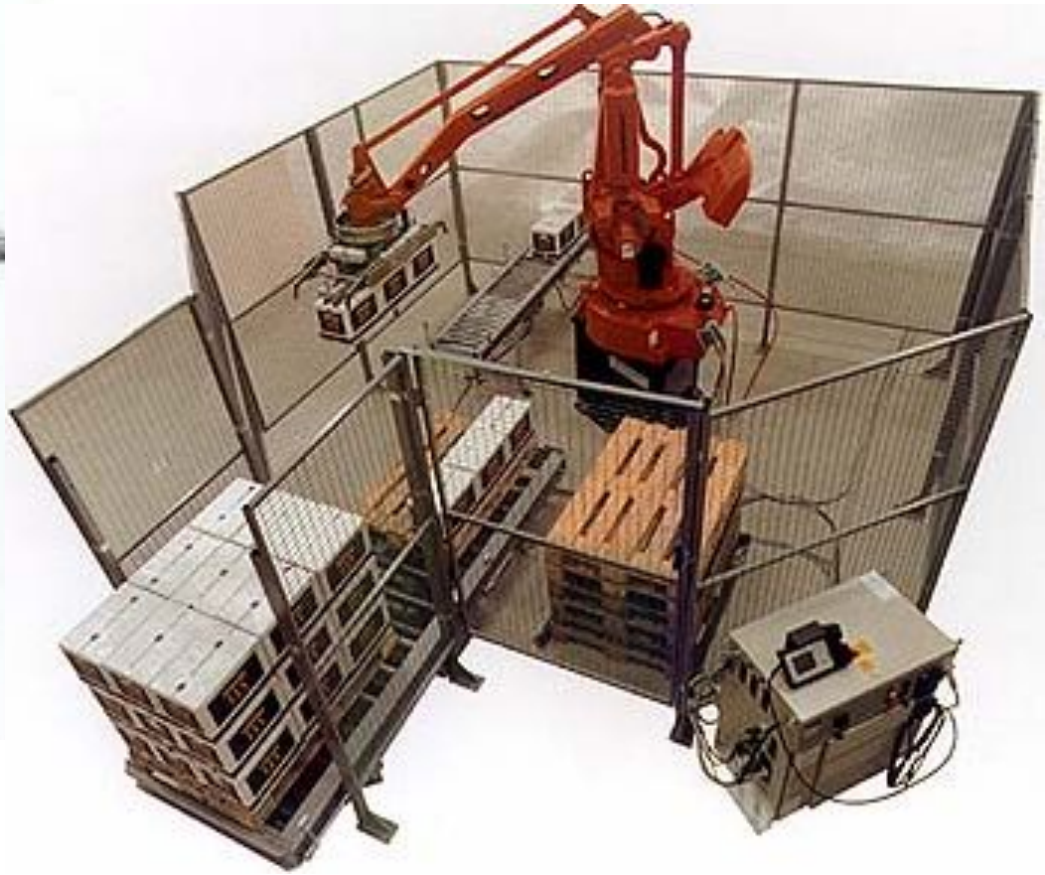
Robots



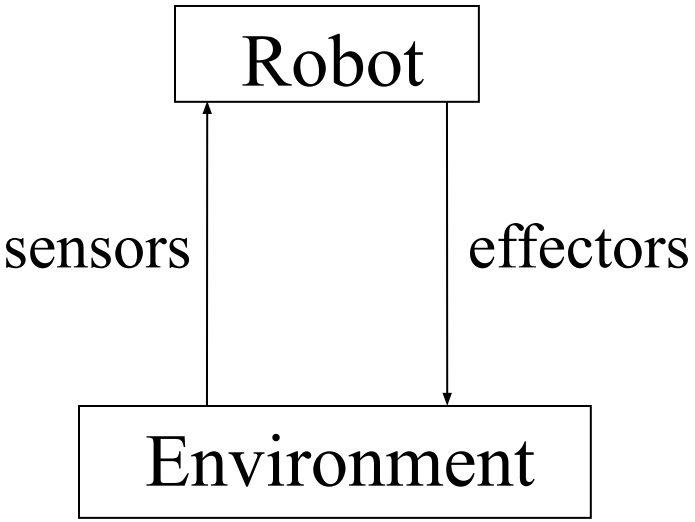
Slides Courtesy of
Benjamin Kuipers

Robots

Robots

What is a robot?

