Wireless Sensor Network Based Real-Time Monitoring System Applications

THESIS

Submitted to Faculty of Science-Ain Shams University in partial fulfillment for Degree of master in Physics

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Contents

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Abstract

A low-cost wireless sensor network (WSN) solution for real-time monitoring of water quality is introduced and experimentally demonstrated. The investigated system provides monitoring of ammonia concentration in water which plays a critical role for aquatic organisms due to its toxic and hazardous effects on them. Additionally, the system can sense water pH, water temperature, and ambient temperature. It is capable of periodically sensing different parameters, then sending parameters captured data to a virtual cloud called ThingSpeak that providing monitoring data remotely via Internet through mobile phone or PC and analyzing them to send alert to the user through IFTTT platform when any parameter's value is out of its safety range. Besides, the system supports sleep/wake-up mechanisms for power saving.

The proposed system can be used in several areas interested in water quality monitoring such as monitoring and contamination detection of water bodies (lakes, rivers, ponds, etc.). Also, it provides water quality monitoring in aquaculture, and aquaponics farms that help in enhancing food productivity and food security. Furthermore, it can be used for drinking water monitoring, irrigation water monitoring, etc.

Keywords

Wireless Sensor Networks, Internet of Things (IoT), Multi-sensor system, Interface circuit, Water quality monitoring

List of Figures

List of Tables