

A novel process monitoring system based on enhanced sensor reliability for sustainable biological wastewater treatment operation

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The efficient implementation of sensors and instrumentation devices is a prerequisite for the successful application of any process monitoring or control system task. However, wastewater treatment plants (WWTP) are notorious for poor data quality and sensor reliability problems due to the hostile environment, missing data problems and more. In spite of sensor failures, the monitoring system in WWTP should be fully operational. This requires a robust and reliable monitoring scheme. A novel process monitoring method combined with a sensor reconstruction scheme to tackle the sensor failure problems is proposed for sustainable biological wastewater treatment operation. The proposed method is applied to a single reactor for high activity ammonia removal over nitrite (SHARON) process. It shows robust monitoring performance in the presence of sensor faults and produces little false alarms. Moreover, it enables us to keep the monitoring system running in the case of the sensor failures. This guaranteed continuity of the monitoring scheme is a necessary development in view of real-time applications in full-scale WWTP's.