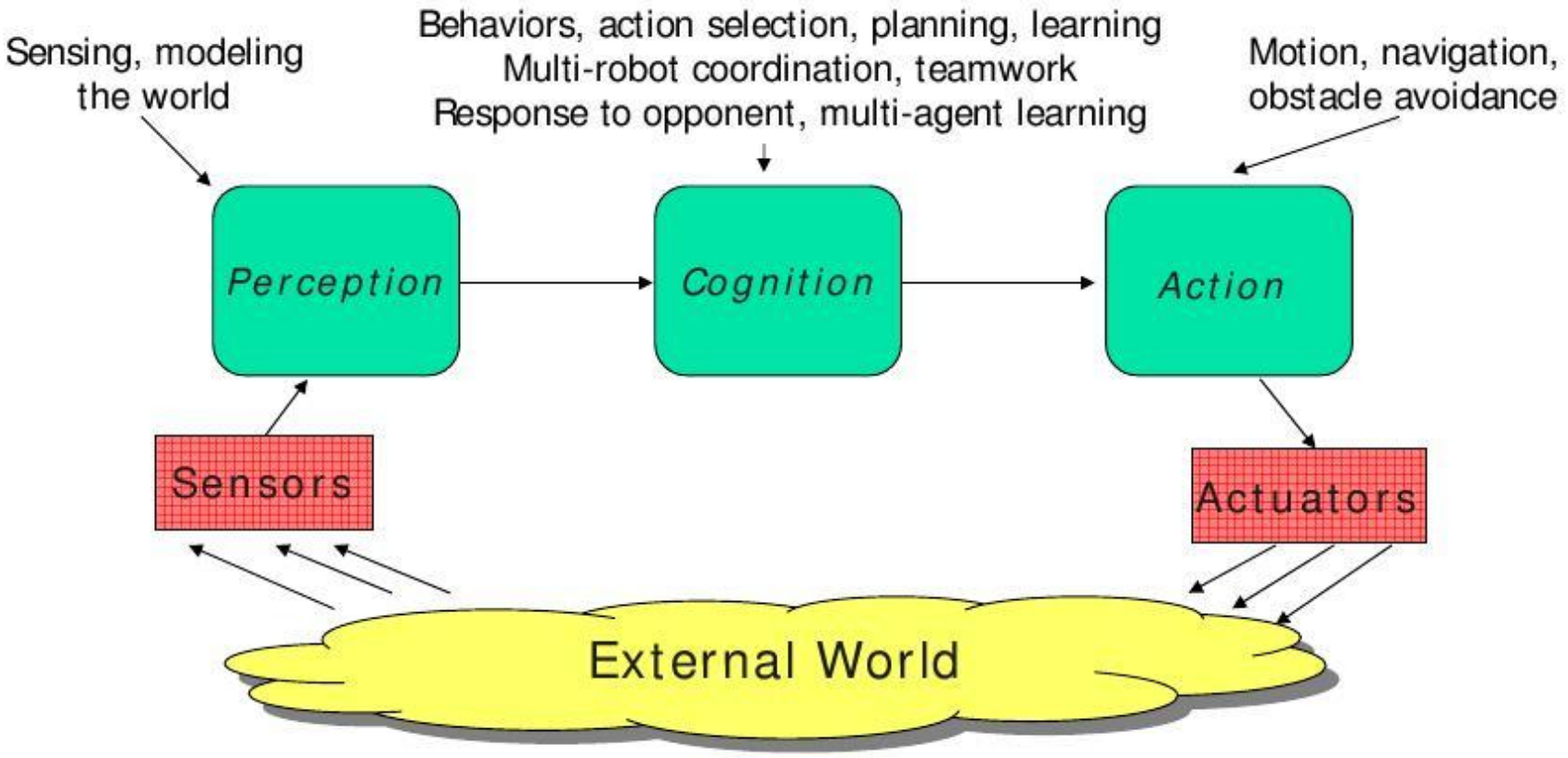
A robot is an intelligent system that interacts with the physical environment through sensors and effectors.



thermostat?

chat ‘bot’?

