Vittorio Maniezzo

University of Bologna

Department of Computer Science

Via dell’Università, 50

Cesena, Italy

vittorio.maniezzo@unibo.it

Prof. Dr. Frank Werner

Editor-in-Chief

Algorithms

September 9, 2025

Subject: Submission of Manuscript for Publication

Dear Professor Werner,

We are pleased to submit our manuscript, "Deconstructing transformer-based time series forecasting" for consideration in *Algorithms*. This paper contributes to the field of data series forecasting by presenting a minimalist transformer architecture that is specifically designed for univariate time series forecasting and provides a transparent and replicable baseline for researchers and practitioners interested in understanding the core mechanisms of transformers when applied to forecasting tasks. We posit that this framework offers significant potential for enhancing research and practice by stimulating further studies within the data science community.

We affirm that no generative AI has been used for purposes such as generating text, data, or graphics, or for study design, data collection, analysis, or interpretation of data. AI-assisted tools were only used to check the spelling, syntax and style of the writing.

We confirm that neither the manuscript nor any parts of its content are currently under consideration for publication with or published in another journal.

All authors have approved the manuscript and agree with its submission to Algorithms.

We appreciate your consideration and look forward to your feedback.

Sincerely,

Vittorio Maniezzo, University of Bologna

Filippo Garagnani, University of Modena and Reggio Emilia

*abstract*

This paper provides a thorough breakdown of a fundamental Transformer-based 1

architecture for forecasting univariate time series. We describe each processing step in detail, 2

from input embedding and positional encoding to self-attention mechanisms and output 3

projection, all of which are tailored specifically to sequential temporal data. By isolating and 4

analyzing the role of each component, we demonstrate how transformers capture long-term 5

dependencies in time series. We implement a simplified, interpretable transformer model 6

and showcase it on a simple use case. We then validate it on a significant benchmark suite, 7

including datasets from forecasting competitions and real-world applications. The aim of 8

this work is to serve as both a practical guide and a foundation for future innovations in 9

transformer-based forecasting.

*(i) brief description for the author’s choices of 5 reviewers and 3 Associate Editors*

*Associate editors*

We believe that the three following Associate Editors would be appropriate to review the manuscript

* Pippo
* Pluto
* Paperino

*Reviewers*

The following scientists have expertise in the topics covered by our manuscript. We have no conflicts of interest with any of them, as they have not worked with us in the 5 years prior to submission. They will ensure a competent and unbiased review.

* Ahmed Kheiri, University of Manchester, ahmed.kheiri@manchester.ac.uk
* Dimitris Politis, University of California, San Diego, dpolitis@ucsd.edu
* Navonil Mustafee University of Exeter, N.Mustafee@exeter.ac.uk
* Giacomo Sbrana, NEOMA Business School, Reims (FR), Giacomo. Sbrana@neoma-bs.fr
* Karl Doerner, University of Vienna, karl.doerner@univie.ac.at
* Marco Caserta, IE University (ES), marco.caserta@ie.edu
* Marc Sevaux, Université Bretagne Sud (FR), marc.sevaux@univ-ubs.fr