

Abstract

Predicting the future can improve the resource allocation of companies and therefore is essential for the success of modern technology companies. Such predictions are often time series predictions. It is difficult to predict the future because the target of interest is often part of an interdependent system. Sometimes, it is necessary to use more complex methods to achieve good prediction results. The decisions of complex methods are often less traceable by humans. Explanations of model decisions can be essential to gain trust from users; else, the users do not accept the prediction. The scope of this thesis is explainable multivariate time series prediction.

Most of the complex methods are designed for large data sets. We evaluate the performance of several methods on a small data set from the accounting domain. This data set is interesting for the evaluation because the data between customers are very heterogeneous. We evaluate the prediction performance of multivariate and deep learning methods and observe that the demand for explainability does not decrease the prediction performance on this data set and that multivariate outperform univariate methods.

We approach to build an evaluation procedure that yields quantitative scores of the explainability. We compare ground truth essential points with the feature weights from the model. This evaluation produces precision and recall for several tasks. We test our approach on the regularized linear model and observe the expected behavior.

Keywords: Time Series Prediction, Explainable Artificial Intelligence, Explainable Time Series Prediction, Deep Learning, Accounting Data, Explainability Evaluation