

Notas do Curso

Patrick Oliveira

Curso ministrado pelo Prof. Denis Fantinato, 3Q19. As notas envolvem anotações de aula e recortes de livros e artigos.

1 de Outubro de 2019

Different definitions and approaches to AI.

1. **Thinking Humanly:** "[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning..." (Bellman, 1978)
2. **Thinking Rationally:** "The study of the computations that make it possible to perceive, reason, and act." (Winston, 1992)
3. **Acting Humanly:** "The art of creating machines that perform functions that require intelligence when performed by people." (Kurzweil, 1990)
4. **Acting Rationally:** "Computational Intelligence is the study of the design of intelligent agents." (Poole *et al.*, 1998)

1 Intelligent Agents

An *agent* is anything that can be viewed as perceiving its *environment* through *sensors* and acting upon that environment through *actuators*. We use the term *percept* to refer to the agent's perceptual inputs at any given instant. An agent's *percept sequence* is the complete history of everything the agent has ever perceived. Mathematically speaking, we say that an agent's behavior is described by the *agent function* that maps any given percept sequence to an action.

The correct action is decided based on its consequences. When an agent is plunked down in an environment, it generates a sequence of actions according to the percepts it receives. This sequence causes the environment to go through a sequence of states. If the sequence is desirable, then the agent has performed well. This notion of desirability is captured by a *performance measure* that evaluates any given sequence of environment variables.

What is rational at any given time depends on four things:

- The performance measure that defines the criterion of success.
- The agent's prior knowledge of the environment.
- The actions that the agent can perform.
- The agent's percept sequence to date.

This leads to a definition of rational agent: *For each possible percept sequence, a rational agent should select an action that is expected to maximize its performance measure, given the evidence provided by the percept sequence and whatever built-in knowledge the agent has.*

2 Solving Problems By Searching