

SPECIAL ISSUE ON NOVEL SENSORS, MATERIALS, AND RELATED TECHNOLOGIES ON ARTIFICIAL INTELLIGENCE OF THINGS APPLICATIONS: PART 6-1

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 6-1 of this special issue, 13 excellent papers in two categories of sensors and materials fields have been selected.

- (1) Related Technologies: “Auscultation Support System for Chronic Obstructive Pulmonary Disease Prediction Using Convolutional Neural Network and Long Short-term Memory Models” by Wu *et al.*, and “Running Biomechanics Analysis for Efficient Training and Injury Prevention Based on Sensor Data” by Liang and Yuan, and “Real-time Sensor Monitoring System for University Sports Training” by Zhang and Hu, and “AI-assisted Vision-based Sensing System for Printed Circuit Board Defect Detection Using You Only Look Once” by Wu *et al.*, and “Natural Language Processing Model to Enhance Coherence and Cohesion in College Writing” by Ding *et al.*, and “Graphiti Model Context Protocol Server: Implementation and Performance Evaluation of a Knowledge-graph-based AI Code Intelligence Framework” by Yang *et al.*, and “Interactive Design of AI-integrated and Sensor-based Food Packaging with Innovative Incorporation of Arts and Crafts Elements” by Chen *et al.*, and “Predictive Maintenance for Smart Appliances of Multiple Manufacturers Using Feature Disentanglement and Multimodal Sensor Data” by Li and Mao, and “From Static Thresholds to Smart Baselines: Incremental AI Enhancement for Industrial Time Series Data Monitoring” by Tang *et al.*, and “Impact of Sensor Technology and Virtual Production Equipment Integration on Film Model-making: Comparative Analysis of Traditional-craftsmanship-based and Virtual-reality-based Digital Workflows” by Yang *et al.*, and “Sensor-integrated Deep Learning Model for Elderly Care Coordination in Industrial Transition Regions of China: Architecture, Calibration, and Validation” by Geng *et al.*
- (2) Sensor Applications: “Optimization of a Wayfinding Visual Communication System for Intangible Cultural Heritage Exhibitions Based on Eye Tracking and Context-aware Sensing: A Case Study of Shanghai Jinshan Peasant Painting” by Zhuang and Yang, and “Sensor-assisted Intelligent Manufacturing Execution System Architecture for Digital Transformation, Intelligent Decision-making, and Enterprise Performance Enhancement” by Chen *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