Intelligent Agents

AGENT

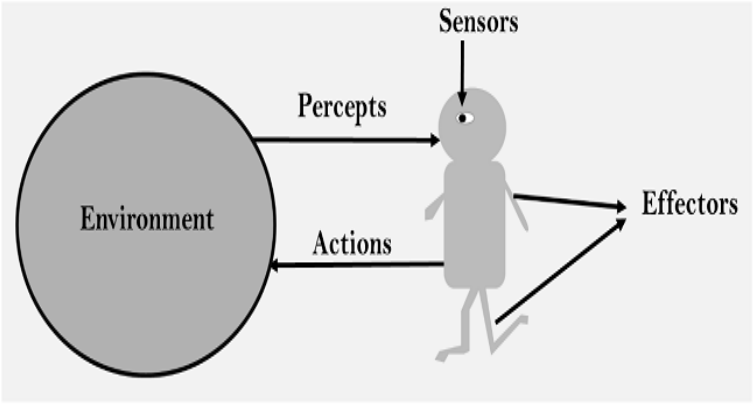
Anything that perceive its environment through its sensors & act upon that environment through actuators.

It act in cycle of:

Perceiving-Thinking-Acting

An agent can be:

- **Human-Agent**
- **Robotic Agent**
- **Software Agent**



Intelligent Agents:

A self-directed entity which acts upon its environment using sensors and actuators to achieve certain goal. It can learn from its environment.

Example: Thermostat

Following are some rules for an intelligent agent:

- **R1:** Ability to perceive the environment
- **R2:** Observation
- **R3:** Decision
- **R4:** Rational action.

Types of AI Agents

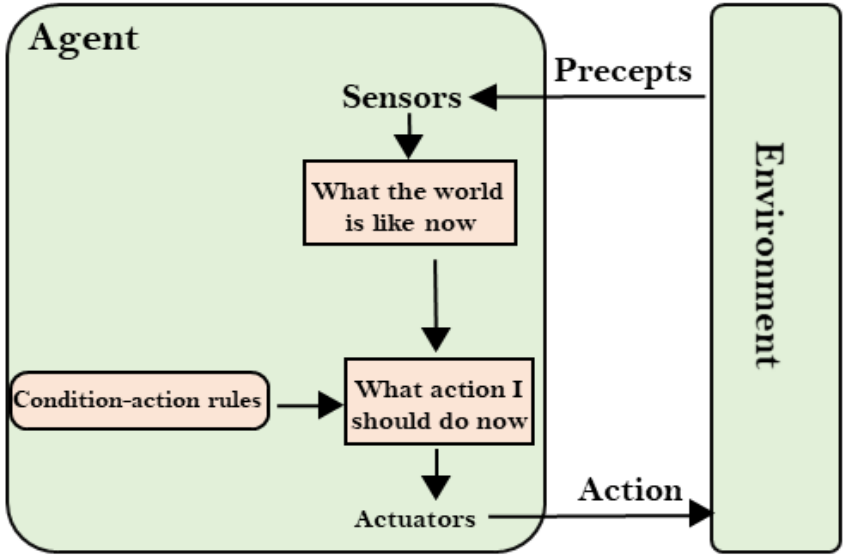
Based on degree of perceived intelligence and capability:

- Simple Reflex Agent
- Model-based reflex agent
- Goal-based agents
- Utility-based agent
- Learning agent

Simple Reflex Agent

- It works on Condition-action rule that means it maps the current state to action.

