



At the Chair of **Logistics and Supply Chain Management** of TUM School of Management we are looking for an interested and qualified student to conduct his/her

## **Master Thesis**

on the topic:

### **Using Machine Learning methods to reduce large Vehicle Routing Problems in cooperation with SAP**

SAP innovations help more than 400,000 customers worldwide to interact more efficiently and use business insight more effectively. The SAP mathematical Optimization develops modern logistics solutions by using optimization and artificial intelligence methods. Industrial companies worldwide integrate these methods into their applications to plan and optimize the transport business. Particularly challenging are the involved routing and scheduling planning procedures which are modeled as Vehicle Routing Problems (VRP). The solution of these problems states which vehicle shall deliver which product to which customer. However, VRP scenarios pose high scalability challenges concerning the capacity and time constraints of planned tours. To improve computational performance many feasible but not ideal tours can be directly filtered out in the optimization procedure. Machine Learning methods can help to identify these irrelevant tours. In the data preprocessing step, the algorithms learn from the data which connections are worth to be considered and which will most likely never be part of the optimal tour.

#### **Key project tasks:**

- Literature review on relevant streams of the research field
- Implementation and testing of machine learning methods and operation research approaches
- Case study based on a fictive or customer case
- Interpretation of results

#### **Requirements:**

The thesis is suitable for Master in Management and Technology students with a major in operations and supply chain management. The ability to work independently as well as analytical skills are required. Knowledge of mathematical programming and optimization is required. Knowledge of a general-purpose programming language (e.g., Python, C++) is preferred. The thesis should be written in English.

**Begin:** as soon as possible

**Advisor:** Christoph Kerscher

**Application:** Email with curriculum vitae and transcript of records to [logtheses.wi@tum.de](mailto:logtheses.wi@tum.de)