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ASSISTANT

Course on Artificial Intelligence

José Coelho, 2024

Lesson 2: Intelligent Agents

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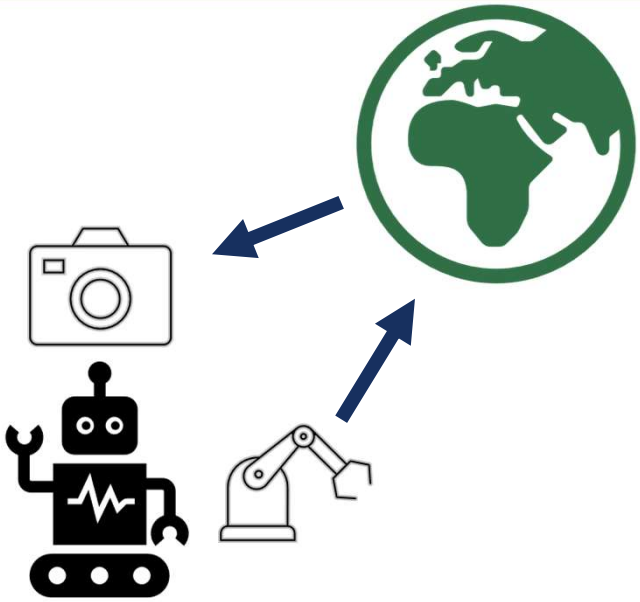
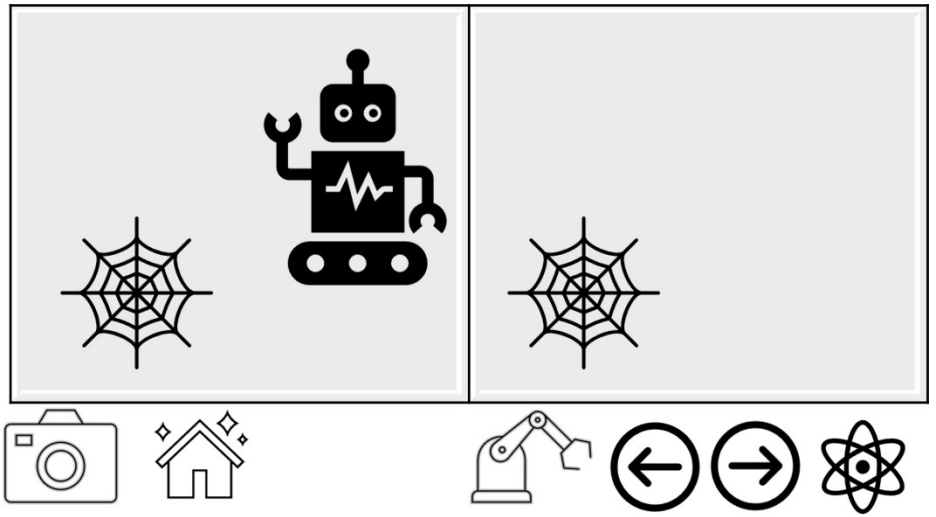
Agent concept

- **Definition of agent**
- **Rational agent**



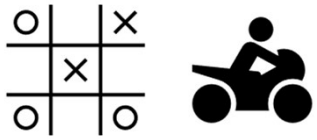


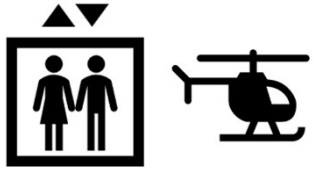
Characterization of an agent

- Performance indicator
  - Quantifiable
  - Goals
  - Operational
- Environment
  - 1D; 2D; 3D. +1D.
- Actuators
- Sensors

