Demo Case Update

From Waternet – Wastewater Treatment Plant Amsterdam West

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Despite the measures which are taken due to the current corona pandemic, considerable progress has been made. At April 15-16 Waternet, KWR, Eurecat and NTUA had a joined online working session on applications of Artificial Intelligence in wastewater treatment. On the first day, the subject was reinforcement learning, on the second day the subject was Soft Sensors. Data scientists as well as wastewater technology experts were present. Focus was on hands-on knowledge exchange and on determining knowledge gaps, priorities and next steps for the partners in the collaboration on the demo case of WWTP Amsterdam West. The working session yielded lots of ideas and insights into the matter and accelerated the definition of next steps.

Although the working session on applications of AI could be done online, unfortunately, the official opening of the research lane at WWTP Amsterdam West, which was scheduled for the 11th of May, had to be cancelled due to the corona lockdown measures. Nevertheless, the setup of the research lane is nearing completion. Sensors have been placed, the required data network infrastructure has been extended and power connections have been installed. Furthermore, the current process automation system (SCADA) has been modified, enabling the use of setpoints determined by the AI models for control of the research lane. In the coming months, the new functionality of the SCADA system will be tested.

Figure 1: Sludge level sensor installation

Currently three models are under development: (1) an AI model for prediction of the influent flow of the treatment plant, (2) an AI model that describes the behaviour of the treatment plant and (3) an AI control model that determines the optimal control settings based on a reward system that includes energy use and nitrous oxide emissions. These three models were coupled and models have been further refined using insights gained during the on-line working session. For example, the prediction horizon of the influent forecast model of RWZI Amsterdam West was extended to 75 minutes with a sliding time horizon. Two AI models (LSTM and FBProphet) were trained and prediction performance was compared. The LSTM model gave the best results for our demo case.

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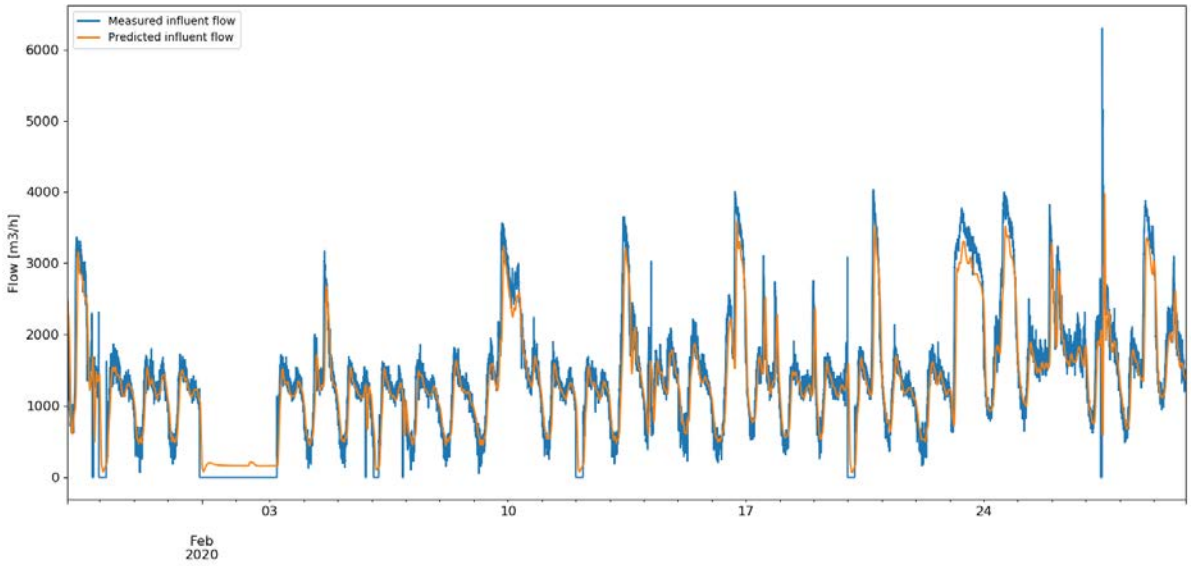

Measured and predicted influent flow for WWTP Amsterdam West on dry and wet weather days

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Project Consortium

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