

Summary

The company Roboxis makes packaging systems mainly for food industries. These systems are build up of standard components in different configurations. This research report focusses on the development of the control part a specific configuration. This configuration consists of a product conveyor that transports the products. The position of each product is determined by a camera system. Parallel to the product conveyor are one or more robots that pick up products, and move them to boxes on a box conveyor .

The main question of this research is how this system should be controlled. The requirements state that all product should be packed and all boxes should be completely filled.

The way the system should work is analyzed using Systems Thinking. This leads to the central question of design: Which product should be put in which box by which robot to achieve the best performance? A strategy to control the system is chosen that continuously determines the best handling solution for a batch of products. Every time a new batch arrives, so new information is available, the previous best solution is revised to determine the current best solution. The part of the previous solution that has not yet been executed will be discarded. This enables the control to determine of a solution per batch. The larger a batch, the less times a solution needs to be calculated.

This method of controlling the system is applied in a simulation. In this simulation a number of algorithms that assign product to boxes is different ways are compared. Lost products and incomplete boxes are counted as a performance indicator. The main factor for high performance is robotcapacity. Sufficient overcapacity will handle fluctuations in input well. However this solution is expensive en not efficient. Test show that significant performance differences exist between the algorithms. This means the choice of algorithm is essential for the performance.

The research has not been finished yet, and is to be continued. We recommend that further research should focus on executing and analyzing a quantitatively amount of simulation runs while altering the amounts and variations of product density. The simulation itself can be improved in different ways as is described in chapter 4 Aanbevelingen. The graphical interface still has to be connected correctly to the underlying simulation.