

Call for Papers for a Special Issue in  
***Applied Soft Computing (Elsevier)***

on:

## **Data Stream Mining and Soft Computing Applications**

### **Co-Organizers**

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### **Scope of the issue**

In current industrial systems, the necessity of ***data stream mining and learning from data streams*** is increasingly becoming more prevalent and urgent, due to speed, volume and on-line nature of the data generated by such systems. While conventional batch and off-line training approaches provide a possible solution, such approaches are often too time and memory intensive, and cannot process the data at the high enough rate that is often desired. This is true even when batch and off-line approaches are applied to sliding windows or onto streaming samples gathered from reservoir computing techniques.

An important aspect in data stream mining is that the data analysis system, the learner, has no control over the order of samples that arrive over time --- they simply arrive in the same order they are acquired and recorded. Also, the learning algorithms usually have to be fast enough in order to cope with real-time and on-line demands. This usually requires a single-pass learning procedure, restricting the algorithm to update models and statistical information in a sample-wise manner, without using any prior data. In literature, this is also termed as *incremental or sequential learning* and plays a key role in data stream mining frameworks and environments.

Practical real-world applications of evolving models include – and are not limited to - on-line quality control of production items, supervision and failure analysis of dynamically changing machine states, decision support systems in medicine, engine control, prediction and quantification in very dynamic production processes, welding processes, user profiling in various applications, forecasting, and internet, among many others.

This special issue intends to draw a picture of the recent advances in data stream mining techniques including all incremental machine learning concepts and evolving soft computing modeling strategies for addressing these important problems discussed above. Finally, all emerging and grand-challenge problems, topics such as interpretability aspects in evolving models, and mimicking intelligent brain – even if at a limited scale - are of particular interest to this special issue. Computational aspects such as real-time capability of the learning methods play central roles within all these issues.

## Topics

Original contributions are solicited from, but are not limited, the following topics of interest:

- **Advanced Aspects for Improved Stability, Performance and Usability** (but not necessarily restr. to) :
  - New Algorithms, Concepts in Data Stream Mining with *Soft Computing* Techniques (for supervised regression, classification and unsupervised learning)
  - New Algorithms, Concepts in Mining with *Machine Learning* Concepts (for supervised regression, classification and unsupervised learning)
  - Concepts to address drifts and shifts in Data Streams
  - On-line single-pass active learning from Data Streams
  - Semi-supervised learning from Data Streams
  - Dynamic dimension reduction and feature selection in Streams
  - Reliability in model predictions and parameters
  - Stability, process-safety and computational related aspects
  - Concepts to address linguistic interpretability
  - Concepts to address visual interpretability (model development over time)
  - Online tuning via human-machine interaction
  - Complexity reduction and interpretability issues in evolving models
  - Incremental and evolving methods for multi-label classification problems
  - On-line ensembling and fusing methods for improved model output robustness
  - Concepts to address dynamic splitting of model components on the fly
  
- **Real-World Applications** of evolving soft computing techniques such as (but not necessarily restricted to):
  - Data stream modelling and identification
  - Online fault detection and decision support systems
  - Online media stream classification
  - Process control and condition monitoring
  - Modeling in high throughput production systems
  - Web applications
  - Adaptive chemometric models in dynamic chemical processes
  - Online time series analysis and stock market forecasting
  - Robotics, Intelligent Transport and Advanced Manufacturing
  - Adaptive Evolving Controller Design
  - User Activities Recognition
  - Cloud Computing
  - Multiple Sensor Networks
  - Big Data

## Related Past Events by Co-Editors

- Special Issue on **Learning in nonstationary and evolving environments** in *IEEE Transactions on Neural Networks and Learning Systems* (IEEE press), 2014
- Special Issue on **Online Fuzzy Machine Learning and Data Mining in Information Sciences** (Elsevier), 2013
- Special Issue on **Evolving Soft Computing Techniques and Applications**, *Applied Soft Computing* (Elsevier), 2014

- Special Issue on **Information Fusion in Smart Living Technology Innovations**, *Information Fusion* (Elsevier), 2015
- Special Issue on **Hybrid and Ensemble Techniques in Soft Computing**, *Soft Computing* (Springer), 2014
- Special Issue on **Smart Living in Healthcare and Innovations**, *Journal of Medical Systems* (Springer), 2015
- Special Sessions on **Adaptive and On-line Modeling in Non-Stationary Environments** at the International Conferences on Machine Learning and Applications (ICMLA) in the years 2010 (Washington), 2011 (Hawaii), 2012 and 2013 (Miami).
- Special Session on **Fusion and Ensemble Techniques for On-line Learning on Data Streams** at the 10th FQAS 2013 conference (Granada, Spain)
- Special Session on **Learning from Static and Dynamic Data with Fuzzy Techniques** at the EUSFLAT 2013 conference (Milano, Italy)
- Special Session on **Fuzzy Machine Learning and On-line Modeling** at the IPMU 2012 (Catania, Sicilia).

## Important dates

<b>Submission deadline:</b>	<del>31<sup>th</sup> of January, 2017,</del> <b>extended: 31<sup>st</sup> of March 2017</b>
First author notification:	30 <sup>th</sup> of April, 2017
Revised version:	30 <sup>th</sup> of June, 2017
Final notification:	31 <sup>st</sup> of August, 2017
Publication:	TBD

Papers will be evaluated based on their originality, presentation as well as relevance and contribution to the field of hybrid and ensemble methods, suitability to the special issue, and overall quality. All papers will be rigorously refereed by 3 peer reviewers. Submission of a manuscript to this special issue implies that no similar paper is already accepted or will be submitted to any other conference or journal. Authors should consult the "Guide for Authors", which is available online at <https://www.elsevier.com/journals/applied-soft-computing/1568-4946/guide-for-authors> for information about preparation of their manuscripts. Manuscripts should be submitted via the Elsevier Editorial System <https://ees.elsevier.com/asoc/default.asp>.

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