Fred Morrison
CSC-366

Reading Assignment - High-level Perception, Representation, and Analogy

1.) “One of the most important properties of high-level perception is that it is extremely flexible. A given set of input data may be perceived in a number of different ways, depending on the context and the state of the perceiver.” (171)
2.) “*Perception may be influenced by goals.* If we are trying to hike on a trail, we are likely to perceive a fallen log as an obstacle to be avoided. If we are trying to build a fire, we may perceive the same log as useful fuel for the fire.” (171)
3.) “The formation of appropriate representations lies at the heart of human high-level cognitive abilities. It might even be said that the problem of high-level perception forms the central task facing the artificial-intelligence community: the task of understanding how to draw *meaning* out of the world.” (174)
4.) “We are deeply skeptical, however, about the feasibility of such a separation from the rest of cognition. A representation module that, given any situation, produced the single “correct” representation for it would have great difficulty emulating the flexibility that characterizes human perception.” (176)
5.) “To separate representation-building from higher-level cognitive tasks is, we believe, impossible. In order to provide the kind of flexibility that is apparent in cognition, any fully cognitive model will probably require a continual interaction between the process of representation-building and the manipulation of those representations.” (177)
6.) “It is difficult to believe that Kepler would have taken thirteen years to make his discovery if his working data had consisted entirely of a list where each entry said “Planet X: mean distance from sun y, period z”. If he had further been told “Find a polynomial equation relating these entities”, then it might have taken him a few hours” (178)
7.) “We are in broad sympathy with Getner’s notion that the mappings in an analogy should preserve high-level structure (although there is room to debate over the details of the mapping process). But when the program’s discovery of the correspondences between the two situations is a direct result of its being explicitly given the appropriate structures to work with, its victory in finding the analogy becomes somewhat hollow.” (182)
8.) “In SME, this problem of high-level perception is swept under the rug, by starting with preformed representations of the situations. The essence of the situations has been drawn out in advance in the formation of these representations, leaving only the relatively easy task of discovering the correct mapping. It is not that the

work done by SME is necessarily *wrong*: it is simply not tackling what are, in our opinion, the really difficult issues in analogy-making." (184-185)

9.) "The problem is simply that a vast oversupply of information would be available in such a representation. To determine precisely which pieces of that information were relevant would require a complex process of filtering and organizing the available data from the representation. *This process would in fact be tantamount to high-level perception all over again*. This, it would seem, would defeat the purpose of separating the perceptual processes into a specialized module." (188)

10.) "It may sometimes be tempting to regard perception as not truly "cognitive", something that can be walled off from higher processes, allowing researchers to study such processes without getting their hands dirtied by the complexity of perceptual processes. But this is almost certainly a mistake. Cognition is infused with perception. This has been recognized in psychology for decades, and in philosophy for longer, but artificial-intelligence research has been slow to pay attention." (192)