
Editorial

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Biographical notes: Urszula Markowska-Kaczmar is an Assistant Professor in the Institute of Informatics of Wroclaw University of Technology, Poland. Her scientific interests lie in the various application of machine learning methods. She teaches graduate and postgraduate courses in neural networks, knowledge acquisition and soft computing. In the last three years, she has worked on the similar image recognition methods. She is also the author or co-author of 90 publications.

Jacek Koronacki is the Director of the Institute of Computer Science, Polish Academy of Sciences, Warsaw, Poland. He is a recognised authority on advanced statistical analysis and machine learning, and possesses more than 30 years experience in statistics and machine learning. His interests include also bioinformatics and quality control. He is the author and co-author of 56 publications, including six books. In addition to his research, he teaches extensively in Poland and has taught graduate/postgraduate courses in USA, Australia and Argentina. He is a Fellow of the Institute of Mathematics and Its Applications (Great Britain).

This issue of *IJDATS* contains extended versions of the papers presented at the Advances in Artificial Intelligence and Applications (AAIA) Symposium which took place in Poland in 2010. The symposium is an annual international meeting that brings together researchers and practitioners from the area of artificial intelligence (AI). Nowadays, with the vast computing power offered by our computers, let alone distributed systems, the AI techniques try to imitate human way of thinking, recognising patterns, and understanding speech, images and text, all this in order to enhance our ability to solve hosts of real-life problems. Needless to say, most AI techniques are based on data analysis.

The first paper included in this special issue is a step towards automatic text understanding. Its focus is on word sense disambiguation which is a challenging problem due in particular to high dimensionality of data and asymmetry of distributions of senses in the data space. Since the amount of labour needed for preparation of training data for supervised methods is much greater than that for unsupervised ones, it is the latter

methods which attract particular attention of researchers. In the paper, the authors applied various clustering algorithms to word sense disambiguation and evaluated them on the basis of five datasets from two languages (English and Polish).

Semantic data modelling and its application to data integration is the subject of the next paper. Its author analyses the issue of mapping database schemes for common data models expressed in the form of ontology. Methods of acquiring ontology from relational databases are described further. The author specifies in detail rules for creating classes, properties, hierarchies, cardinalities and instances. Simple examples are presented to demonstrate the mapping of individual concepts of a relational data model into ontology concepts.

In the third paper, the problem of speech emotion classification is addressed. The motivation of this research is to produce more natural synthetic speech. The authors focus on modelling the prosody parameters on the basis of sound perceptions by humans. In order to solve the problem, knowledge from phonetics and music theory is combined into one whole. Classification is then performed by using two neural networks: the multilayer neural network with backpropagation learning algorithm and the supervised self organising map.

The last paper deals with the problem of solution encoding in a chromosome for a genetic algorithm or an immune system. The so-called Hadamard representation is introduced, where the square of each coordinate equals 1. Several properties of this representation are presented. They allow quick and simple operations on chromosome indices, instead of processing the binary sequences. An immune system based on this approach is also proposed.

The four papers included in this issue do not exhaust all the subject areas of AI presented and discussed at the AAIA symposium. Nevertheless, they are not only characteristic of the symposium but, hopefully, should prove of interest to a wide community of researchers and practitioners.

Acknowledgements

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