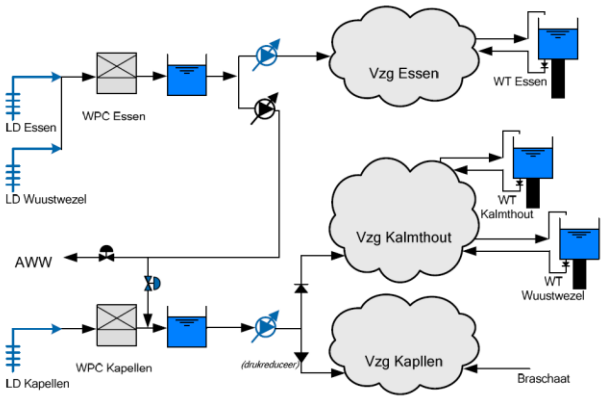
IMPROVING SHORT TERM PREDICTIONS OF DRINKING WATER DEMAND IN FLANDERS FOR MORE STABLE AND ENERGY EFFICIENT WATER PRODUCTION

Introduction

Drinking water utilities are responsible for the drinking water production and supply for huge networks of households and industry (Vzg in figure below). As such they need to guarantee that sufficient drinking water is available in their network at all times (even under conditions of extreme peak demand). At the same time, they aim to keep their production process (WPC) as stable as possible and to plan their production as much as possible during periods of low energy tariffs. Some buffer capacity (buffer tanks and water towers (WT)) exist in the network but a good *prediction* of the expected short term demand in the network is crucial to plan the water production process.



Methodology

This master thesis will be in collaboration with PIDPA (drinking water supplier for the region of Antwerp). Currently, they use rather simple models to predict the short term water demand in their network through a combination of water balances and historical data and patterns (summer, weekend…). Quite some potential for improvement of these models exist which will be the focus of this thesis. Machine learning techniques will be applied for trend analysis in historical data and additional data from smart meters (digital flow meters) in order to better analyze and understand recurring trends which can then be included in the predictive models. Moreover, the thesis will look into integration of new data sources (ex. weather predictions) in the predictive models. Model improvements will first be tested and implemented for a simple network (hydraulically isolated) such as Essen (see Figure). The methodology can subsequently be extended to more complex networks.

Objectives of the thesis

- Make an inventory of existing short term water demand models (literature review + reach out to other drinking water facilities)
- Apply machine learning techniques for pattern analysis on existing data
- Include new data and patterns into predictive models.

SUPERVISOR

Prof. dr. ir. Ingmar Nopens

CO-SUPERVISOR

Prof. Dr. Ir. Jan Verwaeren

Dr. Ir. Elena Torfs

David Geysen (PIDPA)

TUTOR

Daniel Illana

BACKGROUND

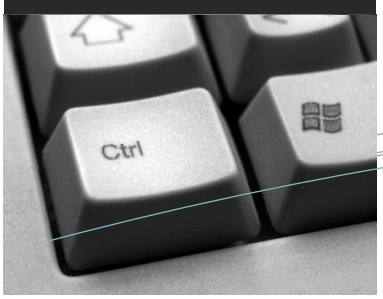
C&B, C&G, M

LANGUAGE

English/Dutch

MORE INFO

Daniel.IllanaGonzalez@UGent.be



CAPTURE BIOMATH