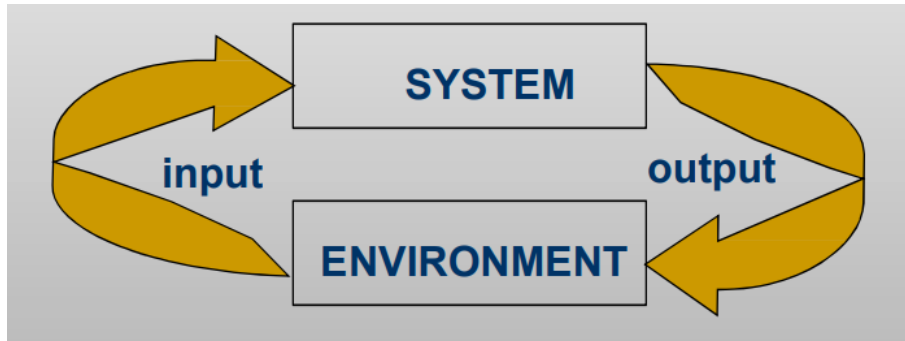


AGENT COMMUNICATION

Autonomous agents

- An agent is a computer system capable of autonomous action in some environment in order to meet its design objectives



BDI agents – basic algorithm BDI-

interpreter –(B,D,I):= Initialize-state(); –While true do

- Update(B,D, I); // perceptions may update beliefs, desires and intentions (ex. Once fulfilled, an intention is dropped)
- Options:= option-generator(B,D,I);
- Selected-options:=deliberate(B,D,I);
- Update-intentions(Selected-options,I);
- Plan:=Planing(I,B); • Execute(Plan); • Get-new-perceptions(); –End While

An agent is a computer system capable of flexible autonomous action in some environment.

Situatedness: peceiving the environment via sensors and being able to affect the environment via effectors

Autonomy: capability of action without intervention, and control over internal state

Flexibility:

Responsiveness: respond in a timely fashion to change in the environment

Pro-activity: actions which go beyond simple response to stimulus

Sociability: ability to interact with other agents and humans for mutual benefit

Cooperation:

It the practice of working in common with mutually agreed-upon goals and possibly methods, instead of working separately in competition, and in which the success of one is dependent and contingent upon the success of another.

– E.g. I can't play a quintet alone!

- When agents are working together, it is important to make a distinction between Benevolent agents and Self-interested agents: it does not mean that they want to cause harm to other agents or that they care only about themselves. It means that it follows its interest as represented by a utility function (representing the agent preferences)

Benevolent Agents

- If we “own” the whole system, or are in a cooperative environment, we can design agents that help each other whenever asked (if possible)
- In this case, we can assume agents are benevolent: others best interest is their best interest
- Problem-solving in benevolent systems is called cooperative distributed problem solving (CDPS) Benevolence simplifies the system design task enormously!

Self-Interested Agents

- If agents represent individuals or organizations, (the more general case), then we cannot make the benevolence assumption
- Agents will be assumed to act to further their own interests, possibly at expense of others
- Potential for conflict.
- E.g. Competitive environment (sport, war, ...)
- May complicate the design task enormously

Task Sharing and Result Sharing

Two main modes of cooperative problem solving:

– **Task sharing:** components of a task are distributed to various agents

– **Result sharing:** information (partial results, etc.) is distributed

- Both benevolent and self-interested agents have to work together and need to cooperate.
- Cooperation requires coordination
- Coordination of multiple independent autonomous agent require communication (of some sort).

E.g. Lifting a table

E.g. I can't play a quintet with the others if I can't hear them