Summary: In this work, a new approach to cluster large sets of time series is presented. The proposed methodology takes into account the dependency among the time series to obtain a fuzzy partition of the set of observations. A two-step procedure to accomplish this is presented. First, the cophenetic distances, based on a time series linear cross-dependency measure, are obtained. Second, these distances are used as an input of a non-Euclidean fuzzy relational clustering algorithm. As a result, we obtain a robust fuzzy procedure capable of detecting groups of time series with different types of cross-dependency. We illustrate the usefulness of the stated methodology through some Monte Carlo experiments and a real data example. Our results show that the methodology proposed in this work substantially improves the hard partitioning clustering alternative.

MSC:
68T37 Reasoning under uncertainty in the context of artificial intelligence

Keywords:
fuzzy clustering; time series; hierarchical clustering; cophenetic distances

Software:
fcclus; fpc; Ternary; dtwclust; Silhouettes

Full Text: DOI

References:

Edited by FIZ Karlsruhe, the European Mathematical Society and the Heidelberg Academy of Sciences and Humanities
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