LEARNING

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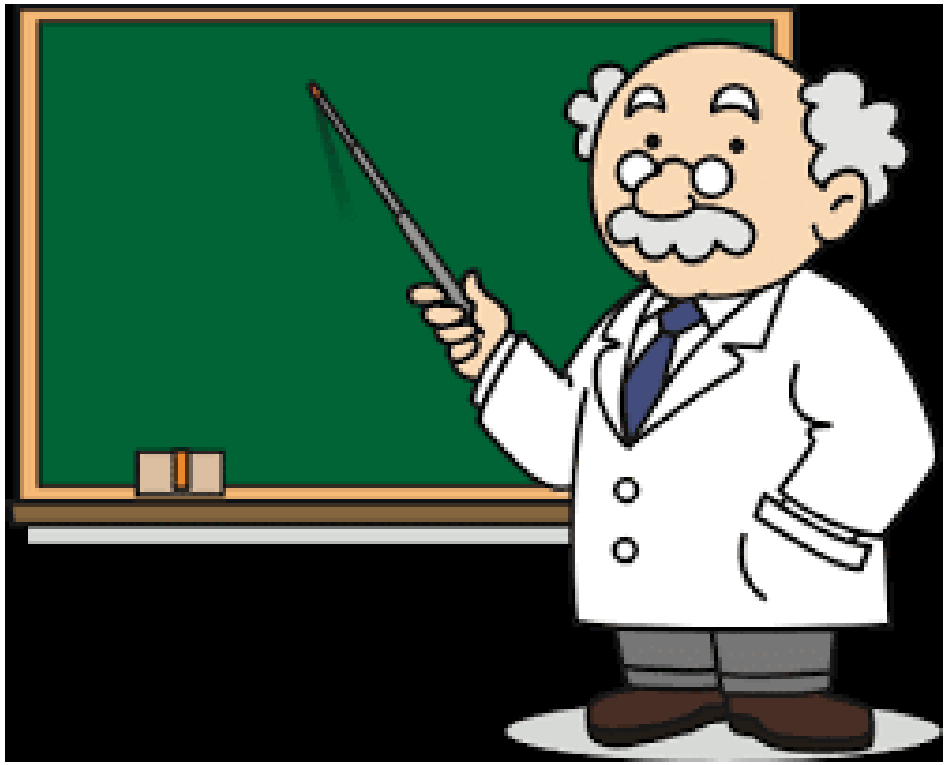
INTRODUCTION

- Learning is the improvement of performance with experience over time.
- Learning element is the portion of a learning AI system that decides how to modify the performance element and implements those modifications.
- We all learn new knowledge through different methods,
- (i) depending on the type of material to be learned,
- (ii) the amount of relevant knowledge we already possess, and
- (iii) the environment in which the learning takes place.

METHODS OF LEARNING

- There are five methods of learning . They are,
- 1. Memorization (rote learning)
- 2. Direct instruction (by being told)
- 3. Analogy
- 4. Induction
- 5. Deduction



LEARNING BY MEMORIZATIONS

- Learning by memorizations is the simplest from of learning.
- It requires the least amount of inference and is accomplished by simply copying the knowledge in the same form that it will be used directly into the knowledge base.
- Example:- Memorizing multiplication tables, formulate , etc.

DIRECT INSTRUCTION

- Direct instruction is a complex form of learning.
- This type of learning requires more inference than role learning
  - since the knowledge must be transformed into an operational form before learning when a teacher presents a number of facts directly to us in a well organized manner.

ANALOGICAL LEARNING

- Analogical learning is the process of learning a new concept or solution through the use of similar known concepts or solutions.
- We use this type of learning when solving problems on an exam where previously learned examples serve as a guide or when make frequent use of analogical learning.
- This form of learning requires still more inferring than either of the previous forms.
- Since difficult transformations must be made between the known and unknown situations.

LEARNING BY INDUCTION

- Learning by induction is also one that is used frequently by humans .
- It is a powerful form of learning like analogical learning which also requires more inferring than the first two methods.
- This learning requires the use of inductive inference, a form of invalid but useful inference.
- We use inductive learning of instances of examples of the concept.
- For example, we learn the concepts of color or sweet taste after experiencing the sensations associated with several examples of colored objects or sweet foods.

DEDUCTIVE LEARNING

- Deductive learning is accomplished through a sequence of deductive inference steps using known facts.
- From the known facts, new facts or relationships are logically derived.
- Deductive learning usually requires more inference than the other methods.
- The inference method used is, of course , a deductive type, which is a valid from of inference.

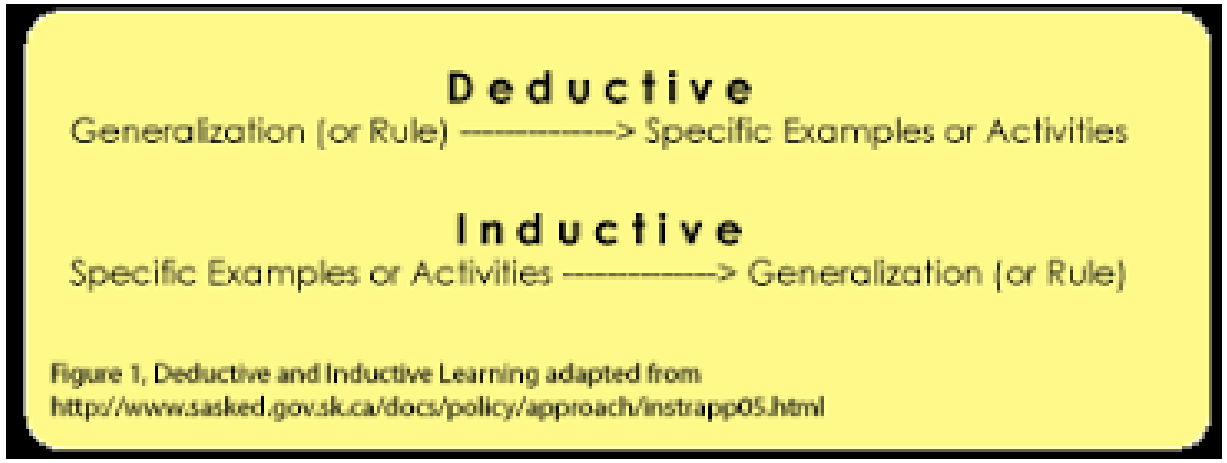


Figure 1, Deductive and Inductive Learning adapted from http://www.sasked.gov.sk.ca/docs/policy/approach/instrappp05.html

