

EVOLUTIONARY METHODS AND MACHINE LEARNING: DATA PREPROCESSING, LEARNING MODELS AND THEIR APPLICATIONS

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The aim of this special session is to serve as a forum for the exchange of ideas and discussions on recent and new trends regarding intersections between evolutionary algorithms and machine learning methods. Machine learning is a very active research field because of the huge number of real-world applications that can be addressed by this field of research. There are many contemporary problems, besides the canonical classification, regression, clustering or pattern mining, which require special focus and development of novel and effective solutions. Such challenges include the problem of imbalanced data, learning on the basis of low quality and noisy examples, multi-label and multi-instance problems, or having limited access to object labels at the training phase, among others.

Learning methods based on Evolutionary techniques are widely used to face the aforementioned challenges with promising results. They can be used either in the data processing part (i.e., data reduction or augmentation such as feature and instance selection or feature engineering) or in the learning process (i.e., genetics-based machine learning, evolving ensembles, neural networks or fuzzy systems). Moreover, Big Data scenario opens up new possibilities for Evolutionary methods in machine learning. New challenges arose with the need of effectively processing large amounts of data in reasonable times.

From this viewpoint, the aim of this special session is to explore Evolutionary methods and machine learning in any part of the learning process both in classical scenarios and in the new directions for addressing Big Data problems. We encourage authors to submit original papers as well as preliminary and promising works in the topics of this special session.

The aim of the session is to provide a forum for the exchange of ideas and discussions on evolutionary algorithms for machine learning, in order to deal with the current challenges in this topic. The special session is therefore open to high quality submissions from researchers working in learning problems using evolutionary techniques.



Topics

- Supervised / Unsupervised / Semi-supervised learning
- Feature Selection / Extraction / Construction
- Instance Selection / Generation
- Data streams and concept drift
- Big data mining
- Imbalanced learning
- Multi-label \ Multi-instance learning
- Feature and label noise
- Kernels and Support Vector Machines
- Ensemble learning
- Fuzzy systems
- One-class classification / Learning from positive and unlabeled samples
- Manifold Learning
- Real-world applications e.g., in medical informatics, bioinformatics, social networks, biometry, etc.