

Preface

The field of artificial intelligence has grown considerably in the past four decades. Originally developed by computer scientists with the hope of producing computer programs capable of displaying human-like intelligence, it has also attracted scientists from several other disciplines such as psychology, philosophy, logic and linguistics with their own hopes and objectives such as understanding the human mind, generating theories of knowledge, modeling rational behaviour, and producing unified theories of natural and formal languages. With the advent of expert systems, knowledge-based systems and intelligent decision support systems, a much wider class of scientists, engineers and other professionals are watching with interest the entry of AI into their respective work places. Representative applications of these systems include medical diagnosis, geological exploration, equipment fault diagnosis and repair, computer configuration, chemical data interpretation, financial decision making, natural language speech and image understanding, robotics, and planning. This period has also witnessed the appearance of the new discipline of knowledge engineering which aims to elicit and encode human experience, expertise and knowledge for machine use.

While the *Journal of the Indian Institute of Science* is a multidisciplinary journal publishing research papers in a variety of scientific disciplines, these two special issues (Nos 2 and 3) aim to present at one place the ongoing work on artificial intelligence and applications being pursued at the Institute. The first issue has four papers. The papers deal with several basic issues of AI. The paper by Sridhar and Murty considers nonmonotonicity associated with reasoning using perceived information. Sekhar considers a model for the temporal behaviour of cohesiveness among concepts. Santhi Seela and Krishna consider the challenging problem of machine translation between English and some Indian languages such as Hindi, Tamil and Kannada. The paper by Alwar and Raman continues the topic of Indian languages. This is the only paper in these special issues by authors of a sister institution, IIT Madras, included here because of the similarity of the subject matter.

The second issue has five papers. The first paper by Sancheti, Venkatesh and Srikant considers the difficult problem of object recognition using simulated annealing. The remaining four papers are on expert systems. Kanaka and Sarma describe an expert system pilot aid for remote control of an unmanned vehicle. Rao, Viswanath, Sridhara Murthy and Jayatheertha consider an expert system approach for the design of composite laminates. Swarup and Chandrasekhariah develop an expert system for fault diagnosis of high-voltage dc power systems. In the final paper of this issue, Pramanik and Venkataram study the diagnosis of steady-state process behaviour using rules derived from signed digraphs.

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Guest Editor