Probabilistic logic has been discussed in a recent paper by Nilsson. An entailment scheme is proposed that can predict the probability of an event when the probabilities of certain other connected events are known. This scheme involves the use of a maximum entropy method proposed by Cheeseman. The model uses vectors that represent certain possible states of the world. Only consistent vectors are entered into the probability scheme. As a result, entailment does not always yield an acceptable result and cannot be applied to real situations that could arise.

This paper investigates a technique to overcome this problem, which involves extending the idea of probabilistic logic and the maximum entropy approach to Dempster-Shafer theory. A new entailment scheme for belief functions is used that produces well-defined results even when only "consistent" worlds are being considered.

The paper also reconsiders an earlier attempt by the author to model default reasoning (and subsequent nonmonotonicity) by adding inconsistent vectors to Nilsson's model. In the extended setting, more sensible entailment values are obtained than in the previous work.

A Knowledge Engineer's Comparison of Three Evidence Aggregation Methods

Donald H. Mitchell
Allied-Bendix, 9140 Old Annapolis Rd., Columbia, Maryland 21045
Steven A. Harp
Honeywell
David K. Simkin
Northwestern University, Evanston, Illinois

The comparisons of uncertainty calculi from the last two uncertainty workshops have all used theoretical probabilistic accuracy as the sole metric. While mathematical correctness is important, there are other factors that should be considered when developing reasoning systems. These other factors include the error in uncertainty measures obtainable for the problem and the effect of this error on the performance of the resulting system.

Towards Solving the Multiple Extension Problem: Combining Defaults and Probabilities

Eric Neufeld and David Poole
Logic Programming and Artificial Intelligence Group, Department of Computer Science, University of Waterloo, Waterloo, Ontario, Canada

The multiple extension problem frequently arises in both diagnostic and default reasoning. That is, in many settings it is possible to use any of a number of sets of instances, defaults, or hypotheses to explain (expected) observations. In some cases, we choose among explanations by making inferences about information believed to be