The Essence of Artificial Intelligence

Chapter 2.2: Knowledge Representation and Inference (Semantic Networks and Frames)

Top Ten Salient Sentences

1. Semantic networks and frames provide a simple and intuitive way of representing facts about objects. Both schemes allow you to represent classes (or categories of objects and relations between objects, and draw simple inferences based on this knowledge).

2. Semantic networks were originally developed in the early 1960s to represent the meaning of English words. They have since been used more widely for representing knowledge.

3. In a semantic network knowledge is represented as a graph, where the nodes in the graph represent concepts, and the links represent relations between concepts.

4. The most important relations between concepts are subclass relations between classes, and instance relations between particular object instances and their parent classes. (. . .). Semantic networks normally allow efficient inheritance-based interfaces using special purpose algorithms.

5. It is now recognized that it is important to state, as precisely as possible, the semantics of a representation language, so we know exactly what expressions mean and which inferences are sound.

6. One simple way to describe precisely the meaning of nodes and links in a semantic network is in terms of set theory. We interpret a class node as denoting a set of objects. (. . .). So the instance relationship can be defined in terms of set membership … while the subclass relation can be defined in terms of a subset relation.

7. Semantic networks allow us to represent knowledge about objects and relations between objects in a simple and fairly intuitive way. The conventional graphical notation allows us to quickly see how the knowledge is organized.

8. Frames are a variant of semantic networks, and a popular way to represent facts in an expert system. All the information relevant to a particular concept is stored in a single complex entity (called a frame).

9. Some of the terminology and ideas used for frame systems has since been adopted for object oriented programming, which also deals with classes and inheritance.

10. It is straightforward to translate between semantic networks and frame bases representations. Nodes in the semantic network become objects in the frame system, links become slots, and the node the other end of the link becomes a slot value.