



Jointly with Optiwiser A.I. Solutions, the **Chair of Operations Management** is offering a

# Master Thesis

on

## Meta Learning for Time Series Forecasting

### Problem and Scope

Optiwiser A.I. Solutions develops software to support decision making in the food and beverage industry. They provide their clients with a tool for optimizing inventories and production planning. Accurate demand forecasting plays a primary role in this kind of optimization, especially considering the perishable nature of the food and beverage goods. The company developed and compared several regression models to forecast the demand from historical data. However, none of the approaches clearly outperforms the others. On the contrary, they observed that some models perform well on some instances but not on others, for which different models have better performances. Ideally, one would want to select the best regression model for the specific instance every time demand forecasting is needed. Nevertheless, in general, it is not possible to know exactly which algorithm is the most accurate until the realization of the demand. However, it is possible to make a prediction of which algorithms will perform well using meta-learning.

The scope of this thesis is to develop a meta-learning model for time series forecasting. Given the historical demand of a certain product on a certain sale channel (B2B, B2C, export) the meta-learning model must select the prediction model from the pool which is expected to return the most accurate prediction. The meta-learning model must also pick the meta-parameters for the selected algorithm. The company provides real-world data with the permission to publish the results in anonymous form.

### Profile of students

The student should be knowledgeable in Machine Learning and Data Science, have a good understanding of Supply Chain Management and a background in programming, preferably with Python.

**Begin:** as soon as possible

**Duration:** 6 months

**Number of students:** 1

**Advisor TUM:** Prof. Dr. Rainer Kolisch

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