

SPECIAL ISSUE ON NOVEL SENSORS, MATERIALS, AND RELATED TECHNOLOGIES ON ARTIFICIAL INTELLIGENCE OF THINGS APPLICATIONS: PART 2-1

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 2-1 of this special issue, 14 excellent papers in four categories of sensors and materials fields have been selected.

- (1) Physical Mechanical Sensors: "Damage Diagnosis for Wet Joints of Prefabricated Beam Bridges Monitored within One Cluster Using the Data Obtained from Distributed Optical

Sensing Fibers” by Zhang *et al.*, and “Development of a Computer-aided Design Packaging Machine” by Lai *et al.*

- (2) Materials: “Molecular Dynamics Simulation of Mechanical Characteristics of Nanoscale Iron Particles during Laser Powder Bed Fusion Additive Manufacturing” by Lai *et al.*, and “Separation and Purification of Degradation Products from Spent *Auricularia auricular* Substrate Oxidized Via Hydrogen Peroxide/Acetic Anhydride Using Polyamide Column Chromatography” by He *et al.*
- (3) Related Technologies: “Improving Wind Power Forecasting Technology Using Multiple Technologies” by Wang *et al.*, and “Designing Pressure-relieving Eyeglass Frame Using Analytic Hierarchy Process, Quality Function Deployment, and Theory of Inventive Problem Solving (TRIZ)” by Shen *et al.*, and “Wearable Technology: Merging Computer Processing with Sensor Technology for Health Monitoring” by Ren and Du, and “Enhancing Engagement in Virtual Classroom in Higher Education Using Artificial Intelligence” by Li *et al.*, and “Artificial Intelligence-based Immersive Virtual Reality Technology in Digital Dissemination of Intangible Cultural Heritage” by Zhao *et al.*, and “Optimization of Coffee Grinder Quality Characteristics under a Sensor-driven Framework: An Experimental Study Based on the Taguchi Method” by Huang *et al.*, and “Deep-learning-based Detection of Citrus Pests and Diseases via Image Recognition” by Wang *et al.*, and “Image-based Analysis of Mass Spectrometry Data for Noninvasive Gastric Cancer Detection” by Chen *et al.*
- (4) Sensor Applications: “Smart Platform for Matching and Optimizing Barter Using Artificial Intelligence and Blockchain” by Qian *et al.*, and “Design of Home-based Rehabilitation Robot Using Joint-automated-combat-knowledge Virtual Simulation for Patients with Upper Limb Hemiplegia” by Xu *et al.*

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