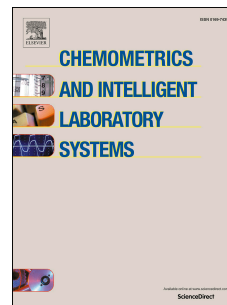


Accepted Manuscript

Development of smart data analytics tools to support wastewater treatment plant operation

Christopher W.K. Chow, Jixue Liu, Jiuyong Li, Nick Swain, Katherine Reid, Christopher P. Saint



PII: S0169-7439(17)30430-6

DOI: [10.1016/j.chemolab.2018.03.006](https://doi.org/10.1016/j.chemolab.2018.03.006)

Reference: CHEMOM 3600

To appear in: *Chemometrics and Intelligent Laboratory Systems*

Received Date: 23 June 2017

Revised Date: 13 February 2018

Accepted Date: 13 March 2018

Please cite this article as: C.W.K. Chow, J. Liu, J. Li, N. Swain, K. Reid, C.P. Saint, Development of smart data analytics tools to support wastewater treatment plant operation, *Chemometrics and Intelligent Laboratory Systems* (2018), doi: 10.1016/j.chemolab.2018.03.006.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

**DEVELOPMENT OF SMART DATA ANALYTICS TOOLS TO SUPPORT WASTEWATER
TREATMENT PLANT OPERATION**

Christopher W.K. Chow^{1*}, Jixue Liu², Jiuyong Li², Nick Swain³, Katherine Reid³, Christopher P. Saint¹

1. Natural and Built Environments Research Centre, School of Natural and Built Environments, University of South Australia, Mawson Lakes, South Australia, Australia
2. School of Information Technology and Mathematical Sciences, University of South Australia, Mawson Lakes, South Australia, Australia
3. SA Water, Adelaide, South Australia, Australia

Abstract

A case study of applying chemometrics approach to develop a real-time industrial process early warning system using online measurements was conducted. An online spectrophotometer was installed for an eighteen-month monitoring study between 2013 and 2015 at the inlet of a wastewater treatment plant. During this time a web-based prototype portal with data integration, visualization, prediction and anomaly detection functions for complex online data sets was developed in-house to assess the spectral data acquired by the spectrophotometer together with other databases (such as rainfall and temperature). Several chemometrics options were trailed to extract useful operational information from the acquired data. In this paper, the anomaly detection function which includes pattern learning and comparison algorithms and a powerful user interface was described in detail. By using the functions, process upsets were successfully detected from the spectral data at the inlet of the treatment plant. The detected events / upsets were then compared with the treatment plant logs and they were found aligned well, which proved that the anomaly detection technique was effective and has the potential to inform decision to assist plant operators. In addition, the proposed anomaly detection technique used a

Download English Version:

<https://daneshyari.com/en/article/7561996>

Download Persian Version:

<https://daneshyari.com/article/7561996>

[Daneshyari.com](https://daneshyari.com)