Time series forecasting using ensemble and hybrid methodologies

Paulo Canas Rodrigues[1]

[1]*Federal University of Bahia, 40.170-110 Salvador, BA, Brazil*

Abstract

Time series forecasting plays a key role in areas such as energy, environment, economy, and finances. Hybrid methodologies, combining the results of statistical and machine learning methods, have become popular for time series analysis and forecasting, as they allow researchers to compensate the limitations of one approach with the strengths of the other, and combine them into new frameworks while improving forecasting accuracy. In this class of methods, algorithms for time series forecasting are applied sequentially, i.e., the second model can be applied to the residuals that were not captured by the first, by considering that the observed data is a combination of linear and nonlinear components. Another category of methods for time series forecasting is the ensemble methods that are the result of the weighted average of individual forecasts from several methods. In this talk, I will discuss several strategies for time series forecasting, including ensemble and hybrid methodologies, with application to electricity load forecasting and to PM10 (inhalable particles, with diameters that are generally 10 micrometers and smaller) forecasting.

Keywords

Time series forecasting, Singular spectrum analysis, Neural networks, Ensemble methods, Hybrid methodologies.

References:

Cordova, C.H., M.N.L.Portocarrero, R. Salas, P.C. Rodrigues, and J.L. López-Gonzales (2021). Air Quality Assessment and Pollution Forecasting using Recurrent Artificial Neural Networks in Metropolitan Lima-Peru. *Scientific Reports 11*, 24232.

Encalada-Malca, A.A., J.D. Cochachi-Bustamante, P.C. Rodrigues, R. Salas, and J.L. López-Gonzales (2021). A spatio-temporal visualization approach to the exploration of PM10 concentration data in Metropolitan Lima. *Atmosphere 12*, 609.

Sulandari, W., Subanar, M.H. Lee, and P.C. Rodrigues (2020). Indonesian electricity load forecasting using singular spectrum analysis. *Energy 190*, 116408.

Sulandari, W., Subanar, M.H. Lee, and P.C. Rodrigues (2020). Time series forecasting using singular spectrum analysis, fuzzy systems and neural networks. *MethodsX 7*, 101015.