جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم
قسم الانظمة الطبية الذكية

Lecture: (11)

Artificial intelligent (AI) and Mobile Agents

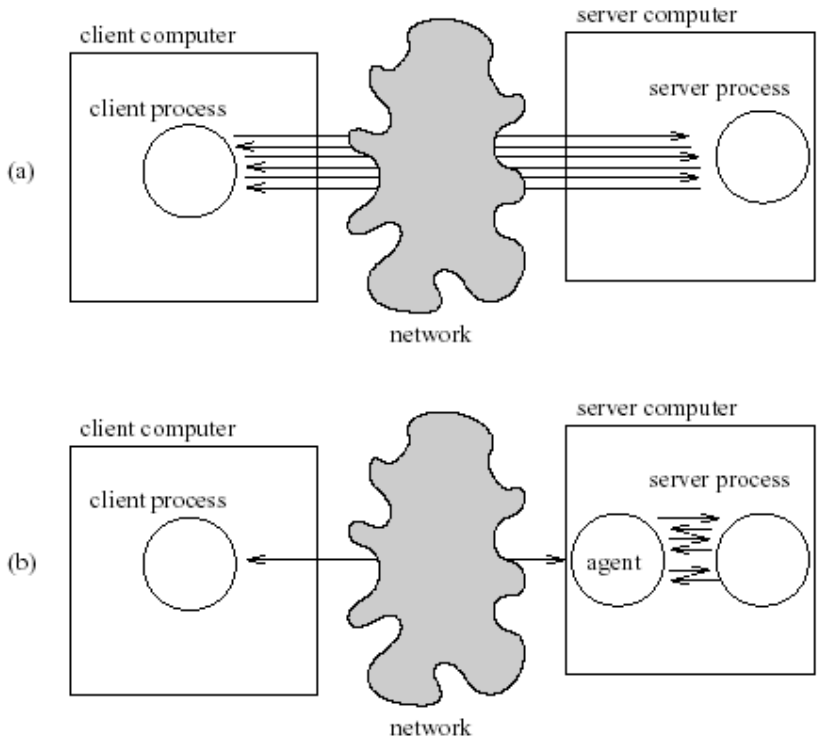
Subject: Artificial Intelligence
Class: Third
Lecturer: Dr. Maytham N. Meqdad

1. Artificial intelligent (AI) and Mobile Agents

Agent originates in artificial intelligence and describes a logical entity that has some level of autonomy within its environment or host.

- A mobile agent has the added capability to move between hosts.
- In a computing context, a mobile agent is a combined unit of data and code that can move between different execution environments with the following characteristics:
  - Reduced network traffic.
  - Decentralization.
  - Increased robustness and fault-tolerance.

For example, we have a remote procedure call versus mobile agent call as in figure below:-



In the client / server model, consists of two pieces: a client piece and a server piece.

- Often, the client and server pieces are on separate machines and they communicate over a common network. When the client needs data or access to resources that the server provides, the client sends a request to the server over the network. The server in turn sends a response to the request. This "handshake" occurs again and again. Each request/response requires a complete round trip across the network.
- In the mobile agent model, when the client in the mobile agent architecture needs data or access to a resource that the server provides, the client actually migrates to the server's machine. When the entire transaction is complete, the mobile agent returns home with the results.

2. Some types of Agents

Table-driven agents

It uses a percept sequence/action table in memory to find the next action. They are implemented by a (large) lookup table.

Table lookup of percept-action pairs mapping from every possible perceived state to the optimal action for that state

Problems with this type

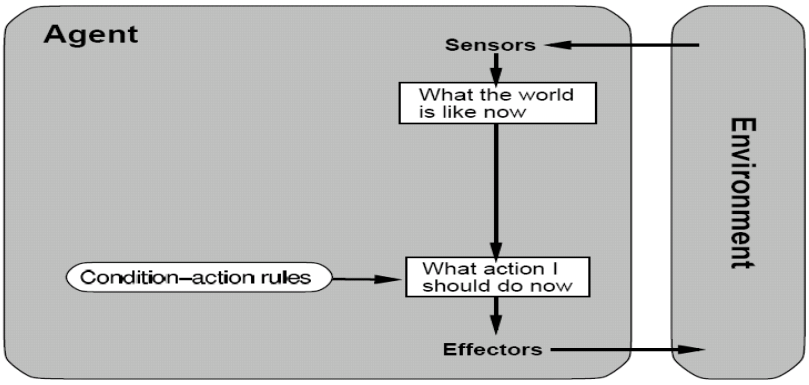
- Too big to generate and to store (Chess has about 10120 states, for example)
- No knowledge of non-perceptual parts of the current state
- Not adaptive to changes in the environment; requires entire table to be updated if changes occur
- Looping: Can't make actions conditional on previous actions/states

Simple reflex agents

It is based on condition-action rules, implemented with an appropriate production system. They are stateless devices which do not have memory of past world states.

Problems

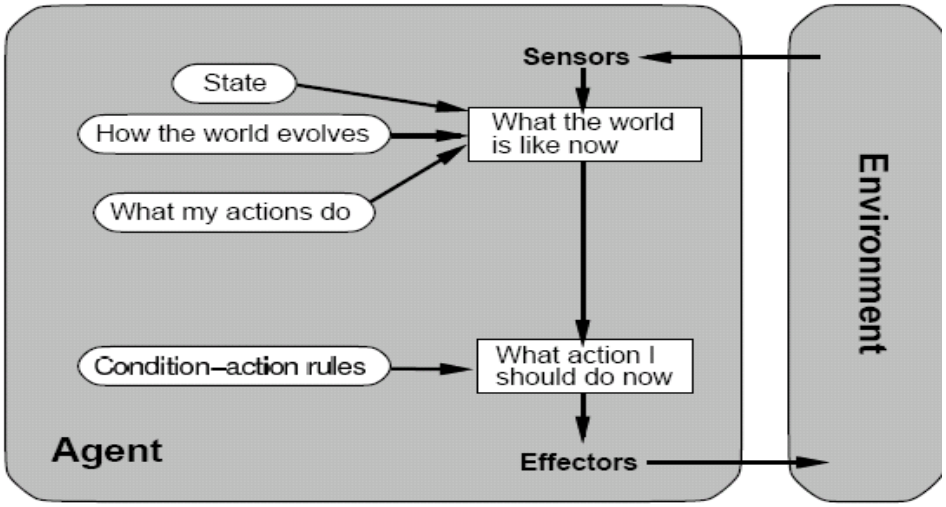
- Still usually too big to generate and to store
- Still no knowledge of non-perceptual parts of state
- Still not adaptive to changes in the environment; requires collection of rules to be updated if changes occur
- Still can't make actions conditional on previous state



Example:
Simple Vacuum Reflex Agent

function Vacuum-Agent([location,status])
returns **Action**
if status = Dirty then return **Suck**
else if location = A then return **Right**
else if location = B then return **Left**

- **Model-based reflex agents**
  In this type, we have internal state, which is used to keep track of past states of the world.



- **Goal-based agents**

In this type of agent, in addition to state information, have goal information that describes desirable situations. Agents of this kind take future events into consideration.