COGNITIVE LINE BALANCING SUPPORT

Based on Similarity Detection and Prior Data

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MOTIVATION & GOALS

- Assembly line balancing is a **complex** and **time-consuming** process
- Experts rely on **tacit** knowledge of **prior balancing solutions** and assembly **requirements** (tasks dependencies, resources availability, etc.)
- **Explicitly modelling** all dependencies is not only a **very costly** (because time consuming) task but also **quickly outdated**.
- Instead, our goal is to rely on **prior balancing solutions** to find **similar situations,** and produce a baseline balancing solution

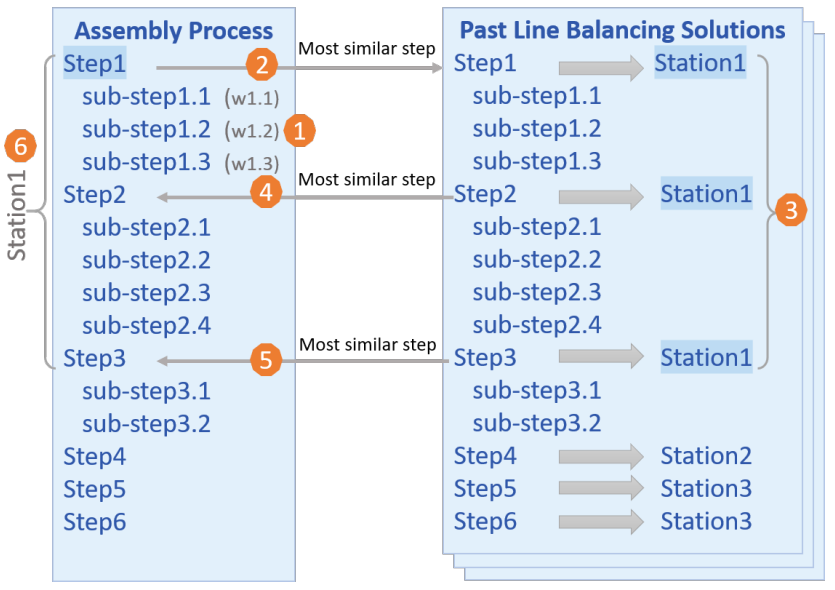
Project FactBox

Project Name LineTACT
Project ID MFP 2.5-2
Duration 24 Months

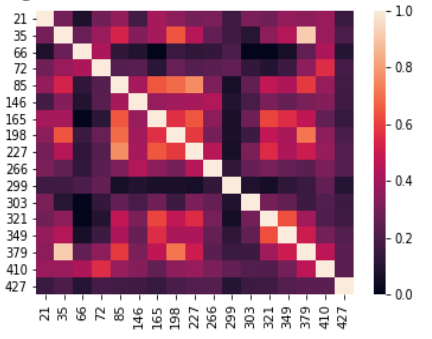
Area 2
Cognitive Robotics & Shopfloors

Project Lead
Dr. Christoph Mayr-Dorn

APPROACH



Related steps are clustered together based on structural similarity calculations with accorded weights.



A heatmap portraying the similarity calculated between steps.

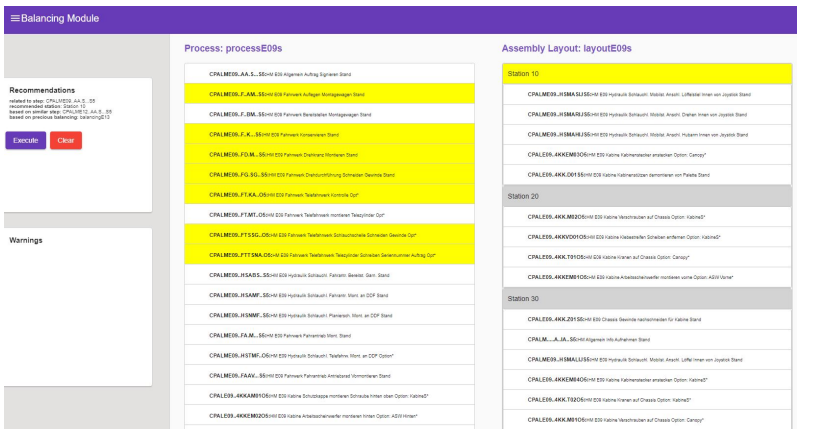
CONTRIBUTION

Scientific contribution
A novel approach for Line Balancing Support reusing prior balancing solutions for different products and extracting similarities.

Economic contribution
This approach will considerably reduce the time and effort currently invested by manufacturing assembly companies, including our industry partner Wacker Neuson, to initially balance new product processes and rebalance existing processes.

PROTOTYPE

- Creates a baseline balancing solution after applying a set of similarity metrics
- The solution can then be refined by the experts
- Station recommendations can be requested for individual steps
- Grouping of related steps (based on the similarity metrics) and allocation to the recommended station
- Warnings are raised in case the new allocation violates some implicitly learned step dependency.



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