PROCEEDINGS OF SPIE

2022 International Conference on Mechatronics Engineering and Artificial Intelligence (MEAI 2022)

Chuanjun Zhao

Editors

November 11-13, 2022 Changsha, China

Organized by Capitol Technology University (United States)

Sponsored by AEIC Academic Exchange Information Centre (China)

Published by SPIE

Volume 12596

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 2022 International Conference on Mechatronics Engineering and Artificial Intelligence (MEAI 2022), edited by Chuanjun Zhao, Proc. of SPIE 12596, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510663169

ISBN: 9781510663176 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2023 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

ix. Conference Committee

ELECTROMECHANICAL DEVICE DESIGN AND FAULT MONITORING

12596 02	Design and research of ship ballast water treatment device [12596-82]
12596 03	Fault diagnosis of reciprocating compressor based on multi-scale permutation entropy [12596-27]
12596 04	Lung cancer prediction and analysis by regression models [12596-71]
12596 05	Construction of power equipment fault feature model based on unified semantic expression [12596-26]
12596 06	Rehabilitating technologies and methods for large milling DC motor on site [12596-5]
12596 07	Design and implementation of welding training simulation platform based on virtual reality technology [12596-22]
12596 08	Design and optimization of injection needle for digital PCR detector [12596-32]
12596 09	Design and optimization of engine plastic cylinder head cover [12596-18]
12596 0A	Fault diagnosis of vibrating screen exciter based on screen box attitude analysis [12596-3]
12596 OB	Vibration analysis and optimization design of profile sawing and milling machine tool [12596-65]
12596 OC	Optimization design of the wing structure based on variable density method and feasible direction method [12596-17]
12596 OD	Bearing fault diagnosis based on prototypical network [12596-31]
12596 OE	Application of dynamic ontology modeling techniques in power equipment fault prediction [12596-36]
12596 OF	Simulation and experimental study of household ice maker [12596-55]
12596 OG	Dimensional modeling of single pass welding in wire and arc additive manufacturing [12596-19]

12596 OH	Structure optimization of thermoelectric parts based on welding process [12596-90]
12596 01	Research on the prediction method of yield in extraction process of trailing suction dredger [12596-33]
12596 OJ	Analysis on deck waves of general-purpose FPSO under extreme sea conditions [12596-62]
12596 OK	Prediction of gas concentration in fully mechanized mining face based on LSTM model based on time series [12596-28]
12596 OL	Multi-objective optimization design of single-stage electromagnetic needle selector with permanent magnet [12596-64]
12596 OM	Geometrical analysis of maneuverability of the AGV forklift for the narrow aisle [12596-52]
12596 ON	Research on model mapping method between MODBUS and IEC61850 [12596-7]
12596 00	Design of root cutting device for Chinese cabbage and research on cutting simulation [12596-15]
12596 OP	The combined supercritical ${\rm CO_2\text{-}based}$ binary mixture Brayton cycle/organic Rankine cycle: a thermodynamic parametric analysis [12596-77]
12596 OQ	Research on the digital application of molten salt electrolysis based on distributed clusters [12596-44]
12596 OR	Design of fractional-order global sliding mode controller for thermal-structure test based on neural network [12596-37]
12596 OS	Mapping relationship between airworthiness and performance testing of military aircraft [12596-42]
12596 OT	Prediction of jet noise in compressible turbulent boundary layer using TPS nozzle scale model [12596-47]
12596 OU	Deepfake detection technique based on improved transformer model [12596-6]
12596 OV	Research on agile production technology for inducing maintenance of space application facilities [12596-107]
	SENSOR NETWORK AND ELECTRONIC SYSTEM MODELLING
12596 OW	Prediction and analysis of lung cancer using machine learning models [12596-70]
12596 OX	Employee turnover prediction using machine learning models [12596-89]
12596 OY	Colorectal cancer classification based on histology images: comparison between DNN and CNN [12596-84]

