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Intelligent Problem Solving

Methodologies and Approaches

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Preface

The focus of the papers presented in these proceedings is on employing various methodologies and approaches for solving real-life problems. Although the mechanisms that the human brain employs to solve problems are not yet completely known, we do have good insight into the functional processing performed by the human mind. On the basis of the understanding of these natural processes, scientists in the field of applied intelligence have developed multiple types of artificial processes, and have employed them successfully in solving real-life problems. The types of approaches used to solve problems are dependant on both the nature of the problem and the expected outcome. While knowledge-based systems are useful for solving problems in well-understood domains with relatively stable environments, the approach may fail when the domain knowledge is either not very well understood or changing rapidly. The techniques of data discovery through data mining will help to alleviate some problems faced by knowledge-based approaches to solving problems in such domains.

Research and development in the area of artificial intelligence are influenced by opportunity, needs, and the availability of resources. The rapid advancement of Internet technology and the trend of increasing bandwidths provide an opportunity and a need for intelligent information processing, thus creating an excellent opportunity for agent-based computations and learning. Over 40% of the papers appearing in the conference proceedings focus on the area of machine learning and intelligent agents - clear evidence of growing interest in this area. There are still many interesting theoretical problems and applications in other areas of artificial intelligence. The proceedings cover several interesting applications, and some theoretical concerns of intelligent systems.

Although the contributions in these proceedings report methodologies and approaches in solving specific problems, we believe generalization of the processes implemented in these papers will, in the future, lead to more general problem solving techniques for intelligent systems in specific problem classes.

The papers included in these proceedings were presented at IEA/AIE-2000, the Thirteenth International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems, held June 19-22, 2000 in New Orleans, Louisiana, USA. The conference was sponsored by the International Society of Applied Intelligence, Southwest Texas State University, and the University of Louisiana at Lafayette, in cooperation with ACM/SIGART, the American Association for Artificial Intelligence, the Canadian Society for Computational Studies of Intelligence CSCSI/SCEIO, the Institution of Electrical Engineers, the International Neural Network Society, and the Japanese Society of Artificial Intelligence. Over 120 high-quality papers were submitted to this conference. After a thorough review by at least two referees per paper, the program committee selected 90 papers.

As editors of these proceedings, we are pleased to present final versions of the accepted papers, revised to incorporate referee comments. These contributions address broad topics, including agents, distributed problem solving, artificial neural networks, data mining, machine learning, diagnosis, expert systems, information systems, genetic algorithms, fuzzy logic, design, natural language processing, pattern recognition, and combinatorial optimization problems. About 19% of the papers in the proceedings address agents, their technology, and approaches to solving problems using agents. Another 22% of the papers discuss machine learning, knowledge discovery and data mining, and the application of artificial neural networks. Approximately 19% of the papers discuss diagnosis and the application of expert systems. The other major focuses of the papers are in the area of information systems and soft computing, with a total strength of close to 13%. There are about four papers in each of the remaining areas. These areas include fuzzy logic and its applications, design, logic, natural language processing, pattern recognition, and combinatorial optimization.

We would like to express our sincere gratitude to the members of the program committee, the reviewers, the session chairs, and the organizing committee. Specifically, we would like to thank Stanislav Kurkovsky for accepting the responsibility of maintaining the online paper collection site, in addition to being the local arrangements chair for the conference. We also would like to thank the graduate students, Bushrod Thomas and Ryan Benton, for cheerfully helping us to complete several laborious tasks. I would like to thank my daughter, Nisha Loganantharaj, for helping me in crosschecking the authors index and table of contents.

We would like to express our sincere thanks to all those researchers and developers who submitted papers, without whom we would not have had an intellectually stimulating conference. Finally, we would like to thank all the auxiliary reviewers who happily reviewed the papers and alleviated some of the strain on program committee members.

May 2000

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