

Editorial

Dear Colleague:

Welcome to volume 25(1) of Intelligent Data Analysis (IDA) Journal.

This issue of the IDA journal is the first issue for our 25th year of publication. From a general bibliometric perspective when a journal is successfully published for so long, it is considered a mature journal. This issue of IDA contains twelve articles representing a wide range of topics related to the theoretical and applied research in the field of Intelligent Data Analysis.

The first group of articles are about unsupervised and supervised methods in IDA. Nazari and Pas-hazadeh in the first article introduce a real-time adaptive fuzzy density clustering for multi-target data association. This is a three step approach that is apparently quite robust and is applied to tracking multiple targets based on using the ship-borne radar data. Their results demonstrate the main advantages of the proposed algorithm, including its simplicity and suitability for real-time target tracking in cluttered environments. Pereira *et al.* in the next article of this issue argue that in many application domains, such as text categorization, biomolecular analysis, scene or video classification and medical diagnosis, instances are naturally associated with more than one class label, giving rise to multi-label classification problems. The authors present a new feature selection method based on the lazy feature selection paradigm and specific for the multi-label context. Their experimental results show that the proposed technique is competitive when compared to multi-label feature selection techniques listed in the literature, and is more scalable, in a scenario where there is an increasing amount of data. Wang *et al.* in the third article of this issue introduce a novel approach to fully representing the diversity in conditional dependencies for learning Bayesian network classifiers (BNC). The authors argue that classical information theory established the mathematical basis for the rapid development of BNC. However, researchers focus on identifying conditional dependence while neglecting conditional independence. The authors prove from the viewpoint of log likelihood that, high-order conditional mutual information (CMI) is appropriate to measure the conditional dependence between any given attribute and its parents. Their extensive experimental evaluation on widely used benchmark datasets reveals that this algorithm achieves competitive classification performance compared to state-of-the-art single learners. Yoshida and Washio in the fourth article of this issue propose novel approaches for classification from positive and unlabeled data based on maximum likelihood principle. These are particularly suited for measurement tasks in which the class prior of the target object in each measurement is unknown and significantly different from the class prior used for training, but the likelihood function representing the observation process is invariant over the training and measurement stages. These characteristics are demonstrated by the authors both theoretically and experimentally and the practicality of their approach is demonstrated in a real application to single molecule measurement. The fifth article of this group by García-Martín *et al.* is about energy modeling of Hoeffding tree ensembles. The authors argue that energy consumption reduction has been an increasing trend in machine learning over the past few years due to its socio-ecological importance where in new challenging areas such as edge computing, energy consumption and predictive accuracy are key performance evaluations for algorithm design and implementation. The authors introduce the *nmin adaptation method* to ensembles of Hoeffding tree algorithms, to further reduce their energy

consumption without sacrificing accuracy. Their results show that their proposed approach reduces the energy consumption significantly while affecting accuracy by less than one percent on average. The last article of this group by Li *et al.* is a comparative study on credit card fraud detection based on different support vector machines. The authors propose the method of optimizing the support vector machine parameters by the cuckoo search algorithm, genetic algorithm and particle swarm optimization algorithm. They report that the linear kernel function would be the best kernel function with a high accuracy rate while the radial basis function is used to optimize the kernel function, which can also improve the accuracy substantially.

The second group of articles in this issue are about novel methods and enabling techniques in IDA. In the first article of this group, Hsu and Chung apply beta distribution techniques to detect attacked items from collaborative filtering, which is the most common form of filtering. The authors propose a method to detect attacks based on the beta distribution. Different researchers in the past assumed that the attacker only attacked one target item in the user data. The research reported in this article simulated an attacker attacking multiple target items in the experiment. Their result showed a high detection rate with a relatively low false rate. Cai *et al.* in the eighth article of this issue present a facial expression recognition based on convolutional neural networks. The authors replace part of the regular convolution operation by depth-wise separable convolution to reduce the number of parameters and the computational workload and adopt the self-adaption joint loss function to improve the classification performance. Their experimental results are before and after train set balancing and network model modification where they compare their results with other researchers. Ghasabi and Deypir in the next article apply optimized statistical distances to confront distributed denial of service attacks in software defined networks. The authors propose statistical solution to detect and to mitigate distributed denial of service attack in software-defined networks utilizing the unique capabilities of the SDN architecture. In this research, the exponential weighted moving average protection mechanism (EWMA) in statistical distances is exploited. The simulation results of their extensive experiments shows that their mechanism is able to quickly detect attack traffics and take mandatory actions. In the tenth article of this issue, Fernández del Río *et al.* present a time-series approach to player churn and conversion in videogames in which they introduce a state space time-series method to model the daily conversion rates between the different groups of players. The authors introduce two different state space formulations namely: an autoregressive integrated moving average process and an unobserved components approach and extensively compare them with linear regression. He *et al.* in the next article of this group present a hierarchical features-based approach for extraction of targeted aspects from online reviews, then to capture the aspect-specific features. Specifically, their model can not only capture the direct features posing target-to-feature semantics but also capture the latent features posing feature-to-feature semantics. Their experiments on real-world datasets demonstrate that their proposed approach outperforms the state-of-the-art baselines in terms of both aspect extraction and document classification. And finally Zhao *et al.* in the last article of this issue argue that with the help of citation recommendation, researchers can improve the efficiency of writing academic papers and reduce the omission of important related literature. The authors present a citation recommendation method based on context correlation in which they use two neural network models to learn the representations of papers and their references, then calculate their context similarity. They further compare their method with other methods and evaluate the performance of different properties where it shows that their proposed method outperforms some baselines.

In conclusion, we would like to thank all the authors who have submitted the results of their excellent research to be evaluated by our referees and published in the IDA journal. We look forward to receiving

your feedback along with more and more quality articles in both applied and theoretical research related to the field of IDA.

With our best wishes,

Dr. A. Famili
Editor-in-Chief