12596 OZ	The comparison of CNN based networks on infiltrating ductal carcinoma images classification in the medical application field $[12596-83]$
12596 10	An extended event graph with probability for causal tracing and event prediction [12596-112]
12596 11	Prediction of survival probability of cancer using machine learning models [12596-78]
12596 12	Recent trend analysis of convolutional neural network-based breast cancer diagnosis [12596-79]
12596 13	Breast cancer prediction using machine learning models [12596-74]
12596 14	Research and application of intelligent traffic system on locomotive overhaul process [12596-46]
12596 15	Diabetes prediction and analysis using machine learning models [12596-81]
12596 16	An improved YOLOv5 method for small object detection in high resolution images [12596-125]
12596 17	The effect of input size on the accuracy of a convolutional neural network performing brain tumor detection [12596-85]
12596 18	YOLO lightweight contraband detection network using attention mechanism [12596-50]
12596 19	Research on shielding effectiveness of shielding vehicle based on wall boundary effect [12596-113]
12596 1A	Research on suppression of pressure shock in shipping hydraulic system [12596-40]
12596 1B	Research on OSNR monitoring technology based on deep neural network [12596-49]
12596 1C	Study on optimization and adjustment of high sodium coal pulverization system for 660MW boiler [12596-98]
12596 1D	Hydrodynamic analysis and design of mooring system for an aquaculture fish cage [12596-56]
12596 1E	RAMS design of air conditioning ventilation system of Fuxing EMU [12596-39]
12596 1F	Research on side pole impact test method of accelerating sled based on multi-point intrusion [12596-48]
12596 1G	Layer counting method of hard target penetration fuze based on geomagnetic signal detection [12596-10]
12596 1H	Mechanical characteristic condition monitoring system of high voltage circuit breaker [12596-63]

12596 11	based on blind source separation [12596-122]
12596 1J	SAR image simulation of ocean surface based on electromagnetic scattering model [12596-66]
12596 1K	Configuration method of power grid accident reserve for new power system [12596-35]
12596 1L	Intelligent lighting system with single live wire based on ZigBee [12596-99]
12596 1M	Failure analysis of wind turbine drive system [12596-24]
12596 1N	Two stage model of capacity planning and operation optimization for integrated energy system [12596-128]
12596 10	U.S. public transportation ridership analysis and prediction based on COVID-19 [12596-72]
	DEVICE SIMULATION AND ARTIFICIAL INTELLIGENCE CONTROL
12596 1P	Transmission line UAV inspection multi-link data congestion control method [12596-25]
12596 1Q	Rotating U-shaped snap gripping point positioning method based on YOLOv5 [12596-104]
12596 1R	Research on lane detection algorithm for large curvature curve [12596-57]
12596 18	Skin cancer image classification optimization through transfer learning with Tensorflow and InceptionV3 [12596-86]
12596 1T	Self-supervised learning for textured surface anomaly detection and localization [12596-126]
12596 1U	Research on low latency return method of transmission line UAV inspection data [12596-29]
12596 1V	Research on polynomial key management algorithm for 5G cellular-connected drone sensor network [12596-103]
12596 1W	Reinforcing feature distributions of hidden units of Boltzmann machine using correlations [12596-80]
12596 1X	Lightweight pear detection algorithm based on improved YOLOv5 [12596-9]
12596 1Y	Connective-aware interaction attention for implicit discourse relation classification [12596-51]
12596 1Z	The feature selection strategy of few-shot learning based on causal inference [12596-88]
12596 20	Machine learning prediction for low-alloy steel strength [12596-73]

12596 2	Analysis and control of solder joints failure of plug-in capacitors [12596-119]
12596 2	Task allocation and route planning in multi-UAV collaboration [12596-2]
12596 2	Performance analysis of sinusoidal weighted multi-carrier frequency scheme based on FDA [12596-127]
12596 2	Research on vehicle vibration threshold based on big data mining [12596-4]
12596 2	A ship object detection algorithm based on improved RetinaNet [12596-53]
12596 2	Application of UAV in intelligent patrol inspection of transmission line [12596-54]
12596 2	Logo detection and replacement method based on SIFT algorithm [12596-45]
12596 2	Research on key point defense strategies of anti-UAV [12596-68]
12596 2	Design of light warning device for escalator [12596-21]
12596 2	PA Failure analysis of drive chain of escalator handrail [12596-11]
12596 2	Comparison of algorithms based on lightweight frame problems [12596-20]
12596 2	Study on detection probability of radar under active and passive jamming [12596-75]
12596 2	2D Ion thrusters to Saturn [12596-87]
12596 2	Chinese font generation based on deep learning [12596-41]
12596 2	Weakly supervised text classification method based on transformer [12596-69]
12596 2	A parallel processing method for long-range contextual semantic information to sentiment analysis based on aspect [12596-115]
12596 2	Research on scene text detection algorithm based on modified YOLOv5 [12596-100]