CSC416 Foundations of Artificial Intelligence
Beyond AI Study/Discussion Guide

Chapter Title: Beyond Human Ken?

Top Ten Salient Sentence Blocks

1. "Thus, we have a question that is crucial to our investigation: Is there a level of capability at which a program is truly autogenous and can improve itself without limit?" (p. 120)
2. "Any program that can be run on any other computer—past, present, or theoretically possible—can be run on our universal computer by means of a program, called an interpreter, that simulates the other computer. It just may take longer." (p. 120)
3. "However, chimpanzees will never create even a chimp-level AI, no matter how long they work on it." (p. 122)
4. "No known example of actual intelligence has the proposed universality; therefore it is incumbent on its proponents to show how it might actually work, and no one has done so." (p. 122)
5. "Its [automatic programming] only strong remnant, genetic programming, exhibits exactly the same search-limited ceiling on complexity that haunted AM and EURISKO." (p. 123)
6. "Suppose you're standing in the lobby of the Empire State Building and you want to go up. Having the elevator right there is like a strong inductive bias—it gets you up, fast. But once you're at the top floor, you're stuck." (p. 124)
7. "The conclusion is that any usable learning system must be of limited generality, so universal systems must be impossible." (p. 124)
8. "We observe that no existing engineered manufacturing system is capable of self-reproduction and, therefore, arguments similar to ones against universality could be made on this basis. However, biological cells are self-reproducing, acting as an existence proof for this somewhat counterintuitive capability." (p. 125-126)
9. "Evolution should have run out of steam with unicellular life as AM did with number theory. That it didn't implies there is a technique or techniques that continue to reduce the search space as complexity is created. Otherwise we wouldn't be here." (p. 127)
10. "It's clear that our built-in representation modules have strong limits: we can't visualize four-dimensional objects, for example. Yet our general learning ability can find ways for us to represent them so that we can manipulate them mentally, predict their properties, and use them to model other things. This gets easier the more we work with them." (p. 127)