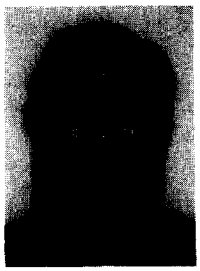
Decision Support Systems 11 (1994) 101–102
North-Holland

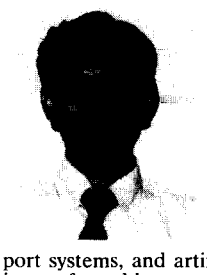
Editor's introduction to the special issue on logic modeling

Hemant K. Bhargava
Naval Postgraduate School, Monterey, CA, USA

Steven O. Kimbrough
University of Michigan, School of Business Administration, Ann Arbor, MI, USA



Steven O. Kimbrough is an Associate Professor at the Decision Sciences Department, the Wharton School, University of Pennsylvania. He is currently the Davidson Visiting Professor of Computer and Information Systems at the University of Michigan, School of Business Administration. His main research interests are in the fields of logic modeling, decision support and expert systems, rational belief revision and electronic commerce. His active research areas include: computational approaches to belief revision and nonmonotonic reasoning, formal languages for business communication, and knowledge-based decision support systems. Since 1985, he has been principal investigator for the U.S. Coast Guard's KSS (knowledge-based decision support systems) project.



Hemant K. Bhargava is an Assistant Professor of Information Systems at the Naval Postgraduate School in Monterey, CA. He received the B.S. in Mathematics degree from the University of Delhi in 1984, the MBA from the Indian Institute of Management (Bangalore) in 1986, and the Ph.D. in Decision Sciences from the University of Pennsylvania in 1990. His research interests lie in the areas of logic modeling, computer-aided mathematical modeling, decision support systems, and artificial intelligence. He is currently working on formal languages and systems for mathematical modeling, defeasible reasoning, the fleet mix planning problem, and intelligent autonomous forces for combat simulators. He is a member of the Big Sur Natural History Association.

Logic modeling is directed at the application of formal and informal logic to practial 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.

0167-9236/94/$07.00 © 1994 – Elsevier Science B.V. All rights reserved
SSDI 0167-9236(92)00015-K

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 applys 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

[1] Davis, Ernest, Representations of Commonsense, Knowledge, Morgan Kaufmann Publishers, Inc., San Mateo, California, 1990.

[2] Genesereth, Michael R., and Nils J. Nillson, Logical Foundations of Artificial Intelligence, Morgan Kaufmann Publishers, Inc., Palo Alto, California, 1988.