# SISTEMAS MULTIAGENTES

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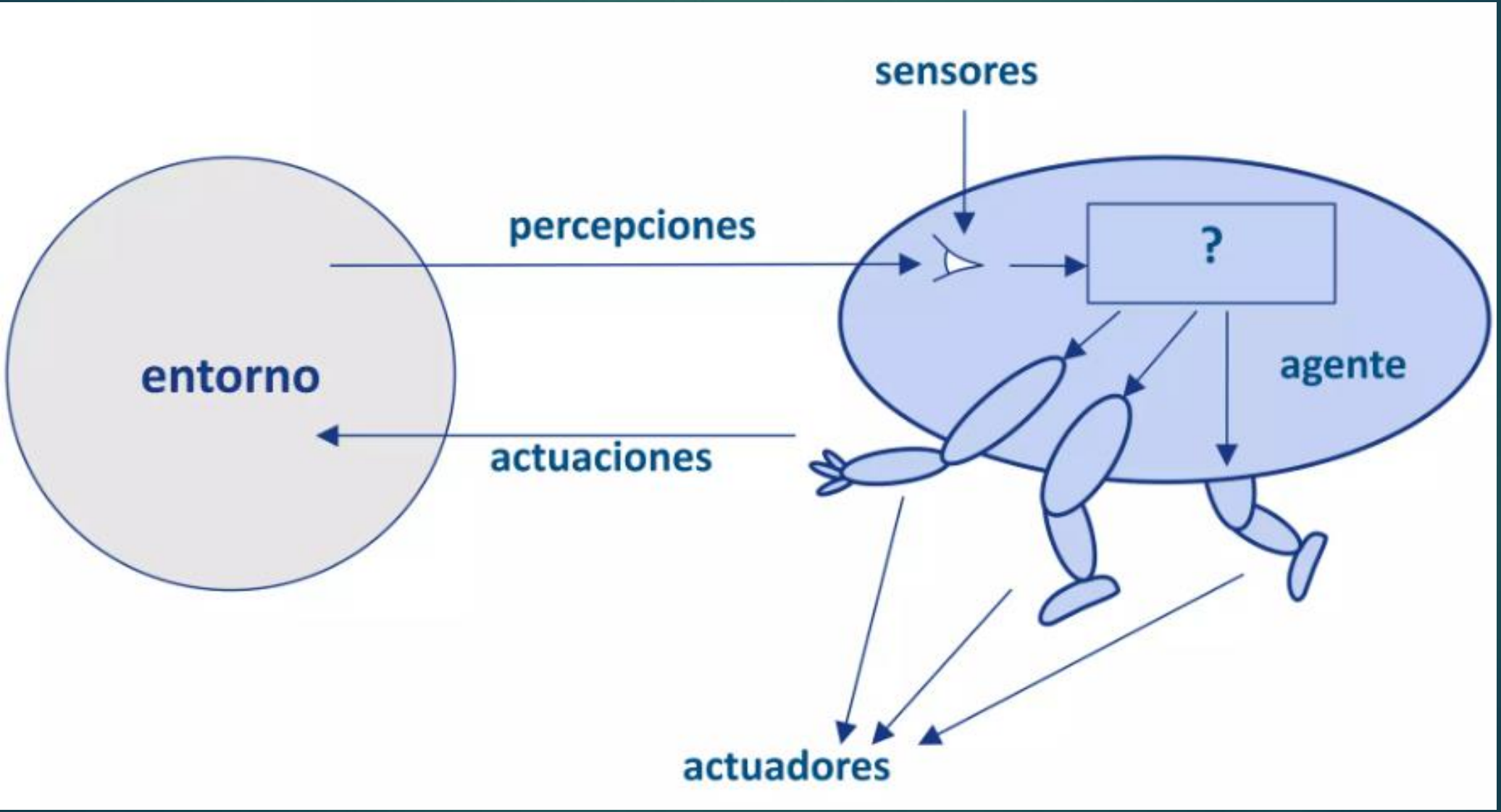
# PEAS


sensores
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# PEAS: description

- PEAS, which stands for Performance measure, Environment, Actuators, and Sensors, is a framework used in the field of artificial intelligence and intelligent agents to describe the key components and characteristics of an intelligent agent. It was introduced by Stuart Russell and Peter Norvig in their influential textbook "Artificial Intelligence: A Modern Approach."
- Here's a breakdown of what each component of PEAS represents in the context of intelligent agents:
  - Performance measure
  - Environment
  - Actuators
  - Sensors

# PEAS: description

- **Performance Measure (P):** This component defines the criteria or metrics by which the success or effectiveness of an intelligent agent is evaluated. It specifies what the agent is trying to achieve or optimize in its environment. The performance measure provides a clear objective that guides the agent's decision-making process.
- **Environment (E):** The environment represents the external context or surroundings in which the intelligent agent operates. It encompasses everything that the agent interacts with or perceives, including physical objects, other agents, data, and any other relevant factors. The environment is typically dynamic and can change over time.

# PEAS: description

- **Actuators (A):** Actuators are the mechanisms or devices through which the intelligent agent can take actions or exert control on the environment. These can be physical actuators like motors in a robot, software commands in a computer program, or any other means by which the agent can affect its surroundings.
- **Sensors (S):** Sensors are the means by which the intelligent agent perceives and gathers information about its environment. These can be physical sensors like cameras, microphones, or touch sensors in a robot, or software components that process and interpret data from various sources. Sensors provide the agent with the necessary input to make informed decisions.

