Intelligent Systems

Foreword

Intelligent systems are systems with the general ability to cope successfully with a complex and changing environment. Regardless of how intelligent behaviour is achieved, intelligent systems are built on some common underlying principles derived from research in artificial intelligence conducted over the past four decades. These include: (1) representation and search, (2) management of uncertainty, (3) learning ability, and (4) problem solving. The most representative and important areas of research and development in intelligent systems are: (1) natural language processing systems, (2) intelligent decision support systems, (3) intelligent tutoring systems, (4) machine learning systems, (5) intelligent robotic systems, and (6) expert systems. In the last few years, systems based on multiple intelligent *agents* have become a popular area of study. These agents are designed to possess some of the following characteristics such as rationality, autonomy, social ability, mobility, pro-activeness, selectivity and robustness. These software robots perform such varying functions as intelligent assistants, to specialist consultants in distributed systems. Naturally, therefore, scientists from several disciplines such as computer science, psychology, philosophy, logic, linguistics, and neuro-biology have contributed to the growth of this area. As a consequence, neural networks and genetic algorithms have emerged as independent disciplines coming under machine intelligence. Intelligent systems have been developed for a variety of applications including medical diagnosis, geological exploration, chemical data interpretation, financial decision making, equipment fault diagnosis, and computer configuration. Some of the major projects in this area are: (1) engineering and operation of spacecraft, (2) intelligent multimedia/multimodal (M4) systems, (3) monitoring patients in intensive care units, (4) management and accounting information systems, and (5) intelligent information retrieval systems.

This special issue of *Sādhanā* has eight papers dealing with several basic and applied issues of intelligent systems. The paper by Dasgupta, Chakrabarti and DeSarkar deals with heuristic search strategies for multi-objective state space search. The paper by Sarkar, Ghose and Chakrabarti considers learning for efficient search, while the one by Siromoney and Siromoney describes a machine learning system for identifying transmembrane domains from amino acid sequences. The paper by Sarma and Deepak Kumar describes an intelligent decision support system for project management. Furtado and Sen in their article consider synthesis of unlimited speech in Indian languages, while Sengupta and Chaudhuri consider morphological processing of Indian languages for lexical interaction. The paper by Rajaraman and Garud deals with an application of decision tables to process

control. Finally, the role of neural networks in contract bridge bidding is discussed by Yegnanarayana *et al* in their article.

June 1996

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