

Production Scheduling with MultiObjective Optimization (MOO)

Abstract

Case Study: A **Multi Phases Pet 's Food Production Process**.

The Challenge:

According to a weekly changing demand of more than 140 SKU's, the problem to solve was how to produce the expected demand, optimizing each of the phases (extrusion, drying, coating, kibbles storage and packaging) that were restrictive over the others, and changing from fluid to discrete. Individual phases capacities were large enough to make the user feel he could produce the input demand, but there was no way to achieve this goal without the help of this simulator.

The Concept:

This optimizer has been designed to be a trade-off solution, between the optimization of the partial components.

Why Anylogic: We have chosen Anylogic, as we needed to combine discrete and fluid behavior. The Fluid library has been extremely useful for the multi components SKU production, as it allowed to combine different master formulas for a certain finish good.

We also needed to develop an agent that will put together a combination of strategies, to allow each phase to make their own decisions, before optimizing the combination. Due to the large number of possible combinations it was not feasible to develop a standard optimization model, so the use of Anylogic agents, with the internal strategic functions we have developed, allowed us to achieve the Multi Objective Optimization, our final goal.

The use of Optquez, in the optimization experiment, was the final step to get the best weekly detail schedule.

Other features we have used are the ability of Anylogic in choosing the excel file to be used and compare runs features, the ability of connecting Anylogic with Python, for previous and outputs reports and graphical interphase.

The Output:

The output of this simulation/optimization is an optimized detail schedule for each of the process phases.

As a result we have been able to maximize the tons produced and minimize the waist in the different stages, with big savings for the company.

Actually the company is using the model, for their weekly detail scheduling, to be able to fulfill their demand and avoid waist.