

Title:

Forecasting financial time series by reservoir computing

Abstract:

Anticipating price crises in the market of agri-commodities is critical to guarantee both the sustainability of the food system and to ensure food security. However, this is not an easy task, since the problem implies analyzing small and very volatile time series, which are highly influenced by external factors. In this paper, we show that suitable reservoir computing algorithms can be developed that outperform traditional approaches, by reducing the Mean Absolute Error and, more importantly, increasing the Market Direction Accuracy. For this purpose, the applicability of five variants of such method to forecast this market is explored, and their performance evaluated by comparing the results with those obtained with the standard LSTM and SARIMA benchmarks. We conclude that decomposing the time series and modeling each component with a separate RC is essential to successfully anticipate price trends, and that this method works even in the complex changing temporal scenario of the Covid-19 pandemic, when part of the data were collected.