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Preface

CISIM 2013 was the 12th of a series of conferences dedicated to computer information systems and industrial management applications. The conference was supported by IFIP TC8 Information Systems. This year it was held during September 25–27, 2013, in Krakow.

Over 60 papers were submitted to CISIM by researchers and scientists from universities around the world. Each paper was assigned to 3 reviewers initially, and in case of conflicting decisions, another expert's review had to be sought for a number of papers. In total, about 200 reviews were collected from the reviewers for the submitted papers. Because of the strict restrictions of Springer's Lecture Notes in Computer Science series the number of accepted papers was limited. Furthermore a number of electronic discussions were held between the PC chairs to decide about papers with confusing reviews and to reach a consensus. After the discussions, the PC chairs decided to accept about 70% of the total submitted papers. The decision of selecting this percentage was indeed very hard as almost all papers were highly relevant and interesting, with good presentation and contents. We therefore followed the standard way of acceptance based on the score obtained from the referees' evaluation.

The main topics covered by the chapters in this book are biometrics, security systems, multimedia, classification, and industrial management. Besides these, the reader will find interesting papers on computer information systems as applied to wireless networks, computer graphics, and intelligent systems.

We are grateful to the three esteemed speakers for their keynote addresses. The authors of the keynote talks were Profs. Krzysztof Cios, Mieczysław Alojzy Kłopotek, and Ryszard Tadeusiewicz and Michał Woźniak. We sincerely believe that the technical papers are well complemented by these keynote lectures covering state-of-the-art research challenges and the solutions.

We would like to extend our gratitude to all the PC members for making the effort to maintain the standard of the conference. We are highly indebted to all the reviewers for their excellent high-quality reviews, which helped to retain the scientific level of the conference. We are also grateful to Andrei Voronkov whose EasyChair system eased the submission and selection process and greatly supported the compilation of the proceedings. We also thank the authors for sharing their latest achievements through the great contributions presented in the book chapters.

We hope that the reader's expectations will be met and that the participants enjoyed their stay in the beautiful historic city of Krakow.

July 2013

Khalid Saeed
Rituparna Chaki
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Abstracts of Keynotes

Building Data Models with Rule Learners: Classical, Multiple-Instance, and One-Class Learning Algorithms

Krzysztof Cios

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Abstract. First, we shall talk about supervised inductive machine learning algorithms that generate rules and explain why rule learners are a preferred choice for model building in domains where understanding of a model is important, such as in medicine. Then we will introduce a classical rule learner that is scalable to big data. Note that classical rule learners require knowledge about class memberships of all instances. Next, we will introduce challenging multiple-instance learning (MIL) and one-class learning problems. The MIL is concerned with classifying bags of instances instead of single instances. A bag is labeled as positive if at least one of its instances is positive, and as negative if all of its instances are negative. In a one-class scenario only a single (target) class of instances is available; this type of learning is also known as an outlier, or novelty, detection problem. Since most inductive machine learning algorithms require discretization as a pre-processing step we will briefly describe an information-theoretic algorithm that uses class information to automatically generate a number of intervals for a given attribute. Second, we shall present MIL and one-class algorithms and introduce a general framework for converting classical algorithms into such algorithms.

What Is the Value of Information – Search Engine's Point of View

Mieczysław A. Kłopotek

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Abstract. Within the domain of Information Retrieval, and in particular in the area of Web Search Engines, it has become obvious long time ago that there is a deep discrepancy between how the information is understood within computer science and by the man-in-the-street.

We want to make an overview of ways how the apparent gap can be closed using tools that are technologically available nowadays.

The key to a success probably lies in approximating (by means of artificial intelligence) the way people judge the value of information.

Man-Machine Interactions Improvement by Means of Automatic Human Personality Identification

Ryszard Tadeusiewicz and Adrian Horzyk

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Abstract. During the man-machine interactions planning and forming we must frequently concentrate on the semantic aspects of communication. For example, striving to more acceptable (for users) forms of communication with numerous computer applications we put big effort in the increasing of machine intelligence, developing more advances methods of automatic reasoning and enriching quantity and quality of knowledge built-in into computer resources. Meanwhile, emotions play an equally essential role as rational reasoning in the judge intelligence of a partner. Therefore, a computer could be accepted as intelligent (or even liked) partner in cooperation with the man if it considers human needs, especially the emotional ones. Such needs must be first recognized. Such recognition must be performed during the natural interactions between man and machine because nobody likes to be tested or examined before they can start merit communication with the selected computer application. Moreover, nobody can honestly and objectively classify their own personality. Hence, in this aspect, we cannot obtain necessary information asking a person about his or her features of personality. The keynote will present a new method for automatic human needs recognition. The personality and needs of the partner can be recognized watching the following behaviors:

- verbal, the way of talking, using vocabulary, phrases, inflection, sentence constructions, ...
- non-verbal (body language), facial and body expressions, the way of movement, dressing-up, driving cars, bicycles, ... concerning environment, family, etc.

During the typical man-machine communication we can perform automatic passive classification of man personality by means of psycholinguistic analysis. The details of how this personality can be discovered during natural language man-machine communication will be presented during the lecture.

Application of Combined Classifiers to Data Stream Classification

Michał Woźniak

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Abstract. The progress of computer science caused that many institutions collected huge amount of data, which analysis is impossible by human beings. Nowadays simple methods of data analysis are not sufficient for efficient management of an average enterprize, since for smart decisions the knowledge hidden in data is highly required, as which multiple classifier systems are recently the focus of intense research. Unfortunately the great disadvantage of traditional classification methods is that they "assume" that statistical properties of the discovered concept (which model is predicted) are being unchanged. In real situation we could observe so-called concept drift, which could be caused by changes in the probabilities of classes or/and conditional probability distributions of classes. The potential for considering new training data is an important feature of machine learning methods used in security applications or marketing departments. Unfortunately, the occurrence of this phenomena dramatically decreases classification accuracy.

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