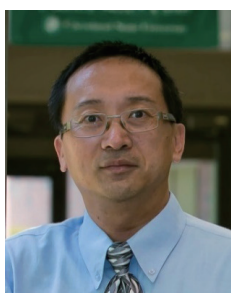# SPECIAL ISSUE ON NOVEL SENSORS, MATERIALS, AND RELATED TECHNOLOGIES ON ARTIFICIAL INTELLIGENCE OF THINGS APPLICATIONS: PART 1-1

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

(1) Physical/Mechanical Sensors: "UV-C Light Detection in Aluminum Gallium Oxide Metal-Semiconductor-Metal Photodetectors" by Liao *et al.*, and "Multilayer Metamaterial-based

Absorber with Ultra-wideband Performance from Visible to Mid-infrared Range" by Wang *et al.*

(2) Related Technologies: "Performance Enhancement of Microbial Fuel Cells Using Graphene-coated Stainless Steel Mesh Anodes via Electrophoretic Deposition" by Hsu and Lin, and "Large Language Model-driven Human-AI Collaboration: An Innovative Approach for Training and Knowledge Construction in Undergraduate Electronics Design Competitions" by H.-C. Chen and Q. Chen, and "Adaptive Fuel Consumption Strategy Based on Operating Conditions of Plug-in Hybrid Electric Vehicles" by Chang *et al.*, and "Simulation of Noise Control of Elliptical Muffler in Smart Venting Flow-altering System" by Lan *et al.*, and "High-precision Wildfire Detection Algorithm Using an Enhanced You Only Look Once Model in a Jetson Xavier Environment" by Kim *et al.*, and "IoT-driven Dynamic Risk Management in Supply Chain Finance: A Multitechnology Fusion Framework and Collaborative Implementation Strategies" by Liu *et al.*, and "Evaluating Nanyin Promotion Effectiveness-An Integrated Framework Using IoT, Delphi Method, and Fuzzy Analytic Hierarchy Process" by Zhou *et al.*

(3) Sensor Applications: "Smart Trash Can Based on AI and IoT" by Liao *et al.*, and "Application of Remote Sensing to Assess Land Ecological Sensitivity" by Hsu *et al.*, and "Impact of Brand Image and Perceived Value on Consumer Purchasing Behavior in the Era of Internet of Things: A Study of Cross-border E-commerce in the Thailand Market" by Pang *et al.*, and "Thermal Hazard Alarm System in Wind Turbines Based on Nanoparticle Detection" by Du *et al.*

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