

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

### **Implementing a Framework to solve the Sub-Problems of a decomposed large-scale VRP in parallel**

The larger the Vehicle Routing Problem (VRP), the more computational time is needed to solve it. Even the state-of-the-art solution methods do not scale well and most often an exponential increase in runtime to find the best-known solution can be observed. Machine Learning approaches aim to split large-scale VRPs into less complex sub-problems which then can be solved independently and in parallel. The goal of this thesis is to implement a framework that allows running a solution algorithm in parallel on a given set of sub-problems. A dynamic load-balancing algorithm should enable the distribution of computing resources in a smart way to minimize idle times.

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

- Literature review on relevant fields of the topic
- Implementation of a parallelization framework
- Systematic comparison of selected model performances
- Analysis of results and implications

#### **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

**Supervisor:** Christoph Kersch

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