

Problem 2.2 Explain the commonalities of and the differences between the performance measure and the utility function.

Answer:

The performance measure is used by an external observer to determine how efficient and successful an agent is. Whereas the utility function is used by an agent itself to evaluate how desirable states or histories are.

The core commonality of performance measure and utility function is that both are used to evaluate the success of an agent. However, an agent's utility function is essentially an internalization of the performance measure. If the internal utility function and the external performance measure are in agreement, then an agent that chooses actions to maximize its utility will be rational according to the external performance measure.

The core difference between the performance measure and the utility function is that the performance measure of an agent is observed by an external observer, whereas the utility function is used by the agent itself. The utility function may not be the same as the performance measure. Furthermore, an agent may have no explicit utility function at all, whereas there is always a performance measure.