

The bioinformatics research lab at the Technical University of Munich, TUM Campus Straubing for Biotechnology and Sustainability and Weihenstephan-Triesdorf University of Applied Sciences is looking for a candidate for a Bachelor's or Master's thesis with the topic

Evaluation of global and local pattern approaches for sales predictions of small and medium-sized companies

at the earliest possible date.

Predicting the future based on historical observations is a common problem in many areas. A potential way to implement this are Time Series Forecasting methods. Some of these combine global and local patterns present in the data. Global effects might be identified in related time series, e.g. from the same domain. These can be enriched with local patterns, e.g. of a specific company, to provide final predictions. There are several approaches in literature which make use of this idea. The goal of this thesis is to evaluate their applicability to sales predictions of small and medium-sized horticultural companies.

Your tasks:

- Literature research on global and local pattern approaches.
Potential algorithms are the following ones:
 - o Deep Factor with Random Effects <https://arxiv.org/abs/1905.12417>
 - o MQ-RNN <https://arxiv.org/abs/1711.11053>
 - o DeepGLO <https://arxiv.org/abs/1905.03806>
- Analysis of datasets provided by partner companies with a focus on the possibility to derive global patterns
- Implementation of about three global and local pattern approaches
- Application of already implemented Time Series Forecasting methods
- Visualization and interpretation of the results based on a comparison of all techniques you used

Your skills:

- You are close to finishing your Bachelor's or Master's degree, preferably in a technical field
- Good programming knowledge, preferably in Python
- Very good programming skills are an advantage
- Basic knowledge of statistics and good mathematical skills
- First experience with statistical models and machine learning are a plus
- Strong motivation and interest for computer science and machine learning
- Ability to work and learn new topics autonomously
- Proactive, goal-oriented and communicative way of working
- Good language competence in English, written as well as spoken