

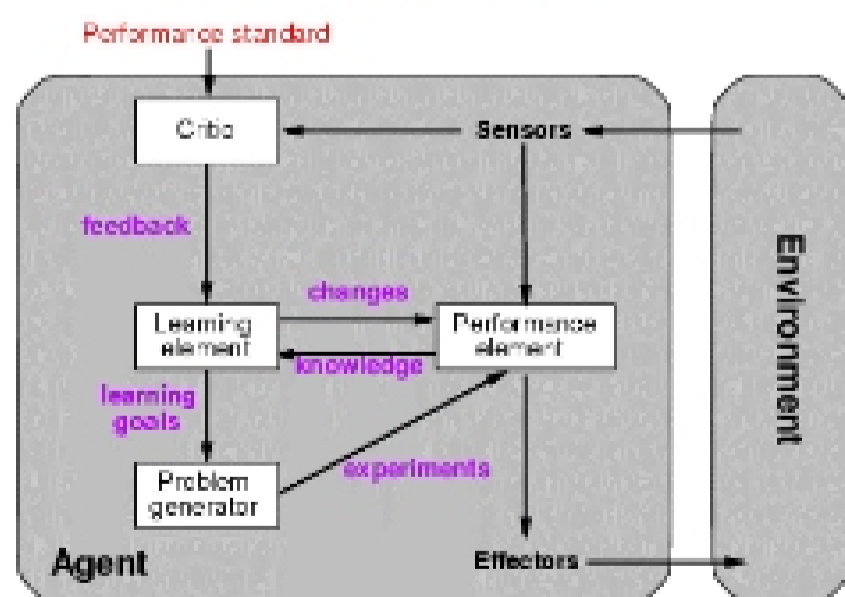
Learning from Observations

Chapter 18
Section 1 – 3

Learning

- Learning is essential for unknown environments,
 - i.e., when designer lacks omniscience
- Learning is useful as a system construction method,
 - i.e., expose the agent to reality rather than trying to write it down
- Learning modifies the agent's decision mechanisms to improve performance

Learning agents



Learning element

- Design of a learning element is affected by
 - Which components of the performance element are to be learned
 - What feedback is available to learn these components
 - What representation is used for the components
- Type of feedback:
 - Supervised learning: correct answers for each example
 - Unsupervised learning: correct answers not given
 - Reinforcement learning: occasional rewards

Inductive learning

- Simplest form: learn a function from examples

f is the target function

An example is a pair $(x, f(x))$

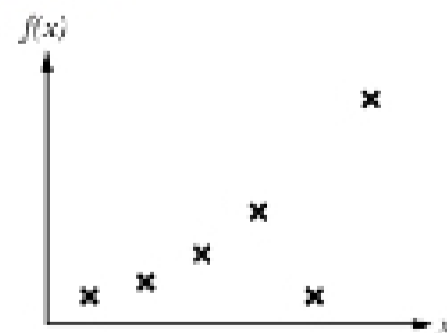
Problem: find a hypothesis h
such that $h = f$
given a training set of examples

(This is a highly simplified model of real learning:

- Ignores prior knowledge
- Assumes a deterministic, observable "environment"
- Assumes examples are given)

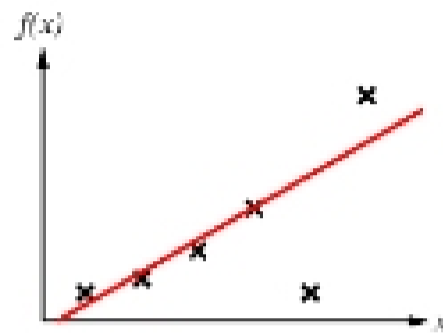
Inductive learning method

- Construct/adjust h to agree with f on training set
- (h is consistent if it agrees with f on all examples)
- E.g., curve fitting:



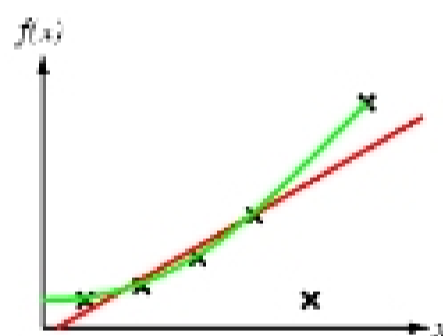
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