Abstract

The paper describes a computational framework for time-series analysis. It allows rapid prototyping of new algorithms, since all components are re-usable. Generic data structures represent different types of time series, e.g. event and interevent time series, and define reliable interfaces to existing big data. Standalone applications, highly scalable MapReduce programs, and User Defined Functions for Hadoop-based analysis frameworks are the major modes of operation. Efficient implementations of univariate and bivariate analysis algorithms are provided for, e.g., long-term correlation, crosscorrelation and event synchronization analysis on large data sets.

References

- M. Small, "Applied nonlinear time series analysis: applications in physics,"
Hadoop. TS: Large-Scale Time-Series Processing

- M. Kapf et al., "Burst event and return interval statistics in Wikipedia access
- A. Bunde et al., "Correlated and uncorrelated regions in heart-rate fluctuations
- J. W. Kantelhardt et al., "Detecting long-range correlations with detrended
- A. Bashan et al., "Comparison of detrending methods for fluctuation
- J. W. Kantelhardt et al., "Multifractal detrended fluctuation analysis of
- J. Ludescher et al., "On the spurious multifractality in long-term correlated
- A. Y. Schumann, J. W. Kantelhardt, "Multifractal moving average analysis and
- A. Bunde et al., "The effect of long-term correlations on the statistics of rare
- A. Bunde et al., "Long-term memory: A natural mechanism for the clustering of
- E. G. Altmann, H. Kantz, "Recurrence time analysis, long-term correlations, and
- J. F. Eichner et al., "Statistics of return intervals in longterm correlated
- J. W. Kantelhardt, "Fractal and multifractal time series," in
  .
- R. Q. Quiroga et al., "Event synchronization: A simple and fast method to
- M. Kapf et al., "From time series to co-evolving networks: Dynamics of the
2012.

Index Terms

Computer Science

Algorithms

Keywords

Time Series Analysis
Detrended Fluctuation Analysis
Return Interval Statistics
Cross Correlation

Event Synchronization

Hadoop

MapReduce