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.

Third International Conference on Testing Technology and Automation Engineering (TTAE 2023), edited by Zain Anwar Ali, Inès Chihi, Proc. of SPIE Vol. 13079, 1307901 © 2024 SPIE · 0277-786X · doi: 10.1117/12.3029027

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.



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 OB	Study on the calibration method of chemiluminescence nitrogen analyser [13079-60]
13079 OC	Study on calibration of oxygen index measuring instrument [13079-30]
13079 OD	Numerical simulation study on wet gas flowmetering overreading characteristics of venturi tube under low pressure conditions [13079-45]
13079 OE	Study on the multiparameter monitoring system in the old VLCC for offshore oil storage [13079-31]
13079 OF	Determination of cadmium, copper, lead, platinum, antimony, tellurium in high content silver jewelry by laser ablation inductively coupled plasma mass spectrometry [13079-59]
13079 OG	Research on optical remote sensing image detection technology based on improved YOLOv5s [13079-61]

13079 OH	Strawberry detection model based on YOLOv5s-MNSX-C-D network [13079-55]
13079 01	Real-time fall detection system based on postural changes [13079-7]
13079 OJ	Research on temperature prediction of lithium battery based on GA-Elman [13079-36]
13079 OK	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 OL	Development of stray current detection system for buried steel pipeline based on STM32 [13079-20]
13079 OM	Application case of typical river crossing pipeline buried depth and anti-corrosion layer detection based on ROV robot [13079-18]
13079 ON	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 00	Research on scheduling of multiple equipment in flexible production line system based on tool data acquisition [13079-2]
13079 OP	A software reconfiguration method for CPU of satellite-board controller [13079-37]
13079 OQ	Design of upper computer for multichannel data acquisition system based on LabVIEW serial communication [13079-22]
13079 OR	Research on fault diagnosis and pre-maintenance of tobacco machine based on fault tree and support vector machine model [13079-42]
13079 OS	Research on satellite platform and payload integrated design and vibration suppression [13079-56]
13079 OT	Protocol conversion method of PCI communication bus to VME communication bus based on FPGA [13079-38]
13079 OU	Application of model-based systems engineering in the design of civil aircraft provide guidance system architecture [13079-13]
13079 OV	The effect of magnetic flux concentrator uniformity on GMR (Giant Magnetoresistance) biosensor performance-based simulation analysis [13079-34]
13079 OW	Research on digital twin technology of substation grounding network state [13079-40]
13079 OX	The design and analysis of a humanoid thoracic cavity platform [13079-32]

3079 OY	Trajectory tracking control of autonomous vehicles based on improved model-free adaptive control [13079-10]
3079 OZ	Research and implementation of remote time synchronization system based on optical fiber [13079-35]
3079 10	Recognition and control of movement intention in 7-DOFs robot position mode [13079-11]
3079 11	Study on design of a human vital signs simulator [13079-26]
3079 12	Design of a multifinger flexible exoskeleton robotic hand driven by a single motor and wires [13079-19]
3079 13	Research on bearing fault diagnosis based on the stacking strategy [13079-43]
3079 14	Rolling bearing fault diagnosis based on multiple wavelet feature fusion method [13079-44]
3079 15	Technical scheme analysis and key technology combing of aerospace cryogenic tank [13079-24]
3079 16	Research on background noise separation of speed reducer based on WOA optimized VMD [13079-33]
3079 17	Research on load characteristics of Typhoon Muifa based on test [13079-6]
3079 18	Multisource weighted domain adaptive network for bearing fault diagnosis [13079-21]
3079 19	Design and implementation of an intelligent control system for hydroponic environment [13079-39]
3079 1A	Research on gear error evaluation algorithm based on all gear edge data points [13079-3]

Conference Committee

Conference Chairs

Minqing Wang, Northwestern Polytechnical University (China) **Xianbin Teng**, Guangzhou Maritime University (China)

Publication Chairs

Inès Chihi, University of Luxembourg (Tunisia)

Zain Anwar Ali, Jiaying University (India)

Program Committee Chair

Xiaofang Yuan, Hunan University (China)

Organizing Committee

Xianbin Teng, Guangzhou Maritime University (China) **Liangxiong Dong**, Guangzhou Maritime University (China) **Qilin Bi**, Guangzhou Maritime University (China)

Technical Program Committee

Yumei Liu, Jilin University (China)

Guangfeng Shi, Changchun University of Science and Technology (China)

Ying Huang, Liuzhou Railway Vocational Technical College (China)

Wei Li, Chang'an University (China)

Quanxin Zhu, Hunan University (China)

Priou, Université Paris Nanterre (France)

Manuela-Roxana Dijmarescu, Politehnica University of Bucharest (Romania)

Yajun Liu, South China University of Technology (China)

Yuliang Liu, Zhejiang Ocean University (China)

Ying Huang, Liuzhou Railway Vocational Technical College (China)

Fangfang Jian, Henan University of Science and Technology (China)

Tong Zhaojing, Henan Polytechnic University (China)

Sandip Kunar, Aditya Engineering College (India)

Sahil Verma, Lovely Professional University (India)

Ghous Bakhsh, NED University (Pakistan)

Ajay, Shree Guru Gobind Singh Tricentenary University (India)

Ankit Sharma, Chitkara University (India)

Sivakumar Dhar Malingam, Universiti Teknikal Malaysia Melaka (Malaysia)

Yong Hao, East China Jiaotong University (China)

Yong Yu, Foshan Power Supply Bureau, China Southern Power Grid (China)