

# [Artificial intelligence: a modern approach chapter 2 intelligent agents](https://assignbuster.com/artificial-intelligence-a-modern-approach-chapter-2-intelligent-agents/)

AgentAnything that can be view as perceiving its environment through sensors and acting upon that environment through actuators.

PerceptAn agent's perceptual inputs at any given instant

Percept SequenceThe complete history of everything the agent has ever perceived.

Agent FunctionA mapping of a given percept sequence to an action.

Agent ProgramThe internal implementation of an agent's agent function.

Performance MeasureThe evaluation of the desirability of any given sequence of environment states.

RationalityThe 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.

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.

Information gatheringDoing actions in order to modify future percepts.

LearningAs the agent gains experience, its initial configuration could be modified or augmented

AutonomyThe ability to learn how to compensate for partial or incorrect prior knowledge

Task environmentsThe problems to which rational agents are the solution. PEAS (Performance Measures, Environment, Actuators, Sensors).

EnvironmentThe external forces or actors acting on, changing, or causing a problem.

ActuatorsControl of actions, production of results

SensorsReceiving input from all sources necessary to solve the problem.

ObservableIf an agent's sensors give it access to the complete state of the environment as each point in time, then we say that the task environment is fully observable. (Fully/Partially)

Single/Multi-agentNumber of agents in an environment as well as the manner in which they interact (competitive, cooperative).

Stochastic/DeterministicIf the next state of the environment is completely determined by the current state and the action executed by the agent, then is is deterministic.

Non-deterministicAn environment in which actions are characterized by their possible outcomes, but no probabilities are attached to them.

UncertainA partially observable or stochastic environment.

Episodic/SequentialExperience can be divided into atomic episodes. In each episode the agent receives a percept and performs an action. The next episode does not depend on the previous one.

Static/DynamicIf the environment can change while the agent is deliberating then it is dynamic.

SemidynamicThe environment does not change but an agent's performance does.

Discrete/ContinuousIf an agent's action and percepts and the state can have an infinite number of values at any given time then the environment is continuous.

Known/unknownIn a known environment, the outcomes for all actions are given.

Simple reflex agentSelects actions on the basis of the current percpt, ignoring the rest of the percept history.

Model-based reflex agentsAn agent that keeps track of unobservable aspects of the current state using the percpet to develop a model.

Goa-based agentAn agent that combines a world model with a goal that describes desirable states to make decisions.

UtilityThe measure of desirability

Utility FunctionAn internalization of an agent's performance measure

Expected UtilityThe expected value of an action's outcome in a partially unobservable or stochastic environment.

Learning AgentAn agent that can compensate for partial or incorrect knowledge.

Learning ElementResponsible for making improvements

Performance ElementResponsible for selecting external actions, it takes in percpets and decides on actions.

CriticResponsible for determining the how the agent is doing and modifying the performance element.

Problem GeneratorIt is responsible for suggesting actions that will lead to new and informative experiences.

Atomic representationEach state of the world is indivisible, it has no internal structure.

Factored representationSplits up each state into a fixed set of variable or attributes, each of which can have a value.

Structured representationeach state consists of objects which may have attributes of the their own and relationships to other objects

ExpressivenessComplexity of learning and reasoning increases with expressiveness. The Conciseness of states increases with expressiveness. More expressive languages can capture at least as much information as less expressive ones but more concisely and complexly.

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