Development of control concepts for a continuous pharmaceutical manufacturing line

The ConsiGma^{TM}-25 is an industry-scale from-powder-to-tablet pharmaceutical manufacturing line. The line integrates the following unit operations: twin screw granulation (to produce wet granules), drying (to dry the wet granules), granule-conditioning (to break the large granules and add powders needed for tableting), and tablet press (to produce tablets). The innovative sensors monitoring critical quality attributes (CQA) have been installed and the artificial intelligence (AI) and machine learning (ML) process models linking the process settings and CQAs have been developed. The objective of this thesis is to integrate the process models that are currently available to design a model predictive controller (MPC).
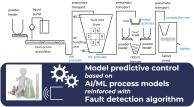
- Possible topics

  (depending on the student's personal interest)

  - Development of MPC in a simulation environment
  - Comparison of MPC performance for different AI/ML process models
  - Improvement of MPC performance with a fault detection algorithm
  - Application of the most promising concepts on the industry-scale manufacturing line

- Start: Right now

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ConsiGma^{TM}-25
from powder to tablet manufacturing line

Model predictive control
based on
AI/ML process models
reinforced with
Fault detection algorithm