

MECHATRONICS BOOK SERIES

CONTROL AND INTELLIGENT SYSTEMS

Momoh Jimoh E. Salami
Abiodun Musa Aibinu
Yasir Mohd Mustafah



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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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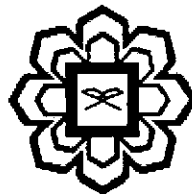
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EDITOR

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Chapter 29

Intelligent SCADA-Based Telemetry System for Monitoring and Controlling of Municipal Sewage Treatment Plant: IIUM, Gombak As a Case Study

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29.1 Introduction

Currently there are 8 sewage treatment plants (STP) located at different locations inside the Gombak campus of International Islamic University Malaysia (IIUM). Despite the fact that sophisticated technologies for system integration and networking are readily available with the cost constantly reducing, those STP are still operated and inspected by technical personnel of IIUM Properties Sdn. Bhd., who periodically visits these sites to check on the operation, control, and performance of the plants. Noted that, there is no centralized procedure in monitoring the overall control and processes of the STP, coupled with the fact that several equipment and devices which are attached to these plants are not integrated with one another. Consequently, performance of the plant is badly affected due to the absence of the inspector at the event of the failure of the devices [1]. This would result in ineffective monitoring of critical parameters, possibility of prolonged downtime, invalid data generation, and poor maintenance of the auxiliary equipments attached to the plant. Due to the mentioned factors, the pollution level and the quality of water for the populace will be at risk.

- I. Recent advancement in microelectronics has motivated many researchers and industrialists to exploit more sophisticated electronics to monitor and control many plant processes. In particular, remote monitoring and control of sewage treatment plants becomes inevitable in many large cities worldwide as there is need to provide efficient services to the ever growing populace. Whilst there are many approaches in achieving this, however, those based on Supervisory control and data acquisition (SCADA) have been reported to be quite effective and efficient [2-3]. Distance and remoteness are two major factors for implementing SCADA systems [4-5]. The use of SCADA system allows remote sites to communicate with one another as well as with the central unit, and this becomes important as either distance to remote sites increase or sites accessibility become difficult.

Motivated by the above mentioned problems and the recent advancement in microelectronics, data-acquisition systems, and remote monitoring and control of systems the development of i-SCADA System is proposed to investigate a comprehensive intelligent monitoring and control schemes for the STP in the Gombak campus. It is aimed to incorporate Supervisory Control and Data Acquisition (SCADA) system so that all 8 plants can be properly linked and integrated, thereby improving the monitoring and controlling of the plant activities. To further improve their performance, this SCADA system will be made intelligent (resulting to 'i-SCADA' term) so that the level of human supervision to the system can be decreased. Also, wireless Local Area Network (LAN) is used to integrate the Main Terminal Unit (MTU) and other eight Remote Terminal Units (RTU) located at each STP.