Biological Vision and Applications
Module 06-01: Cognitive systems

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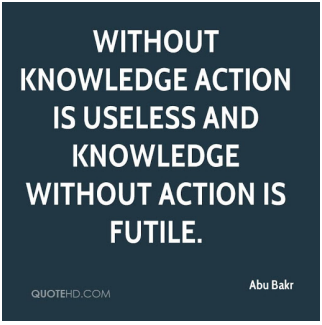
Goal of Cognitive Systems



- We want to build systems that can intelligently act

Cognitive Systems

- Examples
  - Autonomous cars
  - Social robots
- Need to have intellectual capabilities comparable to humans
- The systems must interact autonomously with the environment
  - Must have a goal to fulfill
  - Must work without human intervention
  - Needs to understand the environment and act
  - Combine cognition with action
  - Need to be versatile: work in multiple environments

Autonomous Agents (Intelligent Agents)

Properties

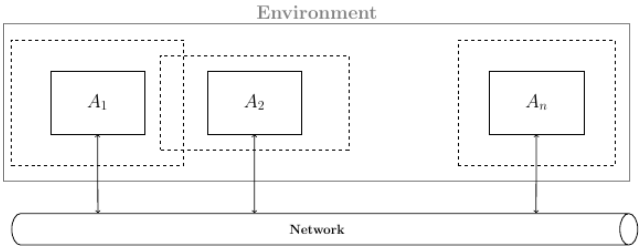
- Autonomy: Can act independently without human intervention
- Goal directed: Has a goal to achieve – tries to maximize some benefit
- Interactive: Can sense and act on the environment
- Social capability: Can communicate with humans and other intelligent agents
- Knowledge: Maintains a model of the world (environment + itself)
- Learning: Stores experience and improve it's performance with experience

- A cognitive system comprises one or more interacting autonomous agents

An agent is “situated” in an environment

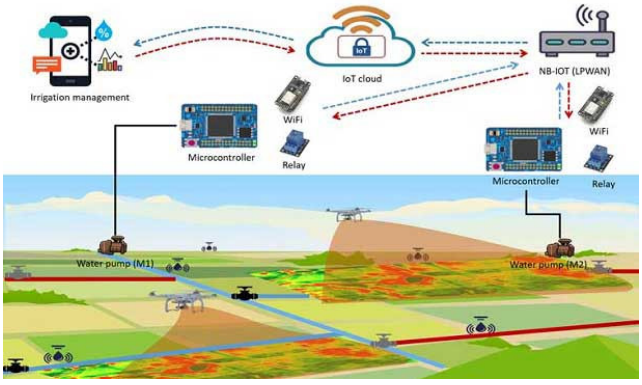
- Physical / embodied: built on dedicated hardware
  - Autonomous car, drones, ...
  - Robotic vacuum cleaner
  - Industrial and Social robots
  - A/C thermostat
- Software / non-embodied: hosted on commodity hardware (laptop/mobile)
  - E-Mail spam filter
  - AI based chess player
  - Recommendation engines

Multi-Agent Systems



- All the agents inhabit the same world
  - Their (local) environments may be different
- Agents communicate with each other

IoT based system as an example of Multi-Agent System



- Smart agriculture

Quiz

No quiz for module 06-01

End of Module 06-01