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Physical explanations of AI-time series forecasting using BAPC

Monday, 16 September 2024 15:15 (20 minutes)

Our previous contribution to ENBIS included an introduction of BAPC ('Before and After correction Parameter Comparison'), a framework for explainable AI time series forecasting, which has formerly been applied to logistic regression. An initially non-interpretable predictive model (such as neural network) to improve the forecast of a classical time series 'base model' is used. Explainability of the correction is provided by fitting the base model again to the data from which the error prediction is removed. This follow-up work is devoted to the practical application of the framework by (1) showcasing the method to explain changes in the dynamics of a physical system, (2) providing guidance on the choice of the interpretable and correction model pair based on explainability-accuracy tradeoff analysis and (3) comparing our method with the state of the art on explainable time-series forecasting. In this context, the BAPC is able to identify the set of model parameters and the time window that brings maximum explanation to the AI-correction local behavior, hence delivering explanation both in the form of feature-importance and time-importance.

Type of presentation

Talk

Classification

Both methodology and application

Keywords

XAI, time-series forecasting, physics informing ML

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Session Classification: Machine learning for time series

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