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Editorial

Advances in time series forecasting: innovative methods and applications

J. F. Torres[1,*], M. Martinez-Ballesteros[2], A. Troncoso[1] and F. Martinez-Alvarez[1]

[1] Data Science and Big Data Lab, Pablo de Olavide University, ES-41013 Seville, Spain
[2] Department of Computer Science, University of Seville, ES-41012 Seville, Spain

*** Correspondence:** Email: jftormal@upo.es.

Time series forecasting plays a critical role in various domains, including finance, economics, environmental science, and healthcare. Time series forecasting has undergone significant evolution with the increasing availability of data and advancements in machine learning and statistical methods.

This special issue aimed to bring together the latest advances, innovations, and research in the field of time series forecasting. Thus, a significant theme in this collection is the application of advanced ensemble learning techniques to improve forecasting accuracy. The work by Gonzales et al. [1] introduces a novel time series ensemble approach for analyzing and forecasting electricity prices in the Peruvian market. Similarly, Divina et al. [2] employ a stacking ensemble learning method to predict Iberian pig activity, highlighting the versatility and effectiveness of ensemble techniques in diverse applications.

Another prominent topic is the integration of neural networks with other sophisticated models to enhance prediction capabilities. Ni et al. [3] present an optimized gated recurrent unit-temporal convolutional network for flood prediction, complemented by improved kernel density estimation for error assessment. This hybrid approach demonstrates the potential of combining different neural network architectures to tackle complex forecasting challenges. Rojas et al. [4] further this exploration by proposing the EMDFormer model, which integrates recurrent neural networks and transformers for financial forecasting, emphasizing the evolving landscape of neural network-based models.

The forecasting of population dynamics and its implications are also well-represented. Li et al. [5] apply a NAR neural network Markov model to predict population trends in Huizhou and Guangdong, showcasing the application of neural networks in demographic studies. Chen et al. [6] explore

optimizing a tourism revenue prediction model using the grey Markov chain, offering valuable insights into the economic impact of tourism in Macau.

Healthcare and safety applications of time series forecasting are highlighted in the study by Alrashidi et al. [7], who predict hospital disposition for trauma patients using data-driven machine learning algorithms. This research underscores the critical role of forecasting in improving healthcare outcomes and resource management.

Detecting anomalies and intrusions in data streams is another crucial area covered in this issue. Chu et al. [8] focus on intrusion detection in IoT data streams using concept drift localization, providing a robust framework for maintaining security in rapidly changing data environments.

Finally, the theoretical advancements in time series analysis are addressed by Aly et al. [9], who explore generalized inequalities on diamond alpha time scales, contributing to the mathematical foundations of time series forecasting.

In conclusion, this special issue presents diverse studies that collectively push the boundaries of time series forecasting. The innovative methodologies and applications featured herein not only enhance our understanding of forecasting techniques but also pave the way for future research and practical implementations in various fields.

Guest Editors

Professor Francisco Martínez-Álvarez, Data Science and Big Data Lab, Pablo de Olavide University, ES-41013 Seville, Spain
Email: fmaralv@upo.es.
Professor Jose. F. Torres, Data Science and Big Data Lab, Pablo de Olavide University, ES-41013 Seville, Spain
Email: jftormal@upo.es.
Professor María Martínez-Ballesteros, Department of Computer Science, University of Seville, ES-41012 Seville, Spain
Email: mariamartinez@us.es.
Professor Alicia Troncoso, Data Science and Big Data Lab, Pablo de Olavide University, ES-41013 Seville, Spain
Email: atrolor@upo.es.

Conflict of interest

The authors declare no conflicts of interest.

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