Properties of an environment

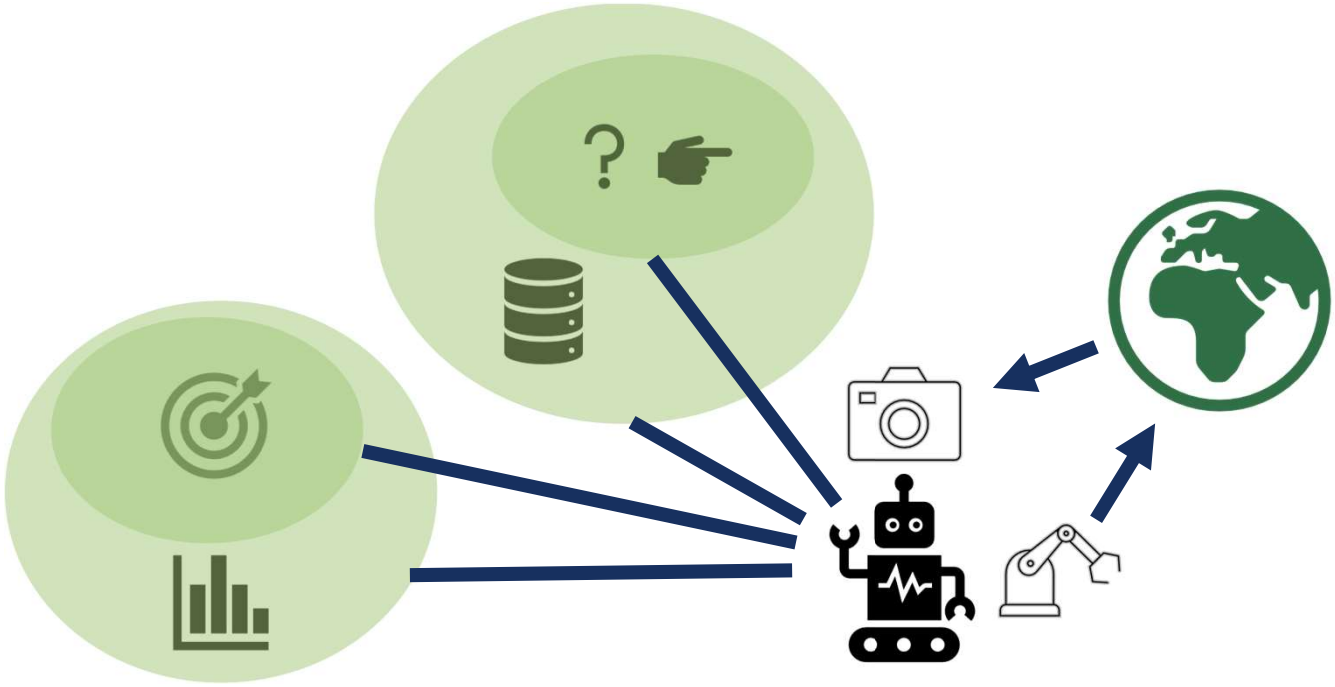
- Completely / Partially observable
- Deterministic / Stochastic
- Episodic / Sequential
- Static / Dynamic
- Discrete / Continuous
- Uni-agent / Multi-agent





Types of agents

- Simple reflex agent
- Model reflex agent
- Objective agent
- Utility Agent



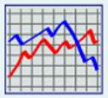
What to do?

Intelligent Agent Characterization

Report submission

Not available unless: The activity **Intelligent A**

Consider an agent, which is an autonomous, closed circuit racing car. The agent is aware of the race rules, which are imposed leading to the disqualification of the agent if involved in a violation of the rules, with the ultimate objective being to obtain the best classification at the end of the race.



Describe the agent in terms of:

- Performance indicator: [ ] [ ] of the final position in the classification. Measurement period: [ ]
- Environment: dimension [ ], a closed circuit, with the positions of the opposing cars in motion.
- Actuators: [ ].
- Sensors: [ ], proximity sensors, GPS, speedometer.

Also classify the environment in the following aspects:

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]

[2014/15]

- Partially observable - The agent only has the sensors available, which are in its position.
- Stochastic- Agent actions may have different results, due to external factors (floor, wind, etc.)
- Sequential - Successive actions over time. It is not episodic, since actions taken in one instant influence subsequent moments
- Dynamic - The environment changes constantly, and so do the positions of the other cars.
- Continuous - Continuous variables, your position and estimation of the opponents' position. Only discrete information will be your classification in the race, which does not invalidate having to deal with issues of continuous variables.
- Multi-agent - There is competition for the same objective, a race necessarily involves several participants.
- Performance indicator - Average position in the final classification, over a set of races.
- Environment - Closed circuit, with naturally several unpredictable factors.
- Actuators - Steering, acceleration, braking.
- Sensors - Proximity sensors, webcam, GPS, speedometer.

Consider an agent, which is an autonomous, closed circuit racing car. The agent is aware of the race rules, which are imposed leading to the disqualification of the agent if involved in a violation of the rules, with the ultimate objective being to obtain the best classification at the end of the race.

Describe the agent in terms of:

- Performance indicator: [Minimize] [the number] of the final position in the classification. Measurement period: [One race/game]
- Environment: dimension [2D+1D], a closed circuit, with the positions of the opposing cars in motion.
- Actuators: [Road movement].
- Sensors: [Vision], proximity sensors, GPS, speedometer.

Also classify the environment in the following aspects:

- [Partially observable]
- [Stochastic]
- [Sequential]
- [Dynamic]
- [Continuous]
- [Multiagent]

Thank you for attention

Resources:

- Microsoft Power Point / Clipchamp / DeepL

- Russell, S. J. & Norvig, P. (2010). Artificial intelligence: A modern approach (3rd ed). Prentice Hall.

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