Preface

The desire for intelligent machines remained just an elusive dream until the first computer was developed. During the past few years, we have witnessed a rapid growth in the number and variety of applications of intelligent paradigms, ranging from consumer electronics, various industrial systems, decision support systems, financial markets and so on. As we see more and more intelligent paradigms come out of research laboratories, it is pertinent to ask the following questions before attempting to use them to our advantage

- What are some of the latest innovations in intelligent systems?
- How they are constructed?
- What sort of applications are they used for?
- How do we choose the right intelligent paradigm for the application?

This special issue on "Advances in Intelligent Systems and Applications" comprising 11 papers is an attempt to answer some of the above questions.

In the first paper authors present a novel two-staged support vector machine for protein secondary structure prediction and the algorithm is validated by comparing the performance with a cascaded neural network.

Second paper proposes an integrated approach for detection and classification of corrosion in critical areas of aircrafts. Data features were captured using wavelets and the extracted features were used by a neural network for classification purposes. The authors have given an efficient method to detect the region of interest for corrosion evaluation and also points out the importance of data fusion (combining multiple sensor signals) to improve the performance.

Third paper presents an algorithm to improve the performance of conventional radial basis function neural networks. Authors propose a new class of kernel functions (phi-functions), which is then combined with regression trees. Instead of using the conventional linear function for the output, a softmax output function is introduced.

In the forth paper, authors point out the usefulness of applying a linear mathematical formulation of fuzzy multiple criteria objective decision methods in organizing business activities. Fuzzy parameters of linear programming are modeled by preference based membership functions. The proposed approach is demonstrated using a multi criteria decision-making problem in a construction industry.

Fifth paper proposes a neuro-fuzzy approach to predict the property of ashes originated from combustion processes for electricity generation. Fuzzy logic is used to model the data and neural network learning techniques were used to optimize the fuzzy inference system.

In the sixth paper authors introduce fuzzy expert agents and demonstrates the importance of fuzzy Web intelligence for soft reasoning. The proposed framework is implemented using javaservlets, JDBC, Oracle and is illustrated using a simple web based problem.

Seventh paper presents an evolutionary algorithm to solve a production-planning problem in an electronics manufacturing industry. Besides presenting some novel ideas related to chromosome representation and evaluation techniques, authors have validated the algorithm using real world applications and illustrated efficiency of the proposed approach at the shop floor level.

Eighth paper presents an intelligent method for processing string in 3-D based on its minimum energy. The author's technique is based on the computation of the energy of its equivalent knot diagram. Minimum distance technique is used to compute the minimum energy and the algorithm is implemented to generate the string figure of cat's cradle.

Although significant research has been conducted on mobile agent based systems, little consideration has been given to the importance of dynamically and autonomously adapting the size of the agent population as function of circumstances in the environment. Ninth paper of this issue focuses on a framework for an adaptive approach to control the number of agents using *pheromones* and is applied to a distance vector routing in a network.

In the tenth paper, authors perform an experimental analysis by comparing four intelligent paradigms comprising of neural network, neuro-fuzzy system, support vector machine and difference boosting neural network for modeling the chaotic behavior of two popular stock indices. Some statistical comparisons are also presented. Empirical results demonstrate how different learning paradigms could capture the complexity very accurately.

Discovering useful knowledge from large databases is always a challenging task. Authors of the last paper present a hybrid knowledge discovery framework and its application using the military health system data repositories. The paper illustrates how much valuable information could be excavated which could be useful to the patients, medical practitioners and administrators.

Editors would like to thank Professor M. Sambandham (Chief Editor of International Journal of Neural Parallel and Scientific Computations) for the timely help and comments related to this issue. We hope that the reader will share our excitement to present this special issue and will find it useful.

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