European Network for Business and Industrial Statistics

Contribution ID: **27**   Type: **not specified**

Streamlining Bioprocess Development through Transfer Learning: A Novel Approach to Model Calibration and Experimental Design

Thursday, 29 May 2025 15:38 (3 minutes)

In the rapidly evolving field of pharmaceutical bioprocess development, the application of transfer learning techniques presents a transformative opportunity to enhance model performance and streamline process development activities. One of the key challenges in bioprocess development is the high cost and time associated with generating new experimental data. Transfer learning offers a compelling solution by enabling models to leverage existing data from previously established processes. This reuse of historical data is particularly valuable in the pharmaceutical industry, where product development often involves lengthy experimentation and significant resource investment.

The study investigates the efficacy of transfer learning in leveraging historical process data to inform the development of models for new products. We demonstrate that transfer learning significantly improves the predictive accuracy of process models when applied to process data of unseen products. Our results indicate that utilizing knowledge from previously established processes allows models to leverage process information that is common for both the historical and the new product being studied. This leads to a more efficient calibration of models, significantly reducing the number of required experiments while maintaining comparable performance to traditional Design of Experiments (DoE) approaches. This strategy is especially useful when research for the new product is still in an early phase, where data is scarce

This research highlights the potential of transfer learning as a powerful tool in bioprocess development, paving the way for more informed decision-making in the pharmaceutical industry, as well as providing a method to accelerate the development of new products.

Type of presentation

Poster

Primary author: RESSURREIÇÃO, Miguel (DataHow AG)

Presenter: RESSURREIÇÃO, Miguel (DataHow AG)

Session Classification: Poster

Track Classification: Spring Meeting