

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

AGV Scheduling Optimization for Production Line Feeding

In many manufacturing processes, AGVs are used for the automated provision of material from the warehouse to production and for transporting finished goods to the shipping area. Current AGVs operate under SLAM (Simultaneous Localization and Mapping), i.e., they are not bound to magnetic strips on the ground. This allows for their optimization regarding sequence planning, order prioritization, and quantity. The aim of the work is the optimization of such a scenario at a JIT plant of an automotive Tier-1 supplier operating with the help of AGVs. The goal is to optimize productivity while adhering to certain constraints (sequence of orders according to production line priority, timely supply of empty packaging, etc.). Possible optimization variables include the number of robots used, the average order duration, and the utilization rate. Currently, orders are planned according to a simple priority procedure, whereby ineffective allocations of transport orders to AGVs can occur, such as long distances, delayed allocation of orders, etc.

The problem should first be modeled mathematically and implemented using mathematical programming. Subsequently, solutions will be determined and visualized for small plants' static problem instances (no real-time scheduling).

Key project tasks:

- Literature Review on AGV optimization for production line-feeding
- Development & implementation of a mathematical model to optimize the AGV scheduling
- In-depth result analysis and derivation of managerial implications

Requirements:

Qualified candidates have a major in Supply Chain Management. The ability to work independently, as well as analytical skills, are required. Knowledge of (mathematical) programming is highly recommended. Ideally, candidates have experience with Python. The thesis should be written in English.

Earliest begin: as soon as possible

Supervisor: Moritz Rettinger

Application: Email with curriculum vitae and transcript of records to logtheses.log@mgt.tum.de