PROCEEDINGS OF SPIE

Third International Conference on Testing Technology and Automation Engineering (TTAE 2023)

Zain Anwar Ali
Inès Chihi
Editors

15–17 September 2023
Xi'an, China

Organized by
Guangzhou Maritime University (China)

Sponsored by
Hunan University (China)
Northwestern Polytechnical University (China)
AEIC—Academic Exchange Information Centre (China)

Published by
SPIE

Volume 13079

Proceedings of SPIE 0277-786X, V. 13079

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:
Author(s), "Title of Paper," in *Third International Conference on Testing Technology and Automation Engineering (TTAE 2023)*, edited by Zain Anwar Ali, Inès Chihi, Proc. of SPIE 13079, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X
ISSN: 1996-756X (electronic)

ISBN: 9781510674769
ISBN: 9781510674776 (electronic)

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time)
SPIE.org
Copyright © 2024 Society of Photo-Optical Instrumentation Engineers (SPIE).

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE. DIGITAL LIBRARY
SPIEDigitalLibrary.org

Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B … 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

vii *Conference Committee*

INTELLIGENT INSTRUMENT AND PRECISION MONITORING TECHNOLOGY

13079 02 **On-line monitoring technology of non-uniform settlement of DC earthed pole line tower** [13079-14]

13079 03 **Calculation method for machining error of thin-walled parts based on on-machine measurement** [13079-41]

13079 04 **Health detection of high-speed train pantograph based on deep belief network** [13079-51]

13079 05 **Research on steam meter calibration in cigarette factory based on machine learning** [13079-50]

13079 06 **A local processing method for gamma spectral drift based on multienergy windows approach** [13079-12]

13079 07 **Development of an ultra-high pressure hydraulic hose assembly pulse test system** [13079-47]

13079 08 **A target-free stereo matching method of 3D vision-based for measuring composite fiber bundles** [13079-5]

13079 09 **Research on residual stress detection and evaluation methods for lifting equipment based on magnetic anisotropy detection technology** [13079-16]

13079 0A **Electric locomotive grounding detection circuit optimization** [13079-8]

13079 0B **Study on the calibration method of chemiluminescence nitrogen analyser** [13079-60]

13079 0C **Study on calibration of oxygen index measuring instrument** [13079-30]

13079 0D **Numerical simulation study on wet gas flowmetering overreading characteristics of venturi tube under low pressure conditions** [13079-45]

13079 0E **Study on the multiparameter monitoring system in the old VLCC for offshore oil storage** [13079-31]

13079 0F **Determination of cadmium, copper, lead, platinum, antimony, tellurium in high content silver jewelry by laser ablation inductively coupled plasma mass spectrometry** [13079-59]

13079 0G **Research on optical remote sensing image detection technology based on improved YOLOv5s** [13079-61]

13079 0H **Strawberry detection model based on YOLOv5s-MNSX-C-D network** [13079-55]

13079 0I **Real-time fall detection system based on postural changes** [13079-7]

13079 0J **Research on temperature prediction of lithium battery based on GA-Elman** [13079-36]

13079 0K **Research on detection and localization of buoyancy material damage in manned submarine vehicles based on PVDF spherical transducers and wavelet threshold denoising** [13079-25]

13079 0L **Development of stray current detection system for buried steel pipeline based on STM32** [13079-20]

13079 0M **Application case of typical river crossing pipeline buried depth and anti-corrosion layer detection based on ROV robot** [13079-18]

13079 0N **Aerodynamic force and flow field analysis of the discharge speed regulation process of the pipeline inner detector** [13079-4]

INTELLIGENT MACHINERY MANUFACTURING AND AUTOMATION CONTROL

13079 0O **Research on scheduling of multiple equipment in flexible production line system based on tool data acquisition** [13079-2]

13079 0P **A software reconfiguration method for CPU of satellite-board controller** [13079-37]

13079 0Q **Design of upper computer for multichannel data acquisition system based on LabVIEW serial communication** [13079-22]

13079 0R **Research on fault diagnosis and pre-maintenance of tobacco machine based on fault tree and support vector machine model** [13079-42]

13079 0S **Research on satellite platform and payload integrated design and vibration suppression** [13079-56]

13079 0T **Protocol conversion method of PCI communication bus to VME communication bus based on FPGA** [13079-38]

13079 0U **Application of model-based systems engineering in the design of civil aircraft provide guidance system architecture** [13079-13]

13079 0V **The effect of magnetic flux concentrator uniformity on GMR (Giant Magnetoresistance) biosensor performance-based simulation analysis** [13079-34]

13079 0W **Research on digital twin technology of substation grounding network state** [13079-40]

13079 0X **The design and analysis of a humanoid thoracic cavity platform** [13079-32]

13079 0Y **Trajectory tracking control of autonomous vehicles based on improved model-free adaptive control** [13079-10]

13079 0Z **Research and implementation of remote time synchronization system based on optical fiber** [13079-35]

13079 10 **Recognition and control of movement intention in 7-DOFs robot position mode** [13079-11]

13079 11 **Study on design of a human vital signs simulator** [13079-26]

13079 12 **Design of a multifinger flexible exoskeleton robotic hand driven by a single motor and wires** [13079-19]

13079 13 **Research on bearing fault diagnosis based on the stacking strategy** [13079-43]

13079 14 **Rolling bearing fault diagnosis based on multiple wavelet feature fusion method** [13079-44]

13079 15 **Technical scheme analysis and key technology combing of aerospace cryogenic tank** [13079-24]

13079 16 **Research on background noise separation of speed reducer based on WOA optimized VMD** [13079-33]

13079 17 **Research on load characteristics of Typhoon Muifa based on test** [13079-6]

13079 18 **Multisource weighted domain adaptive network for bearing fault diagnosis** [13079-21]

13079 19 **Design and implementation of an intelligent control system for hydroponic environment** [13079-39]

13079 1A **Research on gear error evaluation algorithm based on all gear edge data points** [13079-3]