Optimal Design and Execution of Reproducible Experiments in robotic Laboratories for Bioprocess Development

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Abstract:

The KIWI-biolab integrates computational tools for dynamical experimental design, advanced process control, and process design, together with state-of-the-art robotic experimental facilities and FAIR data management systems. Our aim is to maximize the efficiency of knowledge generation throughout the complete pipeline of bioprocess development. The main challenge being the lack of reproducible data and trustworthy mathematical models that are the cornerstone for the application of machine learning and Process Systems Engineering tools. To tackle this, we focus our efforts on breaking the vicious circle in bioprocess engineering: on the one hand, robotic experimental systems need proper digital tools and model based algorithms to fully exploit its capabilities; on the other, the largest obstacle for the application of Model Based Engineering in biotechnology is the lack “reproducible machine-actionable experimental data”.