6.871 SPRING 2006 READING LIST: Installment #2

Lecture 10: Knowledge Representation Overview

- Hayes P, The logic of frames, in *Readings in Knowledge Representation*, , pp. 287-296.
- Shubert L, Semantic nets are in the eye of the beholder, in *Principles of Semantic Networks*, pp. 95-107.
  We claim that both of these papers miss something important about knowledge representation. They both claim to be critiques of a representation mechanism and both take a kind of reductionist view, claiming that when examined closely, the representation has less than meets the eye. Both use logic as a kind of testing ground; the Shubert paper has a slightly less narrow field of view. See if you can tell what parts of their critique meet the issues, and which miss.
- Davis R, Shrobe H, Szolovits P, What is a Knowledge Representation? *AI Magazine*, **14**, #1, Spring 1993, pp. 17--33.
  The basic argument here is that a knowledge representation performs five important roles and that ignoring any one of them is a bad idea. What are the five roles and how well do they fit with any representation you have in mind?

Lecture 11: Pragmatic Issues in Knowledge Acquisition

Cooke, N.J, Varieties of Knowledge Elicitation Techniques, *Int. J. Human-Computer Studies*, 41:801-849, 1994.

Lecture 12: Uncertain Reasoning

- Szolovits P, Uncertainty and Decisions in medical informatics, *Methods of Information in Medicine*}, vol 34, 1995, 111-121.
  Read this survey to get a sense of the primary issues addressed and progress made in uncertain reasoning.
- Heckerman D and Wellman M, Bayesian networks, in *CACM*, March 1995, pp.27--30.
  Read this short article to get a good, quick tutorial on Bayesian nets, one of the more successful and important tools for uncertain reasons.
- Wellman M., et al., From knowledge bases to decision models, *Knowledge Engineering Review*, vol. 7, no. 1, 1992, pp. 35-53.
  Examine the idea of knowledge-based model construction described in this paper, and consider not only its application to decision-theoretic models, but also its applicability to constructing models using other types of representations.
- Dubois D, and Prade H, What does fuzzy logic bring to AI?, *ACM Computing Surveys*, vol 27, no. 3, Sept 1995, pp. 328-330.
  Read this to get a sense of the rationale behind work in fuzzy logic, and what its proponents believe it has to contribute.
- Elkan C, The paradoxical success of fuzzy logic, *Proc AAAI*, 1993, pp.986--703, and
  Reply to Comments on The paradoxical success of fuzzy logic, *IEEE Expert*,

August 1994.
Read this for an eye-opening analysis of the foundations of fuzzy logic that brings into sharp relief the question: what does fuzzy logic actually do? Is it a reasonable model of uncertainty? Do programs based on it work because of it, or despite it? This is an excellent example of some hard-headed thinking that is done too rarely; Elkan asks the probing and important question about these programs, asking *why* do they work, not just *whether* they do.

Lecture 13: Blackboards

- Corkill, D., Blackboard Systems, *AI Expert*, vol 6, no. 9, September 1991, pp. 40--47.
- Erman, L. D., Hayes-Roth, F., Lesser, V.R. and Reddy, D.R,, The Hearsay-II Speech-Understanding System: Integrating Knowledge to Resolve Uncertainty, *Computing Surveys*, 12(2):213-253, June 1980.
  (Also appears in *Blackboard Systems*, R.S. Engelmore and A.M., editors, pp. 503-518.)
- Nii, H.P., The Blackboard Model of Problem Solving and the Evolution of Blackboard Architectures (Part One), *AI Magazine*, vol 7, no. 2, Summer 1986, pp. 38--53.
- Nii, H.P., Blackboard Application Systems and a Knowledge Engineering Perspective (Part Two), *AI Magazine*,vol 7, no. 2, Summer 1986, pp. 82--107.