

IMPROVEMENT AND EXTENSION OF EINDHOVEN WRRF MODEL: THE PATH TOWARDS A DIGITAL TWIN

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BACKGROUND

MT, L&W, C&B

LANGUAGE

English

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Introduction

A Digital Twin (DT) can be considered as the future of water and wastewater treatment modeling and optimization. It is a virtual replica of the physical treatment plant that precisely mimics its operation and behavior in real-time. DT can help the operators to diagnose the potential calamities in the operation of the treatment plant and to take appropriate actions accordingly (cfr. flight simulator for pilots). To achieve a DT, many steps should be considered including but not limited to having a reliable model of the plant, integration of a data cleaning procedure, implementation of scenario analysis and uncertainty analysis, etc.

Methodology

The Eindhoven WRRF has been a subject of modeling and optimization studies for many years. The current model of the plant has been extensively developed and improved over time. However, there are still some improvements and refinements that need to be done to better attune the model for real-time daily use in the context of a DT. Furthermore, an extensive scenario analysis is to be performed and evaluated to determine decision making strategies and training situations for operators.

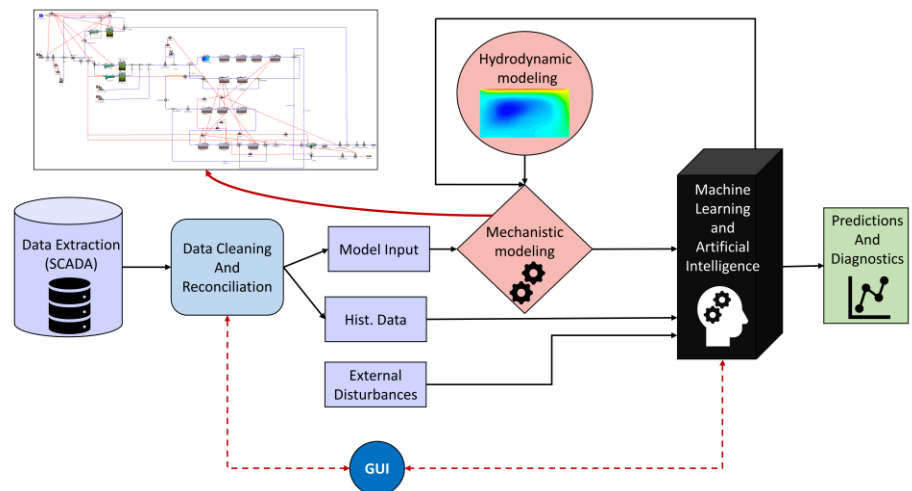


Figure 1. Simplified layout of Digital Twin components

Objectives of the thesis

The focus of this Master thesis is to improve and extend the existing mechanistic model of EH plant and perform scenario analysis to explore important operational scenarios for training and decision making. Prior experience in modeling and simulation as well as basic programming knowledge are required.

