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CONFERENCE PROCEEDINGS

INFORMATION TECHNOLGIES: RESEARCH AND THEIR INTERDISCIPLINARY APPLICATIONS 2012

INSTITUTE OF COMPUTER SCIENCE
POLISH ACADEMY OF SCIENCES

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Preface

This volume contains selected papers from the first conference 'Information Technologies and their Interdisciplinary Applications', which took place in Warsaw on July, 28, 2012 and has been organized within the framework European Social Fund, supported by POKL.04.01.01-00-051/10-00. The speakers were students of the PhD programme bearing the same name as the conference. The programme is co-organized by three institutes of the Polish Academy of Sciences: Institute of Computer Science, System Research Institute and Institute of Biocybernetics and Biomedical Engineering. Selected speakers at the conference were invited to submit their extended contributions to the conference volume. The submissions were then reviewed by the editors and external reviewers. The volume comprises papers which have been finally accepted. The contributions deal with subjects which pertain to information processing and analysis, in particular data mining, mathematical and statistical modeling, natural language processing, and model checking.

"Modeling Consumer Decision Making in the Framework of Fuzzy Sets Theory" by Agnieszka Jastrzębska presents a descriptive model of consumer's decision making processes. The proposed model, based on the operators used in the theory of fuzzy sets, allows to model consumers who have different emotional and rational cognitive abilities.

"Sequential Monte Carlo and Bayesian methodology in the stochastic event reconstruction problems" by P. Kopka, A. Wawrzyńczak, and M. Borysiewicz addresses an important problem of the atmospheric contaminant source localization. The localization of the dangerous substance release is based only on the results of measurements of concentration of the released substance at the points where sensors are placed. The applied methodology combines the Bayesian methodology of estimation with Monte Carlo computer simulation methods.

"Prediction of the structure of the social network" by Robert Kłopotek presents a system for visualisation, exploration, and prediction of the characteristics of medium-size social networks. Beside a detailed description of the software, the experimental section includes some results of the predictive analysis of the three selected social networks, evolving in time (Enron, Autonomous, Hep-Ph).

The paper "Generalized autosort FFT framework" prepared by Michał Lenarczyk describes a concept of improving the fast Fourier Transform (FFT) algorithm and presents some new ideas in this direction developed by the author. This is not a new problem in signal processing and computer science, nevertheless, its practical importance follows from a large area of FFT applications in sciences and engineering.

"Simultaneous deleting and merging regressors for linear model selection" by Aleksandra Maj, Agnieszka Prochenka, and Piotr Pokarowski deals with an important problem of regression model choice when predictors may be quantitative or qualitative. For the latter case deletion or merging factorial levels may be needed. The authors present a new method and algorithm for doing this.

Piotr Przybyła's contribution entitled "Issues of Polish question answering" considers perspectives for building a Polish question answering system. To assess the applicability of existing solutions for English, their language dependence is discussed, preceded by an outline of distinctive features of Slavonic languages, especially Polish, and their impact on text processing. Some already existing question answering solutions for Polish are also discussed.

"Selection and prediction for linear models using Random Subspace Methods" by Paweł Teisseyre and Jan Mielniczuk transfers some methods applied in classification to regression modeling, namely those which use randomly sampled predictors to built small regression models and use specially designed overall performance measure of predictors for model choice and prediction. Special care is devoted to lessen computational cost of the method.

Agnieszka Zbrzezny's paper "Comparing SAT-based bounded model checking RTECTL and ECTL properties" compares two SAT-based bounded model checking algorithms for properties expressed in the existential fragment of the soft real time computation tree logic and in the existential fragment of the computation tree logic. To this aim two standard benchmarks are used: the faulty train controller system and the generic pipeline paradigm.

We wholeheartedly thank the authors of the papers included in this volume for their efforts to extend and revise their contributions. We are also grateful to the reviewers who devoted their time to go through submissions and to comment on them.

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