

**SPECIAL ISSUE ON NOVEL SENSORS, MATERIALS, AND RELATED TECHNOLOGIES  
ON ARTIFICIAL INTELLIGENCE OF THINGS APPLICATIONS PART 3-1**

**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 3-1 of this special issue, 15 excellent papers in four categories of sensors and materials fields have been selected.

(1) Physical Mechanical Sensors: "Pressure Analyses of Instant Turbulence and Vibration between Two Passing High-speed Trains" by Chang *et al.*, and "Structure of Integrated

Device for Bicycle Safe Braking and Smart Directional Warning Lights” by Chuang *et al.*, and “Optimized Near-field Electrospinning of Polyvinylidene Fluoride Fibers for Enhanced Piezoelectric Sensor Performance” by Lee and Chen, and “Design Optimization of Dual-outlet Blower Motor Using Finite Element and Taguchi Methods for Air-conditioning Applications” by Chang *et al.*

- (2) Materials: “Chemical Formula Analysis of High-elasticity Alloys Using Short-range-ordered Structure Model” by Hong *et al.*
- (3) Related Technologies: “Bipolar Switching Properties and Electrical Conduction Mechanism of Silicon Carbide Thin-film Resistive Random-access Memory Devices” by Chen *et al.*, and “Novel Design of Low-power Double Node Upset Tolerant Latch Cell” by Huang *et al.*, and “Building a Monitoring Mechanism for Water Pipe Spatial Status in a Cyber-physical System” by Ye *et al.*, and “Deep-learning-based Character Recognition of Aerospace Alloy Components for Automated Quality Inspection” by Lee *et al.*, and “Detection and Classification of Automobile Wheel Hub Surface Defects Using You Only Look Once Version 8” by Zhang *et al.*, and “Deep-learning-driven Online Tool or Automated Strabismus Diagnosis” by Wang *et al.*, and “Design of Real-time Diaper Monitoring System Based on Message Queuing Telemetry Transport and Application Programming Interface” by Wu *et al.*, and “Development of Sensor-embedded Instrument for Assessing Impaired Hand Function in Patients with Moderate to Mild Stroke” by Wang *et al.*, and “Mixed Reality Shopping-task-based Intervention for Cognitive Engagement in Aging” by Huang *et al.*
- (4) Sensor Applications: “Design and Implementation of Web-based Remote Monitor and Control System Using Raspberry Pi, Programmable Logic Controller, and Django Framework” by Chen *et al.*

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