

Lecture 10: Problem Set 9 (Due Friday May 5)

Reading: Emotion Machine, Chapter 8

Problem 1

In order to find meaningful answers you must first be able to formulate good questions. List ten questions you would like to answer about Chapter 8.

Problem 2

Credit-assignment processes decide what is important to learn or remember. Allan Newell, quoted on page 273, describes how the success or failure of a method by itself is not enough information for quick learning to occur. Instead, each small step within the a larger context of methods must be considered in learning. Minsky goes on to describe how credit must be assigned to each of the different levels of goals and methods depending on what methods were responsible for the success or failure in the current context. If reflective-level critics can detect complex arrangements of failure or success states, there can deploy very specific techniques to maximize what is learned from a single problem-solving experience.

- a) Consider a problem solving situation in which you have a small set of knowledge representations and a collection of successful If-Do reactions. Describe a simple problem domain for these successful If-Do reactions.
- b) Describe in detail the If condition and the Do action of four of these If-Do reaction rules.
- c) Describe a slightly novel learning situation in which one of these If-Do reaction rules now fails. Explain what changes or additions should be made to your rules in order to remember this failure and react accordingly in the future.
- d) Classify the type of failure (See Singh 2003 [1] for ideas) and describe how a credit assignment process could detect and fix this error.

[1] <http://web.media.mit.edu/~push/ReflectiveCritics.html>

(Extra-Credit)

Describe a scheme of how success could turn interpreted rules into 'compiled rules'.

Problem 3

Using multiple representations that have panalogies for quickly switching from one representation to another is a very adaptable technique for solving problems. A panalogy can be used to quickly translate the problem into another mental realm when one way of thinking gets stuck. Problem solving can then make further progress in this new mental realm's way of thinking.

- a) Stories, Scripts, Semantic Networks, Trans-Frames, K-Lines, and Micronemes are a few specific examples of representations that

could be used in different ways of thinking. Associate each representation with a few types of problems those structures make problems easy to solve. (Hint: The power of a representation does not only come from *what* it can possibly represent, but how easily it can be used to solve problems and how the representation can be constructed by another processes involved with learning and refining representations.)

- b) Describe a problem solving situation where using one of these representations might get stuck at finding a solution.
- c) Explain how using a panalogy can translate a stuck problem state into a different realm's way of thinking that allows the stuck way of thinking to successfully make further progress toward a solution in the second realm.
- d) A desk can be viewed as furniture, chair, property, a collection of wood, and so on. What parts of the EM architecture would be responsible for selecting these representations. Ground your argument in a specific problem solving example.