

COMP310 – Multi Agent Systems

Lecture 2: Intelligent Agents

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See Vital for all material



Coming Up Today...

Lecture 2 Overview

- What is an agent?
- Environments
- Intelligent Agents
- Week 2 plan



What is an Agent?

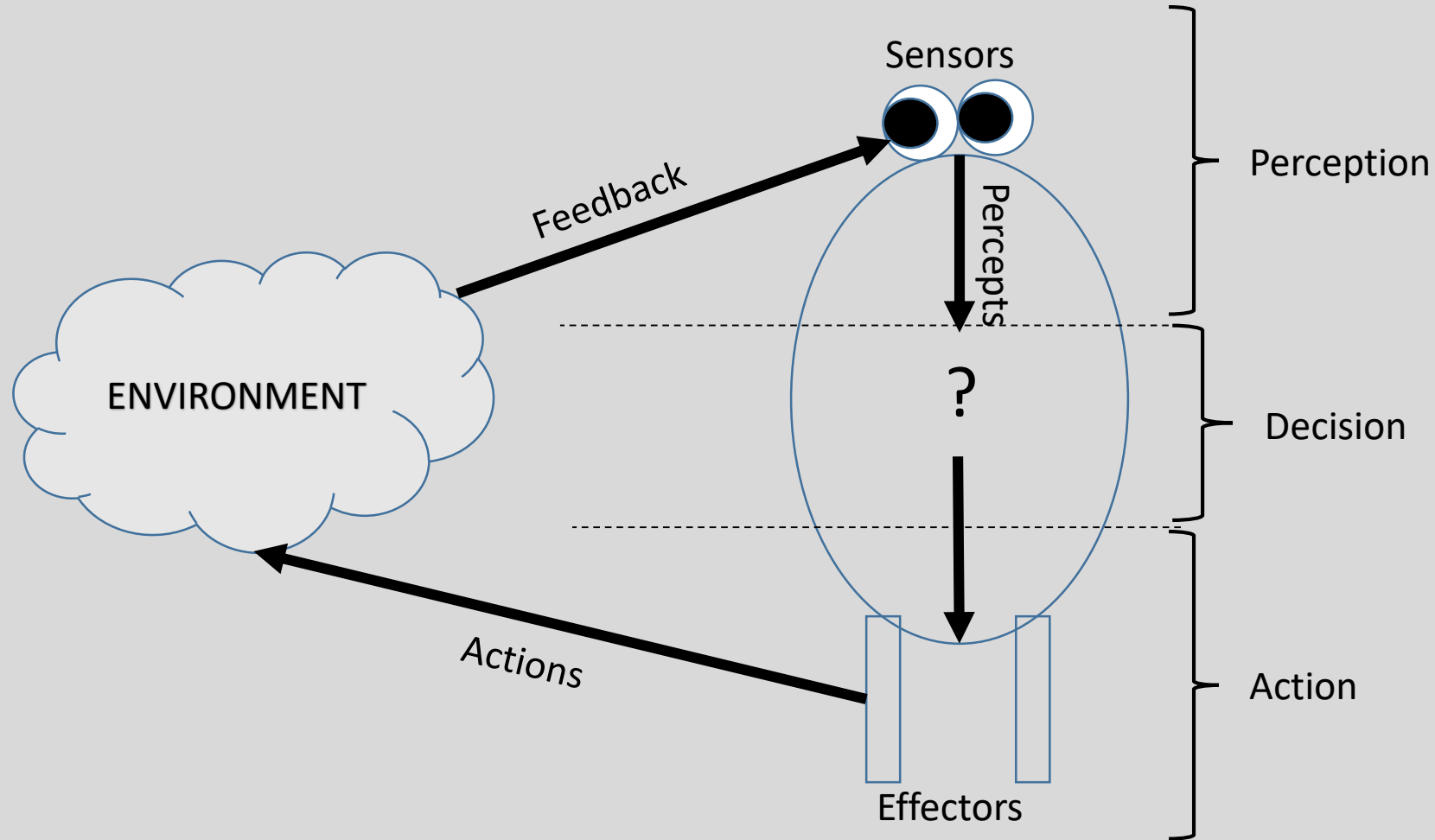
Agent Definition v2

- Agents are **autonomous** (i.e. capable of **independent** action)

