

## "Anomaly Detection in Water Management Systems"

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Quality of drinking water has always been a matter of concern. Traditionally, water supplied by utilities is analysed by independent laboratories to guarantee its quality and suitability for the human consumption. Being part of a critical infrastructure, recently water quality has received attention from the security point of view.

Real-time monitoring of water quality requires analysis of sensor data gathered at distributed locations, and generation of alarms when changes in quality indicators indicate anomalies. The event detection system should produce accurate alarms, with low latency and few false positives.

This chapter addresses the application of data mining techniques developed for information infrastructure security in a new setting. The hypothesis is that a clustering algorithm ADWICE that has earlier been successfully applied to n-dimensional data spaces in IP networks, can also be deployed for real-time anomaly detection in water management systems. The chapter describes the evaluation of the anomaly detection software when integrated in a SCADA system. The system manages water sensors and provides data for analysis within the Water Security initiative of the U.S. Environmental Protection Agency (EPA). Performance of the algorithm is illustrated and improvements to the collected data to deal with missing and inaccurate data are proposed.