MASTER THESIS

DEVELOPMENT OF A LOCAL RAG SYSTEM FOR USE ON THE SHOP FLOOR IN COOPERATION WITH AONIC

Although the use of AI-based assistance systems offers enormous potential for the industry, many companies are critical of this technology, as cloud-based systems are often associated with a loss of control over sensitive production data. Especially in the shop floor environment, data sovereignty and the preservation of expert knowledge built up over many years are crucial. A locally operated RAG (Retrieval-Augmented Generation) system offers a secure, high-performance and customizable alternative.
The aim of the work is to develop a locally executable RAG prototype including hardware and software for the secure and efficient provision of information in the shop floor environment. The focus is on the integration of a local language model, which is supplemented by retrieval components and, in a further step, extended by a knowledge graph.

WORK PACKAGES

- Literature research on the potential of assistance systems on the shop floor
- Literature research RAG and the optimization strategies for RAG
- Identification of the requirements of the RAG system for shop floor applications
- Analysis of available knowledge sources (shop floor documents such as PDFs, instructions, implicit knowledge)
- Development of a local RAG system with a suitable model, considering possible hardware/cost limitations
- Creation of a knowledge graph and connection via GraphRAG
- Analysis of response quality RAG vs. KG
- Documentation and evaluation of usability in an industrial environment

The master thesis is carried out in cooperation with industrial partners from Darmstadt and aims to transfer the solution to a real production environment. It is precisely this practical relevance that makes the Master's thesis particularly valuable and offers the opportunity to gain experience for later work with AI in an industrial environment.

CONTACT
Yuxi Wang
M. Sc.
y.wang@ptw.tu-darmstadt.de

Stefan Schulte
M. Sc.
s.schulte@ptw.tu-darmstadt.de

Christian Kubik
Dr.-Ing.
Christian.kubik@aonic.de

Feel free to contact us with any questions!

START
ASAP

PREREQUISITES
Programming skills (ideally in Python), interest in transferring AI into practice

WE LOOK FORWARD TO RECEIVING YOUR APPLICATION

LEAN. SMART. TRANSFORMATION.

CiP
LINKEDIN
YOUTUBE

CiP
CENTER FÜR INDUSTRIELLE PRODUKTIVITÄT
CENTER FOR INDUSTRIAL PRODUCTIVITY

PTW.TU-DARMSTADT.DE