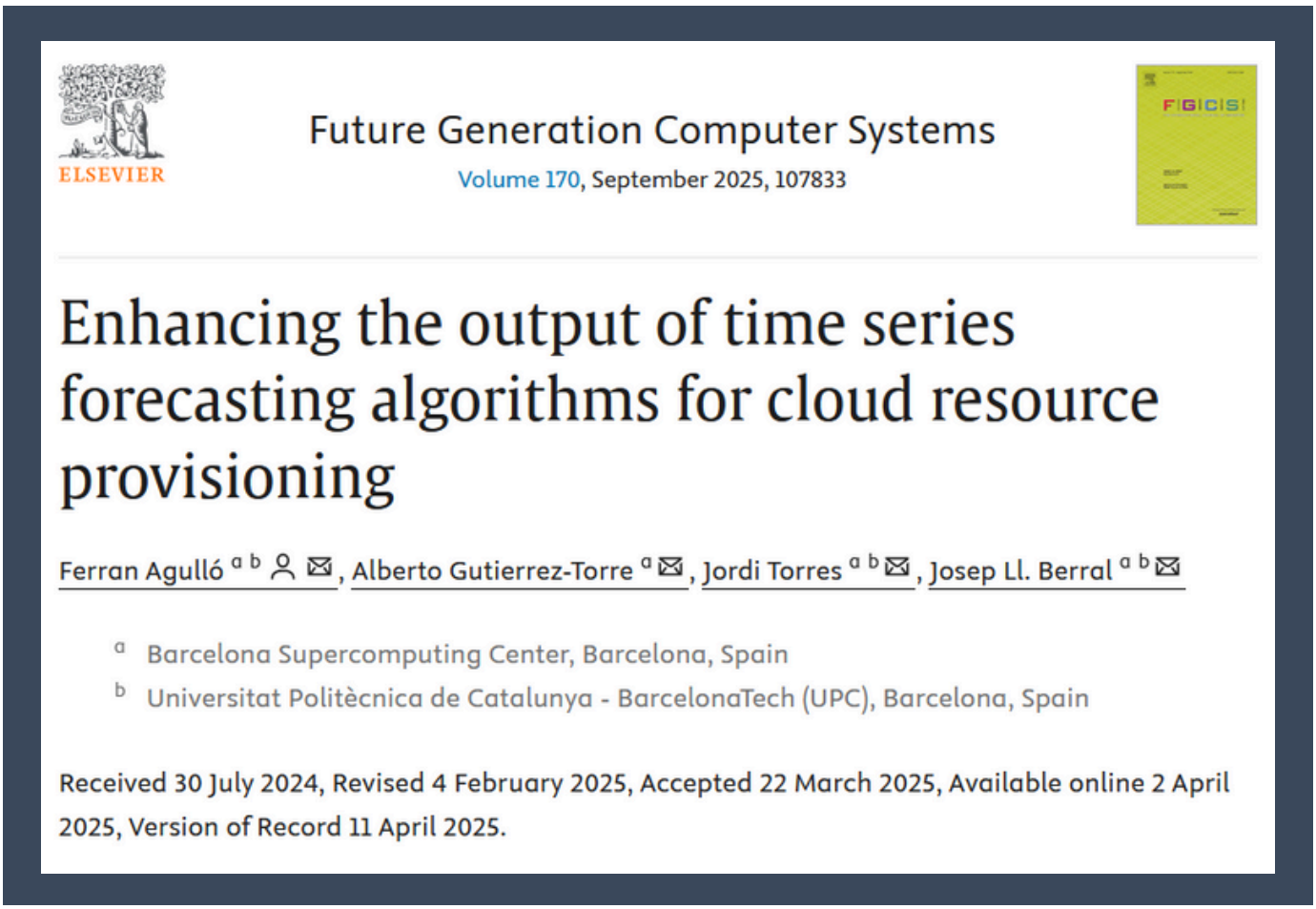
Newsletter

CloudSkin

August, 2025

Enhancing the output of time series forecasting algorithms for cloud resource provisioning



ELSEVIER

Future Generation Computer Systems

Volume 170, September 2025, 107833

Enhancing the output of time series forecasting algorithms for cloud resource provisioning

Ferran Agulló [a b], Alberto Gutierrez-Torre [a], Jordi Torres [a b], Josep Ll. Berral [a b]

[a] Barcelona Supercomputing Center, Barcelona, Spain

[b] Universitat Politècnica de Catalunya - BarcelonaTech (UPC), Barcelona, Spain

Received 30 July 2024, Revised 4 February 2025, Accepted 22 March 2025, Available online 2 April 2025, Version of Record 11 April 2025.

We're excited to share our latest open-access publication in **Future Generation Computer Systems**, where we introduce two novel strategies to enhance spike detection in time series forecasting—without modifying the underlying algorithms. Our methods significantly **improve the accuracy of forecasting sudden workload increases in cloud environments**, with up to 2x higher F1-scores compared to standard models in average. This advancement is particularly relevant for improving Quality of Service and avoiding under-provisioning during peak demand periods.

Beyond boosting predictive performance, our approach includes a tunable mechanism to balance the trade-off between spike detection precision and the cost of over-provisioning. We also propose a targeted evaluation methodology focused on critical usage spikes and apply

by Peini Liu (Barcelona Supercomputing Center)

explainability techniques to better understand model behavior. These contributions are directly aligned with the goals of smarter, more efficient cloud resource management strategies.

Ferran Agulló, Alberto Gutierrez-Torre, Jordi Torres, Josep Ll. Berral, "Enhancing the output of time series forecasting algorithms for cloud resource provisioning", Future Generation Computer Systems, Volume 170, 2025, 107833, ISSN 0167-739X, https://doi.org/10.1016/j.future.2025.107833

Funded by the European Union