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Computational Intelligence in Knowledge Technology

Guest Editors: Tianrui Li, Guoyin Wang

The Third International Conference on Rough Sets and Knowledge Technology (RSKT 2008) was held in Chengdu, P.R. China, May 16-19, 2008. Among 91 final accepted papers from 184 online submissions at RSKT 2008, this special issue includes the eight final revised and extended papers from RSKT2008 to reflect the current development of computational intelligence in knowledge technology.

The first paper by Polkowski and Artiemjew, entitled "On Knowledge Granulation and Applications to Classifier Induction in the Framework of Rough Mereology" presents basic ideas of rough mereology and a description of basic similarity measures called rough inclusions along with the idea of granulated data sets. It then discusses how to construct classifiers from granular data and obtain results of granular classification on real data sets.

The second paper by Peters and Tagg entitled "Intelligent Concepts for the Management of Information in Workflow Systems" shows how rough sets can be utilized to set up an early warning system in cases where information is missing in the workflow system. It also outlines the potential of rough sets to detect excessive or redundant information in a workflow management system's design.

The third paper by Reyaz-Ahmed *et al*. entitled "Granular Decision Tree and Evolutionary Neural SVM for Protein Secondary Structure Prediction" introduces a new sliding window scheme with multiple windows to form the protein data for SVM. It presents two new tertiary classifiers. One makes use of SVMs as neurons in a neural network architecture and the other tertiary classifier is a granular decision tree based on granular computing, decision tree and SVM. The Binary classifier using multiple windows is compared with a single window scheme. Experimental results show that the accuracy levels of the new classifiers are better than most available techniques.

The fourth paper by Marcek *et al*. entitled "Granular RBF NN Approach and Statistical Methods Applied to Modeling and Forecasting High Frequency Data" examines the ARCH-GARCH models for the forecasting of the bond price time series provided by VUB bank and make comparisons the forecast accuracy with the class of RBF neural network models. A new approach of function estimation for nonlinear time series model by means of a granular neural network is based on Gaussian activation function modeled by cloud concept. A comparative study shows that the presented approach is able to model and predict high frequency data with reasonable accuracy and more efficient than statistical methods.

The fifth paper by Wei *et al*. entitled "N-grams based feature selection and text representation for Chinese Text Classification" discusses text representation and feature selection strategies for Chinese text classification based on n-grams. A two-steps feature selection strategy is proposed to combine the preprocess within classes with the feature selection among classes. Four different feature selection methods and three text representation weights are compared by exhaustive experiments. Both C-SVC classifier and Naive bayes classifier are adopted to assess the results.

The sixth paper by Ke *et al*. entitled "Combining Resting-state fMRI and DTI Analysis for Early-onset Schizophrenia" investigates alterations of function-structure relationships in patients with early-onset schizophrenia by the combination of measures of resting-state functional magnetic resonance imaging and diffusion tensor imaging (DTI). DTI analysis reveals reduced fractional anisotropy in right frontal white matter. Corresponding gray matter regions show reduced functional connectivity with other regions in the brain in patients with early-onset schizophrenia, compared with healthy controls. Experimental results demonstrate abnormal function-structure relationships in early-onset schizophrenia, and support the view that white matter lesions might disrupt the neural circuits between frontal regions and other brain regions, and affect the functional connectivity in the frontal cortex.

The seventh paper by Latip *et al.* entitled "Quorum-based Data Replication in Grid Environment" proposes a new protocol named Diagonal Data Replication in a 2D Mesh structure (DR2M) protocol where the performance addressed is data availability which is compared with the previous replication protocols, Read-One Write-All, Voting, Tree Quorum, Grid Configuration, and Neighbor Replication on Grid. . The results prove that DR2M protocol improves the performance of the data availability compare to the previous data replication protocols.

The eighth paper by Zhou et al. entitled "Text Categorization Based on Topic Model" presents a Latent Dirichlet Allocation Category Language Model (LDACLM) for text categorization and estimate parameters of models by variational inference. It regards documents of category as Language Model and uses variational parameters to estimate maximum a posteriori of terms. Experimental evaluation shows the LDACLM model is effective and outperforms Naïve Bayes with Laplace smoothing and Rocchio algorithm but little inferior to SVM for text categorization.

As Guest Editors, we wish to express our deep appreciation to the authors for their contribution, to the reviewers for their cooperation and constructive advices that led to further improvement of the articles. We also wish to express our gratitude to Prof. Da Ruan, Editor-in-Chief of the Journal, for accepting to publish this Special Issue and for his help throughout the publication process.

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