

SPECIAL ISSUE ON LEARNING IN NONSTATIONARY AND EVOLVING ENVIRONMENTS

Using a computational model to learn under various environments has been a well-researched field that produced relevant results; unfortunately, the majority of these efforts rely on three fundamental assumptions: i) there is a sufficient and representative data set to configure and assess the model performance; ii) data are drawn from a fixed – albeit unknown – distribution; and iii) samples are mostly supposed to be independent. Alas, all these assumptions often do not hold in many real-world applications, such as in the analysis of climate or financial data, network intrusion, spam and fraud detection, electricity demand and industrial quality inspection among many others.

Recent efforts towards incremental and online learning allow us to relax the “sufficiency” requirement by continuously updating a model to learn from small batches or online data, yet, the data that become available are still assumed to be drawn from a fixed distribution. More recently, approaches commonly called concept drift – and to some extent domain adaptation– algorithms, possibly in collaboration with change detection tests, have attempted to remove this assumption, by accommodating a stream or batches of data whose underlying distribution changes over time. However, early efforts have made other assumptions, such as restricting the type of faults or changes affecting the system or the distribution and are primarily heuristic in nature with several free parameters to be fine-tuned.

Against this background, the need for a general framework to learn from – and adapt to – a changing environment can be hardly overstated. A special issue that discusses the state-of-the-art and latest results on detecting and adapting to changes in underlying data distributions is very timely. We invite original and unpublished contributions in all areas relevant to learning in a changing environment. Papers must present original work or review the state-of-the-art in the following non-exhaustive list of topics:

- Learning in non-stationary, drifting or dynamic environments
- Adaptive learning in a missing, faulty, limited or unbalanced data context
- Incremental, lifelong and cumulative learning from nonstationary data
- Faults, changes or anomaly detection in data streams
- Domain adaptation
- Data mining from streams of data
- Architectures, techniques and algorithms for learning in such environments
- Applications requiring learning in dynamic and nonstationary environments

IMPORTANT DATES

15 April 2012 – Deadline for manuscript submission
15 August 2012 – Notification to authors
15 September 2012 – Deadline for submission of revised manuscripts
30 September 2012 – Final decision
January/February 2013 – Special issue publication in the IEEE TNNLS

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SUBMISSION INSTRUCTIONS

1. Read the information for Authors at <http://iee-cis.org/pubs/tnn/papers/>
2. Submit the manuscript at the IEEE-TNNLS webpage <http://mc.manuscriptcentral.com/tnn> and follow the submission procedure. Please, clearly indicate on the first page of the manuscript and the Author's Cover Letter that the manuscript has been submitted to the Special Issue on Learning in Nonstationary and Evolving Environments. Send also an email to the guest editors to notify about your submission.