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Knowledge Discovery Using Advanced Computational Intelligence Tools

Data mining plays an important role in Knowledge Management. Knowledge is the product of moving from data to information and finally to knowledge. The Fifth International Conference on Hybrid Intelligent Systems (HIS'05) gathered individual researchers who see the need for synergy between various intelligent techniques for various data mining and knowledge management applications. This special issue comprising of six papers is focussed on using advanced computational intelligence tools for knowledge discovery. Papers were selected on the basis of fundamental ideas/concepts rather than the thoroughness of techniques deployed. The papers are organised as follows:

In the first paper, *Falkowski* presents perceptron learning in the context of the so-called scoring systems used for assessing creditworthiness as stipulated in the Basel II central banks capital accord of the G10-states. It is argued that the results obtained may be exploited to compute associated probabilities using a logistic activation function and maximum likelihood methods.

Han and Cho, in the second paper propose a novel method of predicting the user's future movements in order to develop advanced location-based services. The user's movement trajectory is modelled using a combination of recurrent self-organising maps and the Markov model. Future movement is predicted based on past movement trajectories. A prototype application based on location prediction is also presented.

In the third paper, *Abraham and Grosan* propose an ensemble-based decision support system using genetic programming (GP). The decision support system uses a combination of unsupervised learning for clustering the data and an ensemble of three well-known GP techniques to classify the different decision regions accurately. Experimental results reveal that the proposed ensemble method performed better than the individual GP approaches and the method is efficient.

Hruschka et al., in the fourth paper, investigate the adaptation of Bayesian methods for unsupervised learning

(clustering). The developed algorithm iterates between clustering (assuming that the number of clusters is not known *a priori*) and feature selection. Authors proposed two Bayesian approaches for feature selection (i) Naïve Bayes Wrapper (NBW), and (ii) Markov Blanket Filter (MBF). Experimental results reveal that NBW and MBF could reduce the number of features, while providing good quality partitions.

In the fifth paper, *Guajardo and Weber* propose a novel methodology for regression-based forecasting. A generic hybrid approach is presented that iteratively selects the most relevant features and constructs the best regression model given certain criteria. The developed model is suitable for feature selection as well as for model construction. The application to several time series underlines its usefulness.

Nedjah and Mourelle, in the last paper, present a novel deterministic multi-threaded complete matching method. Complete matching determines whether a subject term contains a sub-term that is an instance of a pattern in a pattern set. The developed method subsumes a deterministic lazy root-matching technique. The model is evaluated using theorem-proving and DNA-computing applications.

The editors wish to thank the referees who have critically evaluated the papers within the short stipulated time. Finally, we hope the reader will share our joy and find this special issue very useful. We would like to take this opportunity to thank Professor Suliman Hawamdeh, Editor-in-chief, *International Journal of Information and Knowledge Management* for all the timely advices and help and also for providing an opportunity for editing this important scientific work.

Nadia Nedjah,
 Ajith Abraham and Luiza M. Mourelle
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