Treating Expert Knowledge as Common Sense

Henry Lieberman
(with Catherine Havasi, Rob Speer, Ken Arnold, and Dustin Smith)
Media Laboratory
Massachusetts Institute of Technology
Cambridge, MA 02139 USA
{flieber, havasi, rspeer, kcarnold, dsmithg}@media.mit.edu

Abstract

Since the expert systems movement of the 1980s and 1990s, AI has had the dream of reproducing expert behavior in specialized domains of knowledge, such as medicine or engineering, by collecting knowledge from human experts. But the first generations of expert systems suffered from two problems — first, the difficulty of knowledge engineering — acquiring knowledge from experts in the form of rules. Second, brittleness — as soon as a problem diverted at all from the precision of the expert knowledge, systems failed catastrophically.

We present a new approach for creating domain-specific AI systems, based on treating specialized knowledge with a methodology originally developed for collecting, and reasoning with, Commonsense knowledge from non-expert users. Advantages of this approach include:

- Easy knowledge engineering from informants and collection from natural language sources;
- Semi-automatic construction of ontologies and knowledge bases of assertions;
- Tolerance of ambiguity, vagueness, redundancy, and contradiction;
- Joint inference between expert knowledge and general Commonsense background knowledge;
- Efficient inference, both forward and backward, of plausible assertions.

Biographical Statement

Henry Lieberman has been a Research Scientist at the MIT Media Laboratory since 1987. His interests are in the intersection of artificial intelligence and the human interface. He directs the Software Agents group, which is concerned with making intelligent software that provides assistance to users in interactive interfaces.

Many of his current projects revolve around applying Common Sense Reasoning to interactive interfaces. He is using a large knowledge base of Commonsense facts about everyday life to streamline interfaces, provide intelligent defaults, and proactive help. Application areas include predictive typing, multilingual communication, management of photo and media libraries, product recommendation and e-commerce tools.