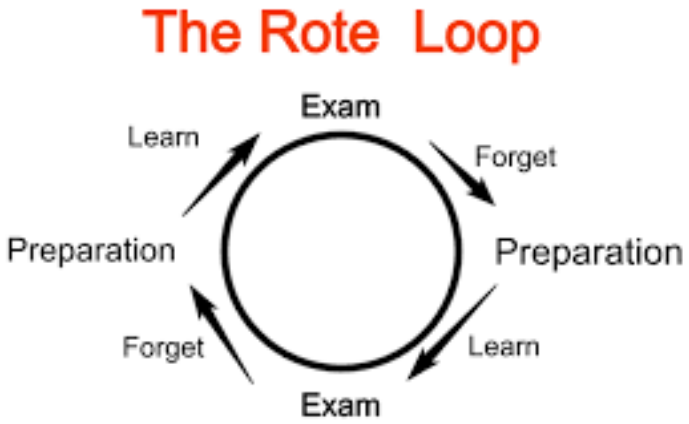
ADDITIONAL TYPES OF LEARNING

- In addition to the above classification, we will sometimes refer to learning methods as
- Weak methods
- knowledge-rich methods

- Weak methods are general purpose methods in which little or no initial knowledge is available.
- These methods are more mechanical than the classical AI knowledge – rich methods.
- They often rely on a form of heuristics search in the learning process.

ROTE LEARNING

- Rote learning is the basic learning activity.
- **Rote learning** is a memorization technique based on repetition.
- It is also called memorization because the knowledge, without any modification is, simply copied into the knowledge base.
- As computed values are stored, this technique can save a significant amount of time.



- Rote learning technique can also be used in complex learning systems provided:
- sophisticated techniques are employed to use the stored values faster and
- there is a generalization to keep the number of stored information down to a manageable level.

- Example: Checkers-playing program

- The idea is that one will be able to quickly recall the meaning of the material the more one repeats it.
- Some of the alternatives to rote learning include
- meaningful learning,
- Associative learning, and
- active learning.

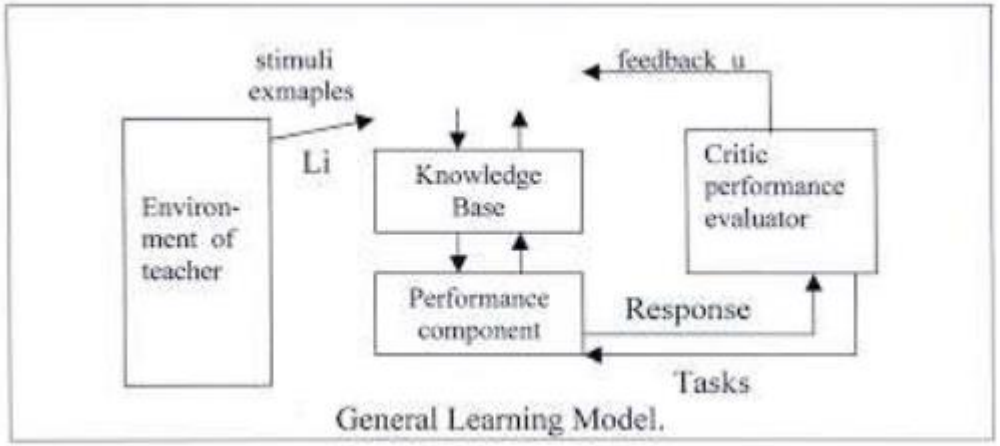
- Example, uses this technique to learn the board positions it evaluates in its look-ahead search.

LEARNING BY TAKING ADVICE

- This is a simple form of learning.
- Suppose a programmer writes a set of instructions to instruct the computer what to do, the programmer is a teacher and the computer is a student. Once learned (i.e. programmed), the system will be in a position to do new things.
- The advice may come from many sources: human experts, internet to name a few.
- This type of learning requires more inference than rote learning.
- The knowledge must be transformed into an operational form before stored in the knowledge base.
- Moreover the reliability of the source of knowledge should be considered.
- The system should ensure that the new knowledge is conflicting with the existing knowledge.
- FOO (First Operational Operationaliser), for example, is a learning system which is used to learn the game of Hearts. It converts the advice which is in the form of principles, problems, and methods into effective executable (LISP) procedures (or knowledge). Now this knowledge is ready to use.`

GENERAL LEARNING MODEL

- As noted earlier, learning can be accomplished using a number of different methods, such as by memorization facts, by being told, or by studying examples like problem solution.
- Learning requires that new knowledge structures be created from some form of input stimulus.
- This new knowledge must then be assimilated into a knowledge base and be tested in some way for its utility.
- Testing means that the knowledge should be used in performance of some task from which meaningful feedback can be obtained, where the feedback provides some measure of the accuracy and usefulness of the newly acquired knowledge



General Learning Model.


Thank You!
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