

What is an Intelligent Agent

agent function

Maps percept sequences to actions

$$f: P^* \rightarrow A$$

Rational agents - exhibits behavior that
are appropriate to the problem at hand

(always do the right thing!)

Perfect agent?

Omniscient - an agent knows the
actual outcome of its actions

Omniscience is (for us) impossible

Rationality concerned with expected
success (what is usual given current perception)

Evaluation — how do we know the agent succeeded?

Rationality depends on 4 things

1. Performance measure defines degree of success.
2. Percept sequence — what agent has perceived so far
3. Knowledge about the environment
4. Action agent performs

ideal rational agent — for each percept sequence $\{s_0, p_1, p_2, \dots\} \Rightarrow$ set of all

sequences, agent A chooses p_i such that a performance measure is maximized

There is a mapping between the percept

sequence and an agent's actions
agents should be autonomous
autonomous agents act on knowledge and
experience

Agent Program

Agent - architecture + program

↓
takes percepts from
agent program and
makes it available
to the system

↓
Need to know
the task
environment

PEAS - Performance Measure,
environment, actuators, and sensors

PEAS description - web bot that
finds best stored price

P - actual lowest price - maybe percentages
into "hidden costs",

shipping & handling

E - online environment (internet)

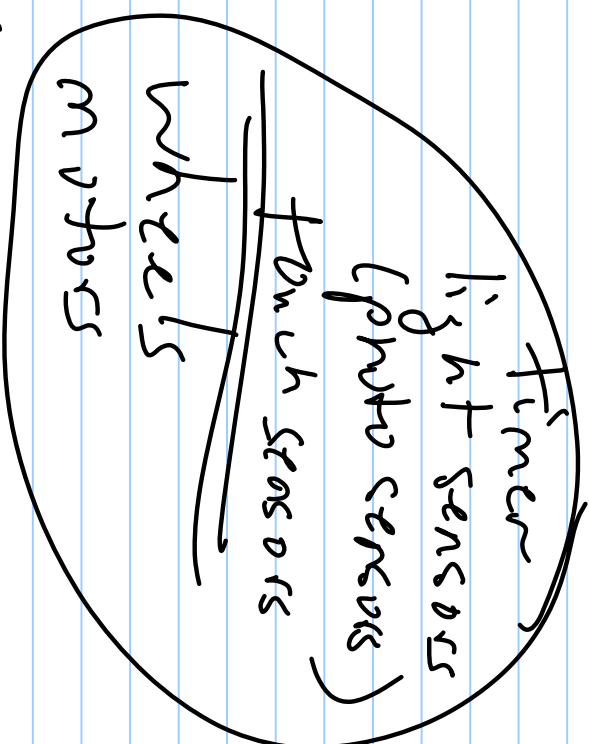
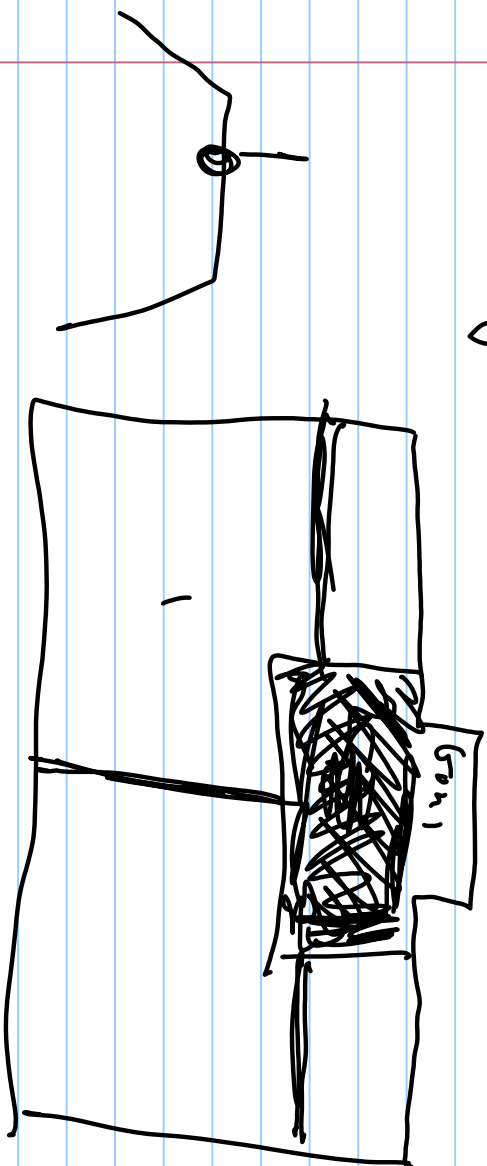
A - http interface (email)

S - html parser

DEAS

Agent Environments

Fully observable vs. Partially observable



Sensors have total access to the environment at each point of time
can detect all aspects of the environment with respect to the problem

Partially observable — some occlusion of the environment

Deterministic vs. Stochastic

↳ The next state of the environment can be determined from the current state and the actions of the agent

Chess

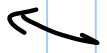
This evaluated from the agent's point of view!

Episodic vs. Sequential

↳ agent's experience is divided into episodes. Episodes don't affect the actions of the agent in another episode

Chess

Static vs. Dynamic



environment

stays the same
soccer field



environment changes

internet

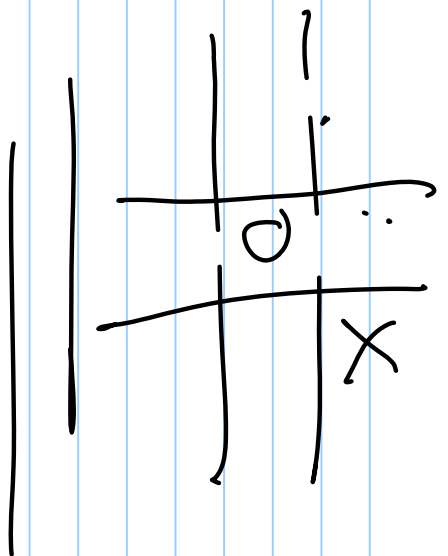


Discrete vs. Continuous



limited # of distinct clearly definable
percepts and actions such as a lookup
environment

tic for the



Single Agent vs. Multi Agent
one agent vs. more than one

Crossword puzzle

Football
Soccer

Competitive

Cooperative

Simplest agent program - looking table