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Foreword

Foreword: Intelligent data analysis

1. Introduction

Nowadays there has been an enormous increase in the amount of available data sets of any kind. As a result, the need of applying techniques to analyze and extract information of those data has become a crucial task. The intelligent analysis of data opens a new way of addressing problems impossible to deal with so far. Intelligent Data Analysis (IDL) is concerned with the application of techniques coming from very different areas such as statistics, artificial intelligence, data mining, computational statistics, machine learning, optimization, dynamic programming; to real-world data analysis problems [1]. In fact, IDL is anew has emerged as a branch of research to avoid the danger of drowning in information, but starving for knowledge, and a considerable number of methods and software tools have been developed to solve data analysis problems [2].

This special issue is devoted to recent research findings in the field of IDL. The special issue is based on substantially extended and updated papers presented at the IEEE 11th International Conference on Intelligent Systems Design and Applications (ISDA-2011), that held in Cordoba, Spain during November 22 to 24, 2011 [3]. The papers besides being selected based on their originality, significance, technical soundness, and clarity of exposition, they are also intended to bring new research findings in the field of IDL. These papers were selected by the scientific program committee and revised before undergoing a rigorous period of peer-review. Contributions of these papers are summarized as follows.

2. The papers

The first paper titled “String analysis by sliding positioning strategy” proposes a new algorithm for discovering frequent factors in long strings. It is based on a new trie-like structure that uses positioning matrices as a routing strategy to insert new patterns. The algorithm can be parallelized by dividing the input string in different substrings, speeding up the resulting.

The second paper titled “Three-Objective Subgraph Mining using Multiobjective Evolutionary Programming” proposes a multiobjective evolutionary programming (MOEP) method for multiobjective graph-based data mining (GBDM). The results confirm the application of multiobjective subgraph mining can discover more diversified subgraphs in the objective space than the classical subdue technique in GBDM.

In the third paper, Abir Smitia and Zied Elouedia propose a novel case base maintenance policy named WCOID-DG: Weighting, Clustering, Outliers and Internal cases Detection based on Dbscan and Gaussian means. The purpose of WCOID-GM is to reduce both the storage requirements and search time and to focus on balancing case retrieval and efficiency and competence for a case base.

The fourth paper titled “Hierarchical Multi-Label Classification Using Local Neural Networks” describes a classification local-based method named Hierarchical Multi-Label Classification with Local Multi-Layer Perceptron (HMC-LMLP). The method incrementally trains a multi-layer perceptron network for each level of the hierarchy.

In the fifth paper Alvaro Ortigosa, Rosa M. Carro and Jose Ignacio Quiroga propose to obtain the user personality as unobtrusively as possible by mining social interactions. They collect interaction data within Facebook and use different machine learning techniques for training automatic classifiers that are able to predict user personality starting from parameters related to the user interactions

In the sixth paper Pasquale De Meo, Emilio Ferrara, Giacomo Fiumara and Alessandro Provetti propose a global method called COmplex Network CLUster DEtection (CONCLUDE) to maximizing a network modularity function. CONCLUDE can detect clusters in complex networks by mixing local and global information for community detection in large networks.

In the seventh paper Jose Otero and Luciano Sanchez introduce a new interval-valued multiple comparison bootstrap procedure (Bootstrap-B) for assessing the significance of the differences between stochastic algorithms in a cross-validation with repeated folds experimental setup. Intervals are used for describing the part of the variability of the data that can be attributed to the repetition of learning and testing stages over the same sets.

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The last but one paper titled “A Feature Construction Approach for Genetic Iterative Rule Learning Algorithm” propose the use of feature construction in a fuzzy rule learning algorithm from two different points of view. One of them tries to extract some interesting relations between the initial variables and the other one tries to find new variables as a combination of a set of pre-defined functions over the initial variables.

Finally, in the last paper Maria del Mar Martinez, Isabel del Angeles Nepomuceno and Jose Cristobal Riquelme describe a multi-objective evolutionary algorithm for mining quantitative association rules to deal with the problem of discovering gene association networks. The approach named GarNet (Gene-gene associations from Association Rules for inferring gene NETworks) is based on the well-known multi-objective evolutionary approach NSGA-II.

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