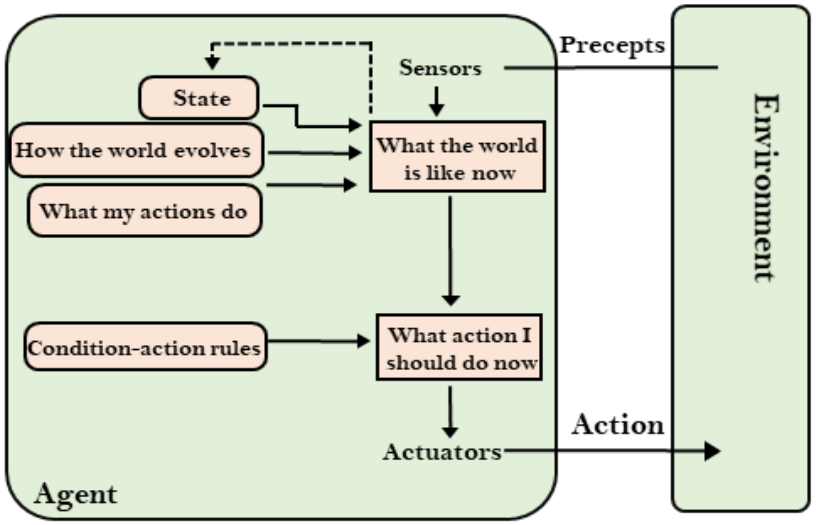
Example:- Room-Cleaner agent



Model-based Reflex Agent

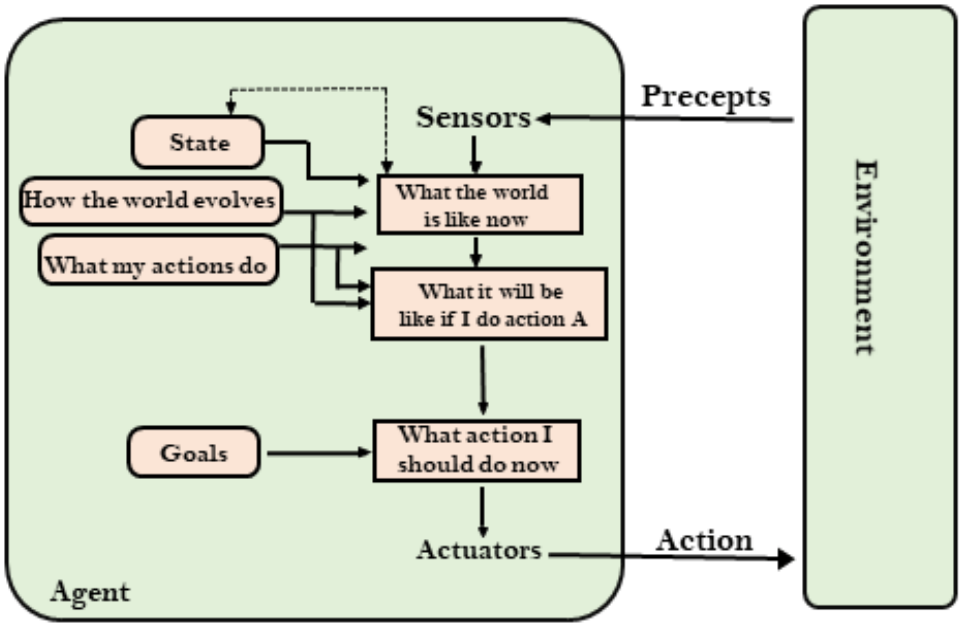
- It can work in a partially observable environment and track the situation.
- Factors:
  - **Model:** It is knowledge about "how things happen in the world,"
  - **Internal State:** Representation of the current state based on percept history.

"How the world evolves" information is used to update the agent state.



