AI based Production Processes Optimization and Management System Development

Summary

The main objective of the research is to study and develop the AI based Production Processes Optimization and Management System. The main activities of the research are: modification of production monitoring system Dimusa; process optimization and management system prototyping; analysis, forecast and visualization modules. The production process optimization and management system have data collection, analysis, visualisation and data storage modules. As each production system has its own specifics with a huge variety of possible modifications, the system should be flexible for modifications. The trends are: web-based architecture, re-configurability, near real time performance, open-hardware and software, wireless connectivity, self-learning with predictive functionality, supported by cloud computing. The tasks of the work is also to create a digital twin of the production processes, which includes the movement of the materials and labour along the production path and processes. During the work a 3D virtual simulation model and digital-twin will be developed to describe production processes use cases and key indicators and to define a solution method for an artificial intelligence-based management system. During the work, the solution method will be validated and tested using real data from the production system based on the input from food-, wood- or machinery industry. Based on the digital twin, the user interface of the Dimusa operative monitoring system will be created, which uses the functionality of artificial intelligence to control and optimize the tasks and activities of production processes at different stages.

Research field:	Production and materials engineering, robotics, transport and logistics
Supervisors:	Prof. Dr. Jüri Majak Kristo Karjust
Availability:	This position is available.
Offered by:	School of Engineering Department of Mechanical and Industrial Engineering
Application deadline:	Applications are accepted between June 01, 2025 00:00 and June 30, 2025 23:59 (Europe/Zurich)

Description

Applicants should fulfil the following requirements:

- a master’s degree in engineering
- practical and research competences and knowledge in electronics solution design
- a clear interest in the topic of the position
- excellent command of English
- strong and demonstrable writing and analytical skills
- capacity to work both as an independent researcher and as part of an international team
- capacity and willingness to help in organizational tasks relevant to the project

(The following experience is beneficial:)

- General/basic understanding on numerical analysis of structures
- Programming in C++
- Working knowledge of SQL

- Working knowledge of statistics

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