March 10, 2023

Silviu Livescu, Ph.D.

Editor-in-Chief

Journal of Geoenergy Science and Engineering

Dear Editor-in-Chief,

Please accept our manuscript for consideration of publication in the Journal of Geoenergy Science and Engineering.

The name of the research article is “Multi-horizon Well Performance Forecasting with Temporal Fusion Transformers”, and the authors are Eduardo Maldonado-Cruz and Michael J. Pyrcz.

The manuscript is not published and is not being considered by any other journals at this time. Both authors have given their approval to submit the manuscript and completed a Conflict of Interest form.

The manuscript presents a novel and valuable workflow to generate a Temporal Fusion Transformer-based surrogate flow model for well-performance forecasting. The problem formulation allows the inclusion of static and dynamic predictor features, forecasts across multiple wells, and allows uncertainty estimation. In the manuscript, we propose two static predictor features to include well location and to improve model interpretability, we propose the use of SHAP values to relate forecasts to attention head weights at each time step. This novel workflow can be used to forecast with uncertainty in subsurface applications with interpretable outputs.

We believe this paper is a good fit for the Journal of Geoenergy Science and Engineering, as the work addresses important challenges in forecasting and model interpretability, where prediction accuracy is insufficient. The demonstration is a subsurface petroleum application with a step change over current workflows.

Thank you very much for your consideration.

Best regards,

Eduardo Maldonado-Cruz

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