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An inductive logic can be formulated in which the elements are not propositions or probability distributions, but information systems. The logic is complete for information systems with binary hypotheses, that is, it applies to all such systems. It is not complete for information systems with more than two hypotheses but applies to a subset of such systems. The logic is inductive in that conclusions are more informative than premises. Inferences using the formalism have a strong justification in terms of the expected value of the derived information system.

Explanation of Probabilistic Inference for Decision Support Systems

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This paper reports work in progress on an explanation facility for Bayesian conditioning aimed at improving user acceptance of probability-based decision support systems. Design of the facility, which appears to be reasonably domain-independent, is based on an information processing model that accounts for both biased and normative behavior in reasoning about conditional evidence. Preliminary results indicate that the facility is both acceptable to naive users and effective in improving understanding of Bayesian conditioning.

Automated Generation of Connectionist Expert Systems for Problems Involving Noise and Redundancy

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When creating an expert system, the most difficult and expensive task is that of constructing a knowledge base. This is particularly true if the problem involves noisy data and redundant measurements. This paper shows how to modify the MACIE process for generating connectionist expert systems from training examples so that it can accommodate noisy and redundant data. The basic idea is to dynamically generate appropriate training examples by constructing both a "deep" model and a noise model for the underlying problem. The use of winner-take-all groups of variables is also discussed.

These techniques are illustrated with a small example that would be very difficult for standard expert system approaches.

A Measure-Free Approach to Conditioning

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