Editor's introduction to the special issue on logic modeling

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Logic modeling is directed at the application of formal and informal logic to practical problems, especially problems in management science, broadly construed. This third special issue of Decision Support Systems devoted to logic modeling \(^1\) appears at a happy time for the field. Logic modeling is established, recognized, and growing. A number of excellent texts have appeared, including Davis’s [1] and Geneserth’s and Nilsson’s [2]. A logic modeling mini-track at the Hawaii International Conference on System Sciences has flourished without interruption since 1987. It is now rather common for logic modeling Ph.D. seminars to be offered in business schools, and it can fairly be said that the logical point of view is finding increasing success in infiltrating research efforts in information systems and the decision sciences generally.

Besides finding itself institutionally successful, the field of logic modeling has continued vigorously to produce excellent research, research that is deep, rigorous, and innovative. We would point to the seven papers in this special issue as examples of such research. Since the best introductions — like the best farewells — are the shortest, we will point only briefly here.

The first paper in the issue is “EVID: A System for Interactive Defeasible Reasoning,” by Robert L. Causey. Defeasible, or nonmonotonic, reasoning has been the subject of much investigation in logic modeling and in artificial intelligence generally. The problem of modeling defeasible reasoning effectively for implementation is deep and difficult. Causey’s paper presents his procedural approach to defeasible reasoning and describes the principles behind the approach. In addition, the paper is an excellent introduction to the problem and to the second and third papers.

\(^1\) The previous two are volume 4, number 1 and volume 6, number 2.
in the special issue, which are also on defeasible reasoning. The second paper is by Sandra K. Dewitz, Young Ryu, and Ronald M. Lee and is entitled “Defeasible Reasoning in Law.” The paper applies principles of defeasible reasoning to illuminate legal reasoning and it represents a welcome trend to move beyond the standard problems so much discussed in the literature on nonmonotonic reasoning. The third paper, “Ordered Logic: Defeasible Reasoning for Multiple Agents,” by Geerts, Nute, and Vermeir, introduces a logic—which they call ordered logic—for defeasible reasoning in the presence of many experts who contribute knowledge. Ordered logic is an extension of defeasible logic, itself presented and discussed in previous special issues.

“Bayesian Logic,” by Andersen and Hooker, our fourth paper, combines probabilistic logic with Bayesian networks to produce the logic named in the paper’s title. Bayesian networks have been much studied in artificial intelligence as quantitative (nonlogical) approaches to nonmonotonic reasoning. The present paper is innovative in adding a logical point of view (and extracting useful results) to Bayesian networks. Robert Blanning is the author of our fifth paper, “A Relational Algebra for Propositional Logic,” which presents a unified framework for management of both data and propositions. Blanning applies the relational framework, developed for database management systems, to the management of logical expressions.

The sixth and seventh papers develop logic models for, respectively, text editing and hypertext systems. “Text Editing and Beyond,” by Michael Bieber and Tomás Isakowitz, is a particularly clear and elegant application of logic to what one would normally think of as an entirely procedural task. Finally, “On the Logical Generalized Hypertext,” by Michael Bieber and Steven Kimbrough, presents a logic model for certain aspects of hypertext systems and illustrates the usefulness of first-order logic as a tool for generalizing and abstracting concepts, here concepts of hypertext.

This special issue has been a long time in the making. We thank the authors and Andy Whinston for their patience. We believe that the wait has been worth the while. The work on display here amply demonstrates why this is a propitious time for logic modeling.

References