Goal Based Agents

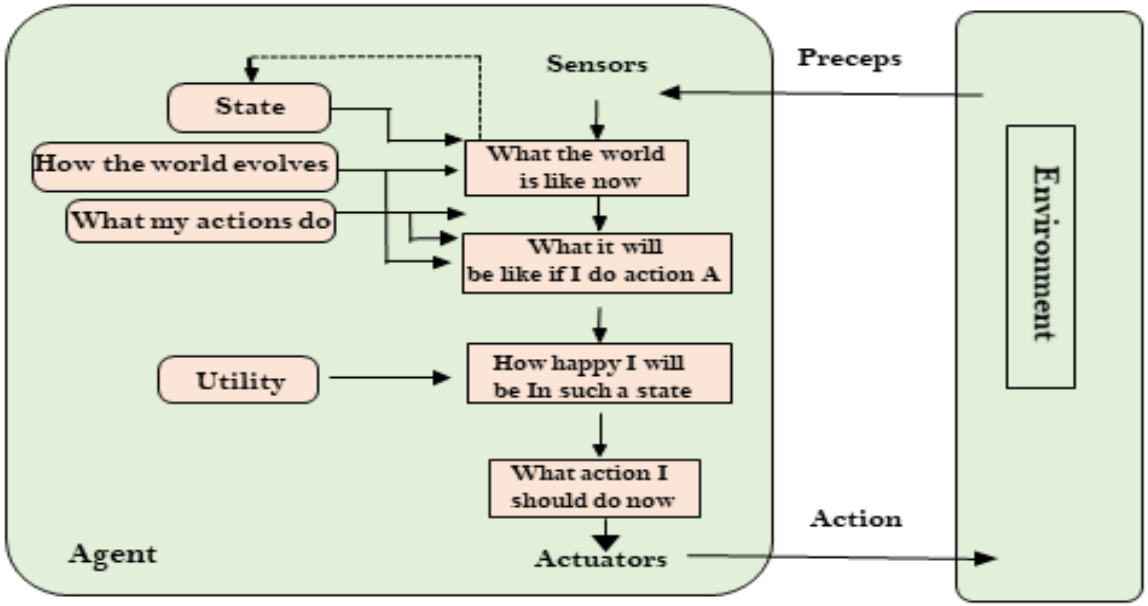
- It expand the capabilities of the model-based agent with additional information about the "goal".
- They choose an action, so that they can achieve the goal.



Utility Based Agents

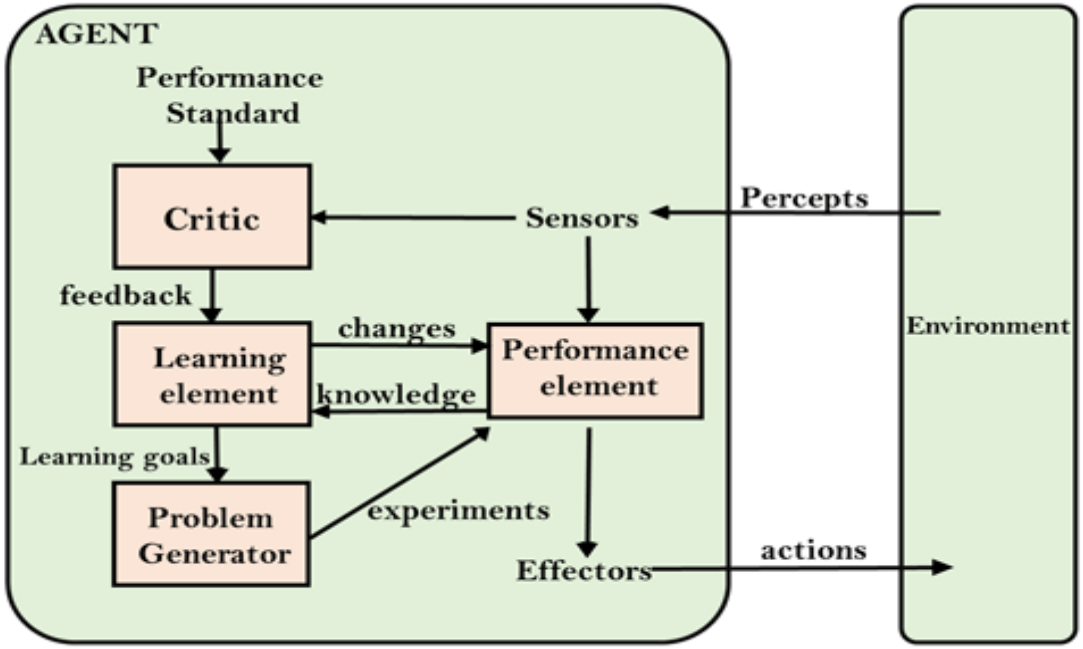
Goal-based agent + Utility measurement capability

- This Utility measurement capabilities provide best way to achieve the goal.
- Useful when there are multiple possible alternatives in order to find the goal.



Learning Agents

- It has four conceptual components, which are:
  - **Learning element**
  - **Critic:** It provide feedback to Learning element
  - **Performance element:** Responsible for selecting external action
  - **Problem generator:** Responsible for suggesting actions



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References:

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