Complexity

Special Issue on

Recent Improvements on Complexity Measures for Time Series

CALL FOR PAPERS

Since the advent of the well-known Approximate Entropy (ApEn) statistic, many more metrics have been introduced in the technical and scientific literature. Most of these new metrics have been proposed as an improvement over the previous ones or to address a new application field. Robustness against noise or artefacts, stability, relative consistency, independence on record length or input parameters, high discriminative power, lower computational cost, and so on are the features usually addressed in this ongoing quest for better metrics.

Although this approach is promising for improving the sensitivity of these measures, it lacks the required genericity for mass application. The studies, where new algorithms are proposed, tackle the characterisation study using a specific experimental dataset that does not cover all the possible factors that may influence the final performance achieved. Readers tend to infer that if metric A is better than metric B in the context described, it will also be better in any other context, and this conclusion can be misleading, inaccurate, or inconsistent.

This special issue is aimed at gathering original research works that compare and characterise the performance of new complexity measures recently proposed or derived, in a disparity of fields and under new conditions in terms of time series used, noise, length, artefacts, and so on, not tested in previous papers. For example, Sample Entropy (SampEn) solved the bias problems of ApEn and it is more consistent; Fuzzy Entropy is claimed to be more accurate than both SampEn and ApEn; Coefficient of Sample Entropy (COSEn) is more flexible in the choice of input parameters; permutation entropy takes into account the temporal structure of the input time series and so on.

The ultimate goal is to provide researchers with a more detailed description of the capabilities and applicability of the new or derived regularity, complexity, or predictability metrics and contribute to speeding up the adoption and increasing the visibility of more powerful metrics that can replace the old ones.

Potential topics include but are not limited to the following:

- Definition of new or customized complexity metrics
- Performance of complexity measures under noisy conditions or artefacts
- Influence of input parameters and stability
- Robustness against data series length and metrics for extremely short time series
- Complexity metrics applicability to broadband or narrowband time series
- Computational cost and optimization techniques, more efficient algorithms, parallelization, and vectorization
- Complexity measure computer implementation issues
- Time series classification
- Fields of application: biology, medicine, engineering, economy, geology, and climatology, among many other interdisciplinary applications

Authors can submit their manuscripts through the Manuscript Tracking System at https://mts.hindawi.com/submit/journals/complexity/ricm/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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