

SPECIAL ISSUE ON INNOVATIONS OF SENSOR APPLICATIONS AND RELATED TECHNOLOGIES IN IOT PART 3-1

PREFACE



In recent years, applications of novel sensors and related technologies in electronic and mechanical devices have become rapidly developing fields. The booming economic development in Asia, particularly in leading manufacturing industries such as automobiles, machinery, computers, communications, flat panel displays, semiconductors, and micro/nanoscale technologies, has attracted intense attention among universities, research institutions, and many industrial corporations. Manufacturing is the economic lifeline of a country and has been regarded as a labor intensive industry. To cut production costs, devices for the Internet of Things (IoT) have been widely developed. IoT systems can be 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 aim of attracting companies that manufacture high-value-added products in the fields of aerospace, automotive, IT molds, textiles, optoelectronics, watches, medical devices, automation, energy, and semiconductor-related parts and components to drive a country's economy. Therefore, the key to maintaining a competitive advantage in domestic manufacturing in the future is still to promote the development of novel manufacturing and precision-machinery-related technologies.

The scope of this Special Issue, "Innovations of Sensor Applications and Related Technologies in IoT," covers fundamental sensors and materials used in electronic, mechanical, and electrical engineering including their synthesis and integration with many elements; the design of electronic and optical devices; sensing technologies; the evaluation of various performance characteristics; and the exploration of their broad applications to industry, environmental control, materials analyses, and so forth. The part 3-1 of this special issue selects 14 excellent papers about four categories of sensors and materials fields:

(1) Physical Mechanical Sensors: "Use of Finite Element Method Software to Assess the Safety of a Newly Designed Electric Motorcycle Frame" presented by Dai *et al.*, and "Bioelectromagnetic-response-based Input Interface for Mobile Devices—Finger Identification Using Bioimpedance Characteristics—" presented by Muramatsu.

(2) Related Materials: “Development of Physical Vapor Deposition Technique and Testing on Ceramics and CoCrMo Alloys” presented by Lai and Chang.

(3) Related Technologies: “A Substrate-integrated Waveguide Bandpass Filter for 5G Applications” presented by Huang *et al.*, “Improved Boost Converter with Functions of Adjustable Output Voltages and Currents” presented by Tsai and Peng, “ChatGPT-powered Inquiry-based Learning Model of Training for Intelligent Car Racing Competition” presented by Chen *et al.*, “Impact of Various Solvents on Extraction of Anthocyanins from Blueberry for Use in Dye-sensitized Solar Cells” presented by Yuan *et al.*, “Development of Energy Storage System Communication Platform with Redundant Station Launched by Transmission Control Protocol/Internet Protocol Connection Detection” presented by Wan *et al.*, “Control Strategies for Photovoltaic Energy Storage Systems” presented by Tsai *et al.*, “Application of Big Data Analysis of Traffic Accidents and Violation Reports for Improving Traffic Safety” presented by Yang *et al.*, and “Integrating 5G and TETRA into Railway Communication System for Railway Safety and Information Security” presented by Hsiao and Lin.

(4) Sensor Applications: “Intrusion Detection in IoT Network Traffic Using Markov Model” presented by Liu *et al.*, “Prediction Model of Residual Current Based on Grey Association and Neural Network” presented by Sun, and “Building Facility Management System Using Sensors and Digital Technologies” presented by Hsieh *et al.*

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

Dr. Teen-Hang Meen

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