

A Multi-resolution Approximation for Time Series

Por: [Sanchez, H](#) (Sanchez, Heider)^[1]; [Bustos, B](#) (Bustos, Benjamin)^[1]

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Abstract

Time series is a common and well-known way for describing temporal data. However, most of the state-of-the-art techniques for analysing time series have focused on generating a representation for a single level of resolution. For analysing of a time series at several levels of resolutions, one would require to compute different representations, one for each resolution level. We introduce a multi-resolution representation for time series based on local trends and mean values. We require the level of resolution as parameter, but it can be automatically computed if we consider the maximum resolution of the time series. Our technique represents a time series using trend-value pairs on each segment belonging to a resolution level. To provide a useful representation for data mining tasks, we also propose dissimilarity measures and a symbolic representation based on the SAX technique for efficient similarity search using a multi-resolution indexing scheme. We evaluate our method for classification and discord discovery tasks over a diversity of data domains, achieving a better performance in terms of efficiency and effectiveness compared with some of the best-known classic techniques. Indeed, for some of the experiments, the time series mining algorithms using our multi-resolution representation were an order of magnitude faster, in terms of distance computations, than the state of the art.

Palabras clave

Palabras clave de autor: [Time series](#); [Multi-resolution representation](#); [Classification](#); [Discord discovery](#)

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Información del autor

Dirección para petición de copias:

Universidad de Chile Univ Chile, Dept Comp Sci, Santiago, Chile.

Dirección correspondiente: Bustos, B (autor correspondiente)

+ Univ Chile, Dept Comp Sci, Santiago, Chile.

Direcciones:

+ [1] Univ Chile, Dept Comp Sci, Santiago, Chile

Direcciones de correo electrónico:hesanche@dcc.uchile.cl; bebustos@dcc.uchile.cl

Editorial

SPRINGER, VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS

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