

## Development of a Cognitive Digital Twin for Shop Floor Management: Use Cases in the Learning Factory "FlowFactory"

The increasing digitization of manufacturing processes makes it possible to create cognitive digital twins, where not only the state of physical assets in the production can be mirrored, but algorithms are used to provide behavior through heuristic and AI models. In order to achieve this, new ontologies that encode background knowledge regarding shop-floor entities, their relationship to data sources, algorithms and decision-making opportunities based on algorithm outcome are to be developed. In this thesis, your main task is to develop a cognitive digital twin for shop floor management (SFM). Besides, you will have the chance to further validate your developed concept in the new coming "FlowFactory" at PTW with practical use cases.

The work packages of this thesis are as follows:

- Literature review on the topics of digital twins, cognitive twins, knowledge graph and ontology in the manufacturing
- Literature review on the topics of SFM
- Development of a cognitive digital twin for the SFM in the FlowFactory
- Validation of developed concept in the FlowFactory with practical use cases
- Documentation of the results

We will provide you:

- Intensive supervision through regular meeting
- Possibility to make contribution to the project „FlowFactory“

Reference:

Rozanec, J. M., Lu, J., Kosmerlj, A., Kenda, K., Dimitris, K., Jovanoski, V., ... & Fortuna, B. (2020). Towards Actionable Cognitive Digital Twins for Manufacturing. SeDiT@ ESWC, 2615.

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