Special Issue on Novel Sensors, Materials, and Related Technologies on Artificial Intelligence of Things Applications Part 3-2

Preface

In recent years, the booming economic development in Asia, particularly the leading manufacturing industries from automobiles, machinery, computers, communication, consumer products, and flat panel displays to semiconductors and micro/nano areas have attracted intense attention among universities, research institutions, and many industrial corporations. Therefore, applications of novel sensors, materials, and related technologies in electronic and mechanical devices have become rapidly developing fields. Manufacturing is the economic lifeline of a country and has been regarded as a labor-intensive industry. To reduce production costs, devices for the Internet of Things (IoT) have been widely developed. IoT is composed of most integrated end devices and facilities, such as intelligent sensors for internal control, industrial systems, mobile terminal systems, floor control systems, and home intelligent facilities. Smart devices and external control information are utilized with the hope of attracting companies that manufacture high-value-added products in the fields of aerospace, automotive, Information Technology (IT) molds, textiles, optoelectronics, watches, medical devices, automation, energy, and semiconductor-related parts and components to drive the country's economy. Therefore, the key to maintaining a competitive advantage in domestic manufacturing in the future still relies on the development of novel manufacturing and precision machinery-related technologies.

In addition, artificial intelligence (AI) is intelligence exhibited by machines, particularly computer systems. The artificial intelligence of things (AIoT) is the combination of AI technologies with IoT infrastructure to achieve more efficient IoT operations, improve human–machine interactions and enhance data management and analytics. The scope of this special issue entitled "Novel Sensors, Materials, and Related Technologies on Artificial Intelligence of Things Applications" covers fundamental and novel sensors, materials, and technologies related to AIoT for electronic, mechanical, and electrical engineering, including their synthesis and integration with many elements, the design of electronic and optical devices, sensing technologies, evaluation of various performance characteristics, and exploration of their broad applications to industry, environmental control, materials analyses, and so forth. In part 3-2 of this special issue, 11 excellent papers in four categories of sensors and materials fields have been selected.

(1) Physical/Mechanical Sensors: "Design of a Dual-axis Solar Tracking Mechanism" by Lin *et al.*

(2) Bio/Chemical Sensors: "IoT-enhanced Fuzzy-creative Quadrant Evaluation Framework for Cultural and Creative Products: A Case Study of Shanghai Jinshan Farmer Paintings" by Lu *et al.*

(3) Related Technologies: “Real-time Vehicle Detection and Distance Estimation: Soft-sensor Approach Using Optimized You Only Look Once Version 5 and Perspective Geometry” by Ni *et al.*, and “Communication Protocol and Network Deployment Design for Wireless Sensor Network” by Ni *et al.*, and “Scientific Knowledge Communication on IoT Platform Environments: An Empirical Study on the Text and Short Videos” by Ding *et al.*, and “IoT-driven Framework for Enhancing Human Resource Management System in Digital Era” by Shi *et al.*

(4) Sensor Applications: “Evaluation of Tourism Development Efficiency Using Multisource Sensor Data: A Case Study in China” by Liu *et al.*, and “Integration of IoT and Sensor Technology in Sports Performance Tracking and Analysis” by Chen and Liu, and “Structured Sensor Data Aggregation for Real-time Analysis in Cloud Computing” by Kou and Zheng, and “C2 Block + Parallel Spatial Attention Module-Ghost Convolution-Feature Diffusion Pyramid Network-You Only Look Once (YOLO)-v11n: An Efficient and Real-time Small Object Detection Algorithm Based on YOLOV11n” by Fan *et al.*, and “Multilevel Knowledge Distillation with U-Net for Resource-constrained Antenna Gain Prediction on IoT Edge Devices” by Lin *et al.*

The guest editors thank the authors for their contributions to this special issue and all the reviewers for their constructive comments. We are also grateful to the editorial staff for their time and efforts on the publication of this special issue of *Sensors and Materials*.

Dr. Teen-Hang Meen
Lifetime Distinguished Professor, Department of Electronic Engineering
National Formosa University, Taiwan

Dr. Wenbing Zhao
Professor, Department of Electrical Engineering and Computer Science
Cleveland State University, USA

Dr. Cheng-Fu Yang
Professor, Department of Chemical and Materials Engineering
National University of Kaohsiung, Taiwan