

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

## **Application Project**

on the topic

### **Automation of Ordering Decisions in C-Parts Wholesale**

Keller & Kalmbach is a renowned German company specializing in supplying fasteners, fastening technology, and C-parts management solutions. Founded in 1878, the company has established itself as a leading provider in its field. Keller & Kalmbach primarily focuses on providing fasteners and fastening solutions to various industries such as automotive, machinery, construction, and electronics. They offer a wide range of products, with more than 100.000 active SKUs. Managing the procurement of such a great variety of items is complex. Planners rely on decision support systems that provide order proposals and suggest the optimal timing and quantities for placing orders. However, human oversight often remains necessary to validate and refine the recommendations it generates. Planners review the suggestions put forth by the system, a process that can entail sifting through a substantial volume of proposals. A remedy to this monotonous and repetitive task is given by leveraging historical procurement data using machine learning algorithms that can learn patterns and criteria for order proposal validation. The automation of such processes saves time by reducing tasks such as data entry and the search for information in various interfaces. It enables employees to focus on value-added tasks like strategic sourcing and supplier negotiation, enhancing overall productivity and competitiveness. When training suitable machine learning models, feature extraction can enhance the algorithm by identifying and selecting the most relevant information from procurement data to improve decision-making in automated ordering. By extracting features such as item descriptions, quantities, prices, supplier performance metrics, and purchase order history, the algorithms gain deeper insights into the procurement process. The main goal of this interdisciplinary project is to develop a model for automating the process of analyzing and verifying order proposals by utilizing machine learning models trained on historical data. After implementation, it is necessary to assess the effectiveness and feasibility of using this model in Keller&Kalmbach's operations. Furthermore, it is important to obtain a deep understanding of which criteria need to be considered to select groups of products that are appropriate for automated ordering.

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

- Performing a literature review on Machine Learning Applications for Task Automation
- Data cleansing and preparation
- Developing a model to suit Keller&Kalmbach's operational requirements
- Performance Evaluation and cross-validation
- Deriving Managerial insights and decision support for deciding upon suitable products for order automation

#### **Requirements:**

This interdisciplinary project is open to students at TUM with strong programming skills, particularly in Python. Candidates should be able to structure research effectively, encompassing exploration, focusing, validation, and detailing, and work independently. A robust background in implementing, training, and parameterizing Machine Learning models. Teams are preferred.

**Earliest begin:** as soon as possible

**Supervisor:** Mahsa Nakhost

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