

Joshua Harkness

CSC 366

Prof. Graci

Reading Assignment 2

10/10/17

1. The main theme of this section involves understanding the importance of the microprocesses that take place in our thought. While many cognitive theorists believe nothing under the 100 milliseconds brain response, the time it takes for recognition, is important for computing, Hofstadter argues those processes are the foundation to an artificial cognition. Hofstadter believes Jumbo is the first project to target this ambitious goal.
2. The goal of Jumbo and other AI projects is to establish a human-like artificial intelligence. What's meant by this is that we should not ignore all the smaller processes that occur to derive conclusions. While we may be able to find other solutions that work faster, the only way to mimic actual intelligence would be to implement microprocesses that function similar to the human brain.
3. Herb Simon is one of the core members who argues against Hofstadter's viewpoint of what AI should be. Simon believes everything that occurs under 100 milliseconds in the brain is not of importance for depicting intelligence. As long as the AI can mimic the same result, it does not matter if the processes underneath function similar to the human brain. Simon believes the importance of neurons in the brain is the same as the electrons that flow between the diodes. This belief establishes more of a machine thought towards the brain than the biological side.
4. Hofstadter believes deep perception is the core mystery of all intelligence. He believes there is a significant difference between vision or hearing and the actual understanding of what is being seen.
5. Jumbo's concrete purpose is to imitate the human brain when attempting to solve a newspaper anagram game called Jumble. The program should attempt to construct English like words out of the given letters.
6. Hofstadter's reference of Jumbo as a building program suggests that Jumbo does not use brute force to solve its puzzles. Instead, Jumbo attempts to "build" words together using relationships between consonants and vowels, syllables out of clusters, and words out of those syllables. In each phase, Jumbo is creating different types of gloms.
7. The serious purpose of Jumbo is to be a model of the mental processes of assembly and transformation the human brain uses. It is not to become an expert at unjumbling words, but

able to unjumble them the way an average person would. The hope is this abstract notion will lead to solutions in more complex domains.

8. The significance of Jumbo's task domain is that it exemplifies a facet of human intelligence. Jumbo replicates humans' ability to juggle many little pieces and combine them into larger pieces until a more meaningful thought is created.
9. The back-and-forth involvement in perception refers to how the mind often does not create the correct answer immediately. Instead, it will construct a possible solution, realize it's incorrect, then deconstruct that result into another possible solution.
10. a. The biological analogy refers to the strength of bonds between letters in a jumble. The letters in the puzzle alone only represent the smallest structure, or the atoms. Typical groupings of letters, including "th", represent commonly formed molecules in the natural world. As the letters continue to combine, their bindings become much weaker, similar to the way molecular bonds weaken with the more molecules combined. Once the brain processes all the letters at once, if a word is not created, it first removes the weakest bonds between letters before completely restarting. This is similar to how in nature, when molecular bonds are broken, the atoms rarely completely separate. Instead, they break into smaller molecules.

b. The sociological analogy functions in a similar way. Humans are the atomic variables in this case. With each interaction between different people, bonds of variant strength are created. Occasionally, people will get along and form strong bonds as friends, where other times the people interacting are just not meant to have any type of relationship. The different strengths in bonds can also be seen in letter grouping, where "qu" could be the closest thing to marriage, but "lx" will rarely be seen together, if at all. Also, some letters may appear to have a strong relationship, but later in the solving process, it's discovered they aren't the proper fit. This could be seen as a romantic relationship between people.
11. Jumbo's parallelism functions similar to a cell, where different processes occur at the same time in different sections. Some of the processes must wait until its information is needed in another process, similar to how some cells have activity sites where enzymes wonder until they find somewhere they fit.
12. A spark refers to the affinity between two letters. When placed next to each other, the letters s and h in that order have a high affinity, or chance to "spark". In the opposite order, the affinity level decreases, resulting in a less possible spark between the letters. The affinity decreases due to the likelihood of the two letters being seen together.