

Problem 2.1 Explain the difference between agent function and agent program. How many agent programs can there be for a given agent function?

Answer:

An **agent** can perceive its environment through sensors and act upon that environment through actuators. However, the agent's perceptual inputs at any given instant are known as **percept**, whereas the complete history of everything the agent has ever perceived is called the agent's **percept sequence**. To understand the whole scenario of an agent, we need to know about the agent function and agent program. The difference between the agent function and the agent program is given below,

Agent function: The agent function is an abstract mathematical description that maps any given percept sequence to an action. An agent's behavior is described by the agent function. The agent function for an artificial agent will be implemented by an agent program.

Agent program: An agent program is a concrete implementation running within some physical system. This is assumed that agent program will run on some sort of computing device with physical sensors and actuators, which is called architecture. Therefore, agent = architecture + program.

There can be more than one agent program that implements a given agent function since the agent function is the purpose, and the agent program is the code for its implementation. If the agent function has multiple options, then there must be more than one agent program. For example, given an architecture with n bits of storage, there are 2^n agent programs possible.