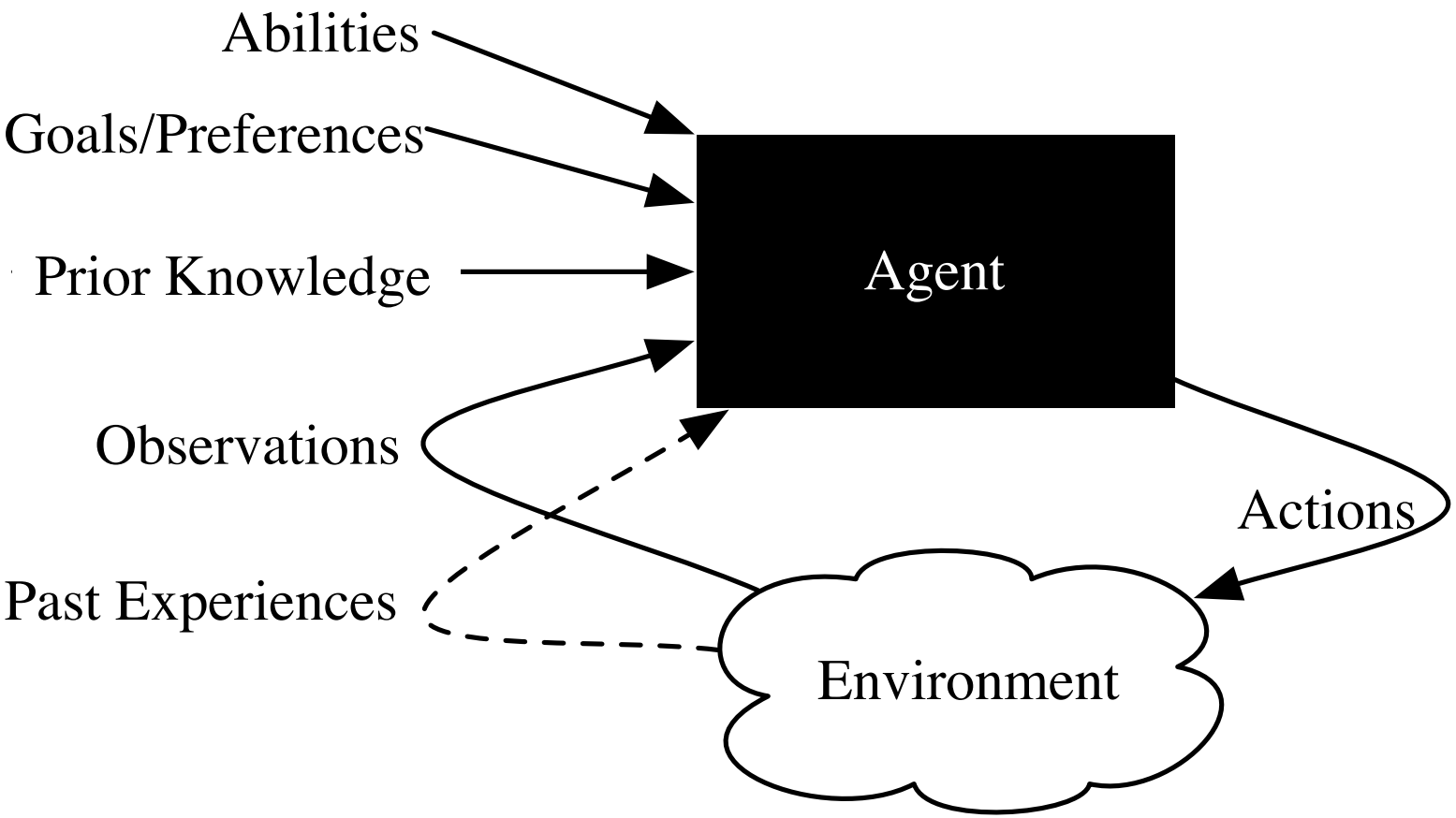
What is Artificial Intelligence?

- 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

- Scientific goal: 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
- Engineering goal: design useful, intelligent artifacts.
- Analogy between studying flying machines and thinking machines.

Agents acting in an environment



Examples of Agents

- Organisations Microsoft, Al Qaeda, Government of Canada, UBC, CS Dept,...
- People teachers, physicians, stock traders, engineers, researchers, travel agents, farmers, waiters...
- Computers/devices thermostats, user interfaces, airplane controllers, network controllers, games, advising systems, tutoring systems, diagnostic assistants, robots, Google car, Mars rover...
- Animals dogs, mice, birds, insects, worms, bacteria...

Inputs to an agent

- Abilities — the set of things it can do
- Goals/Preferences — what it wants, its desires, its values,...
- Prior Knowledge — what it comes into being knowing, what it doesn't get from experience,...
- History of observations (percepts, stimuli) of the environment
  - (current) observations — what it observes now
  - past experiences — what it has observed in the past

Example agent: robot

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

Example agent: teacher

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

Example agent: medical doctor

- abilities:
- goals:
- prior knowledge:
- observations:
- past experiences:

Example agent: autonomous car

- abilities:
- goals:
- prior knowledge:
- observations:
- past experiences:

Example agent: Apple Inc.

- abilities:
- goals:
- prior knowledge:
- observations:
- past experiences:

Example agent:

- abilities:
- goals:
- prior knowledge:
- observations:
- past experiences:

Agents acting in an environment