Intelligent Complete Robot



Slide by Manuela

Is a human a robot?

By our definition, yes.

- Humans interact with a complex physical environment via sensors and effectors.
- We are not artificially manufactured, of course!

Does this diminish humans?

No!

- Understanding the difficulties of robotics helps us appreciate how amazing humans are.

Intelligent robots …

… function in (mostly) unmodified human environments.

… that use, and perhaps even learn, useful *models* of the environment.

They have *knowledge*, and act on it.

What makes a good model of the environment?

A good model is a *simplified* description of the environment such that …

If the robot orients itself in the *model*,
and makes a plan using the *model*,
and executes that plan in the *real environment*,
then the plan has its intended effect.

Examples from my Research

My Research Question

To what degree can autonomous intelligent agents learn in the presence of teammates and/or adversaries in real-time, dynamic domains?

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Research Areas

- Autonomous agents
- Robotics
- Machine learning
  - Reinforcement learning
- **Multiagent systems**

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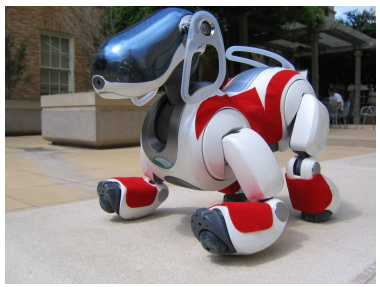
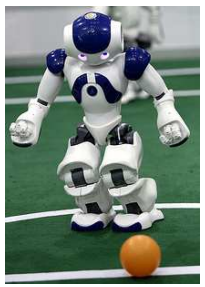

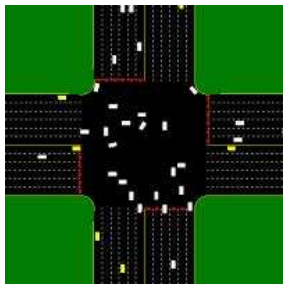

RoboCup Soccer

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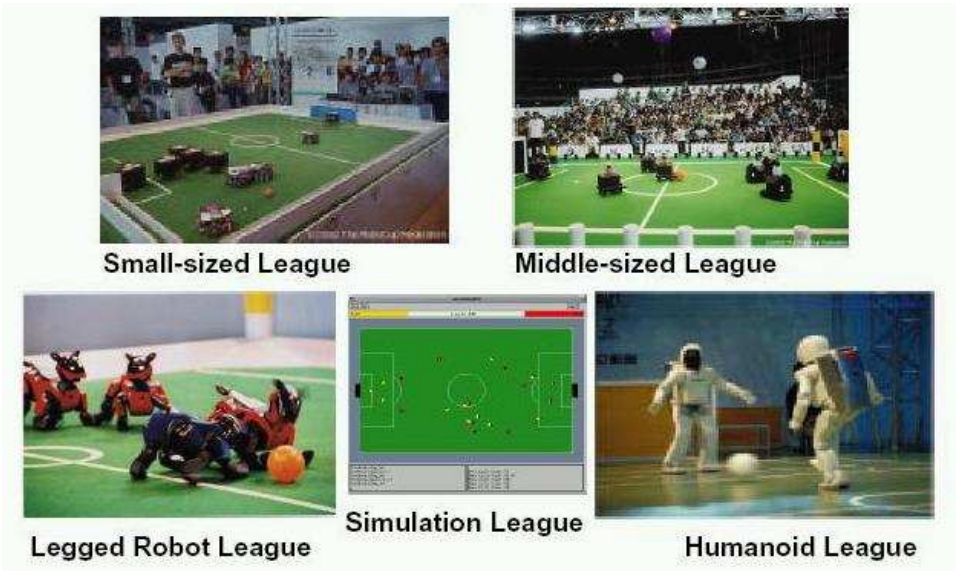

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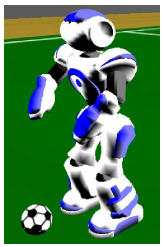



Small-sized League


Middle-sized League


Legged Robot League


Simulation League


Humanoid League