OPTIMIZATION FOR AUTOMATED PACKAGING

Assignment

The goal of this intern project is to design and implement an appropriate method to optimize a(n) (ideally generic) packaging machine aiming to also make use of product inflow predictability.

Context

Sioux Technologies has developed for one of its clients a solution that concerns real-time optimization algorithms for the automated packaging of products by robots. Both the packaging boxes and the different types of products flow on conveyor belts, leaving a limited amount of time for the robots to perform packaging each product. The algorithm controls the actions of the robots, determining in which order the products should be packed and which product should go in which box.

Typically, given the machine setup, the objective function is to minimize the number of products that leave the conveyor belt unpacked. There are also several constraints that should be taken into account, for instance, each box should contain the correct number of each type of product. An important other type of constraint is that everything should perform real-time. This makes that the algorithm should be fast and even

Internship overview

- Master Student
- Graduation Assignment
- Mathware
- Location: Eindhoven

Technologies

- Optimization
- Scheduling

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faster with an increased speed of the conveyor belts. There is obviously a commercial incentive to use higher belt speeds.

Our developed solutions perform a last-minute optimization, taking into account (only) all the products that are currently on the conveyor belt. However, the flow of products is typically quite predictable. How can we use this to better optimize the packaging? This requires rethinking the current optimization approach. A second goal is to design a(n) (meta) algorithm that solves a more generic case. For instance, up to now LIME has developed two algorithms for two different machine types and these two algorithms partially differ. As an illustration of a more generic algorithm, imagine that the algorithm can handle any specified number of robots. As a nice-to-have, we would like to obtain a bound on the performance of the algorithm. This would enable us to tell how far the algorithm is maximally off the (in hindsight) optimal solution.

Why choose Sioux?

- Working on innovative technology
- Challenging, dynamic and varied work
- A comfortable and personal work environment
- Plenty of opportunities for personal development
- Great carreer opportunities
- Contributing to a safe, healthy and sustainable society

Get in touch!
Would you like to know more about this student assignment?

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