An agent is a computer system that is **situated in some environment**, and that is capable of **autonomous action** in that environment in order to meet its **delegated objectives**

- It is all about **decisions**
 - An agent must choose **what** action to perform
 - An agent must decide **when** to perform an action

Agent within an Environment

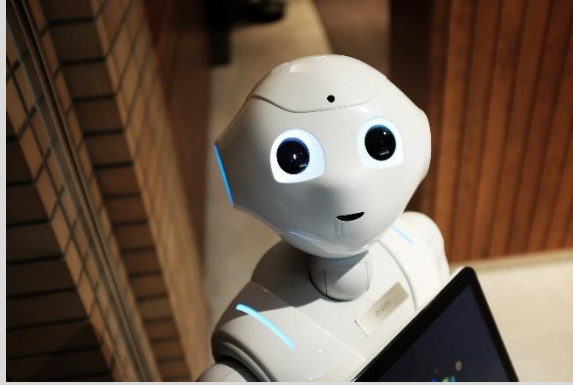


What is Autonomy?

- Autonomy is on a **Spectrum**



No Autonomy



Full Autonomy

- Autonomy is **Adjustable**
 - Decisions can be handed to a higher authority when beneficial

Simple Agents

- Thermostat:
 - Environment: Physical Room Environment
 - Delegated goal: Maintain good room temperature
 - Actions: Heat On/ Heat Off
- Software Demon (biff email alert program)
 - Environment: Unix OS
 - Delegated Goal: Check for email, flag if new email arrives
 - Actions: GUI operations
- They are “simple” because the decisions made are trivial

Agents vs Objects

Agents

- Are autonomous
 - can **choose** to perform an action
- Are Smart
 - Capable of flexible behaviour

Objects

- Are not autonomous
 - Perform an action because they **must**
- Are not “smart”
 - OO says nothing about flexible behaviour per se

Objects do it for free....
Agents do it for **personal gain**

Agents vs Expert Systems

Agents

- Are situated in the environment
 - can **perceive** the environment and make decisions
- Are aware of the environment
 - Can directly act upon any new knowledge gained from environment

Expert Systems

- Are removed
 - Rely on input from outside
- Are not “aware”
 - Only info obtained is what a human gives it

Objects do it for free....
Agents do it for **personal gain**

Environments

Properties of Environments

- The environmental characteristics can have a **huge** effect on agents
- Fully observable –vs- partially observable
- Deterministic –vs- Non-Deterministic
- Static –vs- Dynamic
- Discrete –vs- Continuous
- Episodic –vs- non-episodic
- Real Time

“Intelligent” Agents

A Little Intelligence Goes A Long, Long Way!

- We simply want an agent that can choose the **correct action** to perform at the **correct time**
- No need to solve **all** problems of AI for this!
- 3 Properties of Intelligent Agents:
 - Reactive
 - Proactive
 - Social



**Coming Up This
Week...**

Week 2 Overview

- More about Intelligent Agents and Environments
- The Intentional Stance
- Abstract Architecture for Agents, Actions, and Environments (notation...)
- Agent Control Loop
- Utility
- Tasks

Week 2 Plan

- **Saturday 1st Feb Evening:** Blended Learning materials released on vital (stay tuned to your email for my announcement)
- Saturday – Thursday: Learn from video material, attempt quizzes
- **Tuesday 4th Feb: NO LECTURE**
- **Thursday 5th Feb: Group Work / Tutorial**
- **Friday 6th Feb: Lecture**