

# **Artificial Intelligence in laboratories: Machine and Deep Learning based monitoring of flooding behavior in distillation and extraction columns**

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As part of the KEEN project, TU Dortmund University Laboratory of Equipment Design is conducting research to detect and control the flooding behavior of distillation and extraction columns. Therefore Machine Learning (ML) algorithms can be implemented in automated modular laboratory plants and recognize the flooding behavior of laboratory fluids separation columns. Hence, artificial intelligence (AI) tools with deep learning (DL) offer a high potential for the process industry and allow to capture operating states that are otherwise difficult to detect or model. However, the advanced methods are only hesitantly applied in practice. This talk provides an overview on how artificial intelligence-based algorithms can be implemented in existing laboratory plants. Process sensor data as well as image data are used to model the flooding behavior of distillation and extraction columns and the system is adapted to the existing modular automation standard of the Module Type Package MTP, which allows a simple implementation with high reusability.

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