Week 0

What is AI, Intelligent Agents

Preliminary: Introductory Lecture

Workshop

What is AI

1) Study what the "Turing Test" is.

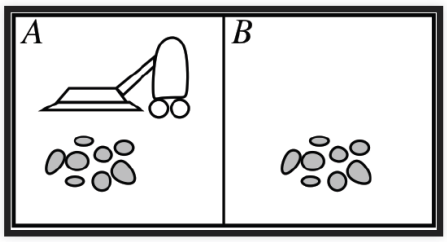
2) Study then summarize each of the following definitions.
    a. Acting humanly
    b. Thinking humanly (cognitive model)
    c. Thinking rationally (the laws of thought)
    d. Acting rationally (the rational agent)

3) Rationality

To design a rational agent, we must specify the *task environment*, which consists of the following four things:

- Performance measure : the agent's criterion for success
- Environment : the outside world interacting with the agent
- Actuators : how the agent controls its actions
- Sensors : how the agent percieves the outside world

Consider a VACUUM-CLEANER AGENT.



Percepts: location and contents, e.g. (A, Dirty)

Actions: Left, Right, Suck, NoOp

a) Define a *performance measure*.
b) Bear in mind that rational ≠ successful, write a simple program for the VACUUM-CLEANER AGENT.

ENVIROMENT TYPES: DIMENSIONS OF COMPLEXITY

ENVIRONMENT TYPES, EXAMPLES

	Chess (w. clock)	Poker	Driving	Image recognition
Observable?	*fully*	*partially*	*partially*	*fully*
Deterministic?	*determ.*	*stochastic*	*stochastic*	*determ.*
Episodic?	*sequential*	*sequential*	*sequential*	*episodic*
Static?	*semidyn.*	*static*	*dynamic*	*static*
Discrete?	*discrete*	*discrete*	*continuous*	*disc./cont.*
N:o agents	*multiple (compet.)*	*multiple (compet.)*	*multiple (cooper.)*	*single*

The real world is (of course):
partially observable, stochastic, sequential, dynamic, continuous, multi-agent

4) Study and discuss to understand every term in the above table.

TYPES OF AGENTS

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Simple reflex agent	selects actions based on *current percept* — ignores history
Model-based reflex agent	maintains an *internal state* that depends on the percept history
Goal-based agent	has a *goal* that describes situations that are desirable
Utility-based agent	has a *utility function* that measures the performance
Learning agent	any of the above agents can be a learning agent — learning can be *online* or *offline*

5) Study and discuss to understand and distinguish each type of agent and what are required in order to develop each of them.