PARALLEL DATA FUSION FOR AN INDUSTRIAL AUTOMATIC MONITORING SYSTEM USING RADIAL BASIS FUNCTION NETWORKS

WEN-TSAI SUNG* AND CHIA-HAO CHEN

Department of Electrical Engineering
National Chin-Yi University of Technology
No.35, Lane 215, Section 1, Chung-Shan Road, Taiping City, Taichung County, 411 Taiwan
*Corresponding author: songchen@ncut.edu.tw

ABSTRACT. *This paper proposes a Radial Basis Function (RBF) network method to process parallel data fusion computation for Industrial Automatics Monitoring System (IAMS) architecture. This study applies parallel data fusion technology to real-time multiple sensor data signal recognition in a wireless sensor network (WSNs) system using a node–sink mobile network structure. The IAMS includes temperature, humidity, multimeter and PH-concentration, four variable measurements with a database system approach that significantly improves classification data fusion system capacity. The classification fusion system examined here employs parallel computing, which increases the system data fusion rate via RBF. To efficiently manage the classification fusion system outlets and apply database RBF technology to processing data fusion, we propose a ZigBee controller model with neural network learning functions. The ZigBee controller model has several default conditions to wake up the power outlets and control the dimming over various limiting values. By using RBF technology learning functionality, the ZigBee controller model can improve the parallel data fusion calculation for real-time IAMS for factory appliance remote control. The IAMS system project is considered an implemented case study on the Yang-Fen Automation Electrical Engineering Company and SUREWIN Technology Company. The experiment was continued for six months. The engineers also operate a web-based classification parallel data fusion system. The analyzed cooperative plan will be described in detail.*

Keywords: Radial basis function, Wireless sensor networks, Industrial automatics monitoring services, Parallel data fusion

1. **Introduction.** Multi-sensor data fusion has found increasing widespread applications in industrial automatic monitoring system research. The purpose of real-time multi-sensor data fusion is to dynamically estimate an improved system model from a set of data from multiple sensors. In the last five years, this has been reflected in the literature, as well as in an increasing number of sessions at international conferences with numerous national and international projects funded on this topic. This investigation designed various sensors onto experimental circuit boards to monitor temperature, humidity, multimeter and ph-concentration measurements for IAMS. These nodes are usually small and inexpensive, allowing them to be deployed on a large scale such as a factory, farmland... and so on. These sensors usually have a wireless link that can be used to extract the information captured by the sink node.

Techniques for machine condition monitoring and diagnostics are gaining acceptance in various industrial fields. The industrial automation market periodically undergoes major shifts as new technologies improve the functionality and economics of industrial monitoring and control systems. Industrial monitoring and control systems have been