# PEAS: description

- In summary, PEAS provides a high-level framework for understanding and analyzing intelligent agents. It helps in defining the goals and objectives of an agent (performance measure), understanding the context in which it operates (environment), specifying how it interacts with the environment (actuators), and how it perceives the environment (sensors).
- This framework is valuable for designing, analyzing, and comparing different types of intelligent agents across various domains and applications.

# PEAS: an example

- Let's consider an example of PEAS in the context of a self-driving car.
- In this example, the self-driving car's performance measure is to navigate its environment safely, efficiently, and comfortably for passengers. It uses actuators like steering and pedals to control its movements and sensors like LiDAR (Light detection and ranging) and cameras to perceive the road and surroundings. The environment consists of various elements, such as road conditions, traffic, and weather, which the car needs to navigate. The combination of these components forms the PEAS framework for a self-driving car agent. The agent's objective is to make driving decisions that optimize the specified performance measures while taking into account the information provided by its sensors and interacting with its environment through actuators.

# PEAS: an example

- **Performance Measure (P):** The performance measure for a self-driving car could be a combination of factors, including safety, efficiency, and passenger comfort. Specifically, it might involve metrics like:
  - Safety: The number of accidents or collisions per mile driven should be minimized.
  - Efficiency: The car should reach its destination as quickly as possible while obeying traffic rules and minimizing fuel consumption.
  - Passenger Comfort: The ride should be smooth, with minimal jerks and sudden stops.

# PEAS: an example

- **Environment (E):** The environment for a self-driving car includes everything in its surroundings, such as:
- Roadways: Including lanes, intersections, and various road conditions.
- Other Vehicles: Cars, trucks, bicycles, pedestrians, and other objects that share the road.
- Traffic Signals and Signs: Stop signs, traffic lights, yield signs, etc.
- Weather Conditions: Rain, snow, fog, and other weather factors that can affect driving conditions.
- Passengers: The presence of passengers and their preferences.

# PEAS: an example

- **Actuators (A):** The actuators in a self-driving car include:
- Steering Mechanism: To control the car's direction.
- Accelerator and Brake Pedals: To control speed.
- Turn Signals and Lights: To communicate with other drivers.
- Horn: For warning or communication.
- Emergency Braking System: To respond to sudden obstacles.

# PEAS: an example

- **Sensors (S):** Sensors in a self-driving car are crucial for perceiving the environment and making informed decisions. These sensors can include:
- LiDAR (Light Detection and Ranging): To detect nearby objects and their distances.
- Cameras: For visual recognition of road signs, lane markings, and other vehicles.
- Radar: To sense the speed and location of objects.
- GPS (Global Positioning System): For navigation and positioning.
- Inertial Measurement Units (IMUs): To measure acceleration and orientation.

# PEAS: a second example

- Let's consider an example of PEAS in the context of ambient intelligence for a smart home system.
- In this example, the ambient intelligence system's performance measure is to enhance the convenience, energy efficiency, and security of the smart home. It uses actuators like lighting control, HVAC systems, and smart locks to interact with the environment and provide desired outcomes. Sensors, including motion detectors, cameras, and temperature sensors, collect data about the home and its occupants. The environment consists of the physical space, occupants, and various sensors and devices that make up the smart home ecosystem. The intelligent agent in this context aims to optimize the specified performance measures by making decisions based on the information provided by sensors and taking actions through actuators to create a more comfortable, energy-efficient, and secure living environment.

# PEAS: a second example

- **Performance Measure (P):** The performance measure for an ambient intelligence system in a smart home could revolve around the convenience, energy efficiency, and security of the living environment. Specific metrics might include:
  - Convenience: The system should automate tasks to make daily life more convenient for residents, such as adjusting lighting and temperature based on preferences.
  - Energy Efficiency: The system should optimize energy consumption by controlling heating, cooling, and lighting to minimize waste.
  - Security: Ensuring the safety and security of the home, such as monitoring for intrusions or emergencies and alerting residents as needed.

# PEAS: a second example

- **Environment (E):** The environment in the context of ambient intelligence within a smart home encompasses:
- Physical Space: The rooms, appliances, and devices within the home.
- Occupants: The people residing in the home and their preferences and activities.
- Sensors: Motion detectors, temperature sensors, security cameras, and other sensors deployed throughout the home.
- Appliances and Devices: Smart thermostats, lighting systems, locks, and other controllable devices.

# PEAS: a second example

- **Actuators (A):** The actuators for this ambient intelligence system include:
- Smart Lighting: To control the brightness and color of lights in different rooms.
- HVAC System: To adjust temperature and ventilation.
- Smart Locks: To secure and grant access to the home.
- Alarms and Notifications: To alert residents of security breaches or system updates.

# PEAS: a second example

- **Sensors (S):** Sensors play a crucial role in ambient intelligence by providing data about the environment and the residents. These can include:
- Motion Sensors: To detect occupancy and movement patterns.
- Temperature and Humidity Sensors: To monitor climate conditions.
- Cameras: For surveillance and facial recognition.
- Voice and Audio Sensors: To recognize voice commands or unusual sounds.
- Environmental Sensors: To detect factors like air quality and light levels.