Editorial

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Biographical notes: Jun-ichi Aoe received a BSc and MSc in Electronic Engineering from the University of Tokushima, Japan, in 1974 and 1976, respectively and the PhD in Communication Engineering from the University of Osaka, Japan. Since 1976, he has been with the University of Tokushima. Currently, he is a Professor in the Department of Information Science and Intelligent Systems, Tokushima University, Japan. His research interests include design of an automatic selection method of key search algorithms based on expert knowledge bases, natural language processing. He is the Editor of Computer Algorithm Series of the IEEE computer Society Press.

1 Introduction

Knowledge-based systems provide intelligent assistance in solving any problem. They can be used not only as systems within engineering, but also within management, marketing, internet, communication, networking, psychology, education, etc. The research and development of these systems which exploit knowledge in the target domain is at the forefront of modern research.

This Special Issue is intended to present applications of knowledge-based systems. Submitted papers are expected to postulate diverse problems, models and solutions for these applications.

2 The papers in this issue

The first paper in this issue, 'Optimal allocation problem: performance evaluation of communication networks using GA', by T. Vasanthi and G. Arulmozhi, attempts to provide a comprehensive study of the signal transmission in Linear Multi-state Consecutively-Connected System (LMCCS) considering the effect of noise. Evolutionary algorithms often have to solve optimisation problems in the presence of a wide range of uncertainties.

The second paper, 'Handling imbalanced data sets with a modification of Decorate algorithm', by S.B. Kotsiantis, provides a systematic study on the various methodologies that have tried to handle the problem of an imbalanced data set.

The third one, 'An efficient method of intention understanding and learning for the ambiguous expressions of sentence end', by Nobuo Suzuki and Kazuhiko Tsuda, proposes a method to presume the writers' intentions using the rules extracted from corpora built from data on the internet. The evaluation tests conducted have produced excellent results for emoticons, pictograms and three-point leaders.

The fourth and fifth papers, 'Intelligent monitoring and diagnosis of manufacturing process using an integrated approach of neural network ensemble and genetic algorithm', by Jianbo Yu and Lifeng Xi and 'Design expert system tool with hybrid knowledge representation and reasoning', by Zhan Si Jiang, Yi Zhong Wu, Li Ping Chen and Nian Meng Luo, develops a hybrid learning-based model for online intelligent monitoring and diagnosis of manufacturing processes. In this model, a Genetic Algorithm (GA)-based selective Neural Network (NN) ensemble (GASENN) is developed for monitoring the manufacturing process and recognising faulty quality categories of products being produced and describes a design expert system tool with hybrid knowledge representation and reasoning.

The sixth paper, 'Reverse-query diffusion over unstructured overlay network for content delivery', by Yoshikatsu Fujita, Daisuke Mori, Yasufumi Saruwatari and Kazuhiko Tsuda, proposes novel information delivery network architecture built over the existing unstructured P2P network.

The seventh paper, 'Discovering auditing criteria for the going-concern disclaimer', by Catherine K. Murphy, induces decision rules from cases of financially distressed companies for the period of economic expansion, in the USA, from 1991 to 2000.

The eighth paper, 'Intelligently reconfigurable manufacturing control system based on knowledge function block', by Bin Wu, Li-Feng Xi, Jian-Bo Yu and Bing-Hai Zhou, verifies the validity of knowledge function block standard, Web Services middleware and service-oriented philosophy in the design of intelligently reconfigurable manufacturing control system.

The ninth paper, 'Technology extraction from time series data reflecting expert operator skills and knowledge', by Setsuya Kurahashi, establishes a method to mine a set of meaningful control rules from Learning Classier System using the Minimum Description Length criteria and Tabu search method. The proposed method has been applied to an actual process of a biochemical plant and has shown the validity and the electiveness.

The tenth paper, 'A development method of UML documents from requirement specifications using NLP', by Masakazu Takahashi, Satoru Takahashi and Yoshikatsu Fujita, proposes an efficient development method of adequate Unified Modelling Language (UML) documents which can be used by inexperienced designers. This method consists of three countermeasures:

1   develop requirement specifications that contain all information necessary for development of UML documents using Natural Language Processing

2   share all information about developed UML documents and reuse it when developing other UML documents

3   decide on a UML document development process for inexperienced designers.

The eleventh paper, '*mar*Service: multi-attribute utility recommendation for e-markets', by Nikos Manouselis and Constantina Costopoulou, presents the design, development and evaluation of *mar*Service, a product recommendation service that is based on Multi-Attribute Utility Theory (MAUT). This approach studies the application of *mar*Service for providing wine recommendations in an existing e-market, and presents the results of a simulation experiment.

The twelfth paper, 'Multilingual and multicultural message presentations to enhance communication capabilities of people with special needs', by Tetsuya Hirotomi and Yun Zhang, presents a new approach for multilingual and multicultural message presentations via the multimedia hieroglyph and its multiple views. Special attention is paid to implementations and evaluations of multimedia hieroglyph-into Japanese/Chinese translators.

The thirteenth paper, 'Accuracy improvement for a voice recognition using field association knowledge', by Yasuhiko Fujita, El-Sayed Atlam, Atsushi Sakakibara and Masao Fuketa presents a domain specific voice recognition technique using field association knowledge that can find only the segment of utterances. Therefore, it enables us to change the domain of the language models in the real time processing.

The fourteenth and fifteenth papers, 'A method of reduction e-mails using replacement and repression', by Atsushi Sakakibara, El-Sayed Atlam, Kazuhiro Morita and Yasuhiko Fujita and 'Automatic acquisition for sensibility knowledge using cooccurrence relation', by Tomoko Yoshinari, El-Sayed Atlam, Kazuhiro Morita, Kumiko Kiyoi and Jun-ichi Aoe, introduces a meaning distortion rate and the criterion of reducing texts uniformly. For the real time process, an extension of a string pattern-matching algorithm is discussed and presents a method to acquire sensibility expressions automatically by using cooccurrence relation.

The sixteenth paper, 'A method for extracting knowledge from medical texts including numerical representation', by Kumiko Kiyoi, El-Sayed Atlam, Masao Fuketa, Tomoko Yoshinari and Jun-ichi Aoe, presents a method for determining not only numbers but also expressions of modification to expand the range of corresponding numbers. The meaning of sentences is often determined by the combination of number expressions and their object words. Therefore, the presented method categorises with each meaning of expressions of modification and range expressions.

The seventeenth paper, 'Outlier detection and evaluation by network flow', by Ying Liu and Alan P. Sprague, introduces a novel method to separate abnormal points from normal data, based on network flow. This Approach uses the Maximum Flow Minimum Cut theorem from graph theory to find the outliers and strong outlier groups, and evaluate the outliers by outlier degrees.

The eighteenth paper, 'A fuzzy intelligent design retrieving system for customer requirements', by Li Yu and Liya Wang, proposes a fuzzy intelligent design retrieving system to provide design engineers with easy access to relevant designs and knowledge. It employs Fuzzy ARTMAP (FAM) NN as its key technique to retrieve reference designs based on customer requirements and product specifications.