Data-driven modelling of an industrial anaerobic digestion reactor

Ramin, Pedram; Junicke, Helena; Ramin, Elham; Flores-Alsina, Xavier; Gernaey, Krist V.

Publication date:
2019

Document Version
Peer reviewed version

Citation (APA):
Conference title:
10th IWA Symposium on Modelling and Integrated Assessment (Watermatex)

Conference scope:
International

Conference date:
1-4 September 2019

Conference place:
Copenhagen, DK

Conference URL:
https://www.conferencemanager.dk/watermatex2019/home.html

Talk title:
Data-driven modelling of an industrial anaerobic digestion reactor

Authors:
Pedram Ramin, Helena Junicke, Elham Ramin, Xavier Flores-Alsina, Krist V. Gernaey

Abstract:
This study presents model simulations of an industrial anaerobic digester using two data-driven models, Random Forest and Cascade-forward Neural Network. The two models are compared with a detailed first mechanistic multi-scale model in terms of prediction of methane production and volatile fatty acids formation. Faster simulation times (3E4 times) and the need for only a limited number of input variables (6 instead of 35) are found as key advantages of data-driven models over their more complex mechanistic counterparts, while maintaining similar prediction capabilities. The model will be later used for rapid scenario analysis under different loading and operational conditions.