We dedicate our work for this volume to
Professor Toshiro Terano

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Preface

The present volume is the fourth in Springer-Verlag's Lecture Notes in Artificial Intelligence series dedicated to the subject of Fuzzy Logic in AI. Like the preceding volumes, it is designed around an IJCAI event, this time the Fuzzy Logic in AI Workshop held in conjunction with IJCAI'97, in Nagoya, Japan, in the last week of August 1997. As for the preceding volumes, the participants of the workshops have been encouraged to submit significantly enhanced and revised versions of their workshop contributions. Furthermore, we are including a few invited contributions of work not presented at the workshop, as we did in the previous volumes.

As it happens, this volume is the last one of the 90's. As this is the last decade of a century and millennium, people all over the world have felt the need to ponder about various aspects of their lives, of the state of mankind, etc. On a much smaller scale we too thought that it would be interesting to include in this volume several opinions about the relevance of fuzzy logic to AI. Thus the first three contributions, by Lotfi Zadeh, Didier Dubois and Henri Prade, and James F. Baldwin address directly the relevance of fuzzy sets and fuzzy logic to AI. Each of these contributions reflects, as expected, the rich experience that their authors have in the field. To begin with, Lotfi Zadeh, the founder of fuzzy sets theory and fuzzy logic, presents a compelling argument as to why fuzzy logic is relevant and indeed indispensable to AI. Didier Dubois and Henri Prade present a well documented and formal argument which reflects their very important contribution to the field. It should be mentioned here that by their contributions to each of the IJCAI workshops on fuzzy logic, since the first one in 1991, they have been the most loyal supporters of these events. Finally, Jim Baldwin's contribution presents the relevance of fuzzy sets, as treated in the mass assignment theory, to the concept of computing with words. It too reflects his experience accumulated over a long period of work in this field. We believe that many more longtime researchers in fuzzy logic could have contributed their wisdom to this very important question of the relevance of fuzzy sets and fuzzy logic to AI. Perhaps a future book project could indeed collect many more views on the subject.

The remaining thirteen contributions range from theoretical to applied. They encompass subjects such as knowledge representation and induction, based on ID3 (H. Narazaki and I. Shigaki), or on cartesian fuzzy granules (J. F. Baldwin, T. P. Martin, and James G. Shanahan), case-based reasoning (D. Dubois, F. Esteva, P. Garcia, L. Godo, R. López de Màntaras, and H. Prade), object-oriented logic programming with uncertainty (J. F. Baldwin, T. P. Martin, and M. Vargas-Vera), fusion of symbolic and computational processing for user interfaces (S. Tano), treatment of generalized quantifiers (A. L. Ralescu, D. A. Ralescu, and K. Hirota), neuro-fuzzy methods - an algorithm (V. Niskanen), and applications to air traffic management (L. Zerrouki, B. Bouchon-Meunier, R. Fondacci,

S. Selam), and applications to robotics (J. Zhang and A. Knoll). Several contributions concern problems in image understanding, ranging from reasoning with words about geographic information (Hans W. Guesgen), fuzzy morphology and fuzzy distances (Isabelle Bloch), possibility theory for classification of satellite images (Ludovic Roux), pattern recognition based on possibilistic c-means (L. Wendling and J. Desachy).

We hope that the present volume, in its variety, will be of use to its readers regardless of their involvement with the field of fuzzy logic. Indeed, we hope that it offers once again, a window into the fascinating and challenging world of intelligent systems built on and with fuzzy sets and fuzzy logic.

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