

PROCEEDINGS OF SPIE

Fifth International Conference on Optics and Machine Vision (ICOMV 2026)

Mingguang Shan
Editor

10–12 April 2026
Zhengzhou, China

Organized by
Henan University (China)

Published by
SPIE

Volume 14251

Proceedings of SPIE 0277-786X, V. 14251

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 SPIDigitalLibrary.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 *Fifth International Conference on Optics and Machine Vision (ICOMV 2026)*, edited by Mingguang Shan, Proc. of SPIE 14251, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9798902325680

ISBN: 9798902325697 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2026 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**

SPIDigitalLibrary.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

ix	<i>Conference Committee</i>
xi	<i>Introduction</i>

OPTICAL SENSING AND METROLOGY

14251 02	Surface acoustic wave-driven automated sorting of zebrafish eggs [14251-43]
14251 03	Study on the field-of-view effects of a high-precision dual-rotating waveplate transmission ellipsometer [14251-64]
14251 04	Study on shallow air-gap defects in insulating pull rods using infrared thermal wave imaging [14251-97]
14251 05	FBG-based three-dimensional force sensor for minimally invasive surgical robots [14251-26]
14251 06	Research on high-sensitivity angle sensor based on fiber grating [14251-66]
14251 07	On-chip integrated in-plane nanowire lasers with optimized optical feedback [14251-80]
14251 08	Algorithm for estimating field-of-view point positions based on binocular stereo vision [14251-69]
14251 09	Phase-shift measurement system for fringe projection based on the talbot effect [14251-40]
14251 0A	A positioning method for automated guided vehicles based on a fiber Bragg grating array sensor [14251-4]
14251 0B	Research on programmable photoacoustic manipulation of metal sheets excited by pulsed laser [14251-47]
14251 0C	High-sensitivity intensity-demodulation refractive index sensor based on an MXene-coated eccentric fiber Bragg grating [14251-57]
14251 0D	Vision-based non-contact motion error compensation for multi-axis optical measurement systems [14251-89]
14251 0E	An optical refractive index sensor with multilayer dielectric film structure based on Fano resonance [14251-44]
14251 0F	Vehicle detection method for distributed optical fiber sensing based on an improved eigenfilter [14251-60]

- 14251 OG **Optimization of underwater ranging accuracy based on Bayesian combined improved sparrow search algorithm** [14251-99]
- 14251 OH **Research on flame distribution detection using Hikvision 4-in-1 high temperature meter** [14251-91]
- 14251 OI **Vision-based crane trolley position calibration system with Kalman filter for multisensor data fusion** [14251-6]
- 14251 OJ **Off-axis illumination lens design via differentiable ray mapping** [14251-83]
- 14251 OK **Robust visual pose estimation for optical waveguide coupling via morphological reconstruction** [14251-27]
- 14251 OL **Chaotic synchronization in hybrid integrated lasers with microring feedback** [14251-23]
- 14251 OM **Research on large blade measurement based on viewpoint planning** [14251-3]
- 14251 ON **Transverse-momentum-resolved two-photon beating with weak coherent light** [14251-7]
- 14251 OO **An improved binocular camera calibration method based on the ICP algorithm** [14251-9]
- 14251 OP **Reconstructing deep landslide shear deformation from sparse FBG data using spatially adaptive Fourier physics-informed neural networks** [14251-70]

MACHINE VISION AND OBJECT DETECTION

- 14251 OQ **Deep learning-assisted outdoor passive TDOA localization via NLOS classification and confidence-weighted CWLS** [14251-59]
- 14251 OR **Aircraft pose measurement method based on a tri-band frequency selection dehazing network** [14251-25]
- 14251 OS **Target recognition and tracking technology based on multisource information fusion** [14251-20]
- 14251 OT **Design and implementation of real-time visual inspection system for metal gasket in industrial field** [14251-90]
- 14251 OU **Geometric-aware cross-attention for robust LiDAR loop closure detection and point cloud registration** [14251-78]
- 14251 OV **Vessel trajectory prediction method based on densely connected transformer** [14251-84]
- 14251 OW **A real-time face verification system based on gray histogram features and dynamic threshold tuning** [14251-94]

- 14251 0X **Feature enhancement and bounding box regression optimization for complex remote sensing scenes** [14251-19]
- 14251 0Y **Defending face recognition systems against laser dazzling via identity-preserving latent diffusion** [14251-2]
- 14251 0Z **Layer aware mixed attention fusion for lightweight aerial dual modal object detection** [14251-35]
- 14251 10 **Intelligent health monitoring of electric shovel bucket teeth in open-pit mines based on improved deep learning** [14251-36]
- 14251 11 **Distracted driving behavior detection method based on improved YOLOv8** [14251-10]
- 14251 12 **A lightweight DMSE-YOLO algorithm for dense pedestrian detection** [14251-45]
- 14251 13 **Visual fall detection based on improved YOLOv10 + AlphaPose + GCN** [14251-96]
- 14251 14 **Enhanced YOLOv11-based model for small ship detection in maritime scenarios** [14251-92]
- 14251 15 **AMF-Net: adaptive multiscale fusion network for high-precision camouflaged object detection** [14251-82]
- 14251 16 **An improved YOLOv8 model for ship object detection in optical satellite remote sensing imagery** [14251-73]
- 14251 17 **Full-scale infrared dim small target detection algorithm under complex sea surface background** [14251-34]
- 14251 18 **A conductive particle image classification method based on improved MobileMamba network** [14251-13]
- 14251 19 **DAEF: an insulator detection algorithm combining dynamic convolution and efficient attention** [14251-12]
- 14251 1A **Yolo-pc: a yolo-based cat's eye target detection method integrating polarization imaging** [14251-28]
- 14251 1B **MSD-YOLO: PCB defect detection algorithm integrating multiscale dilated convolution** [14251-46]
- 14251 1C **Real-time detection algorithm for hot-rolled strip surface defects based on improved YOLOv8** [14251-85]
- 14251 1D **Online machine vision method for tool wear detection in intelligent manufacturing based on attention-enhanced U-Net and Retinex illumination correction** [14251-11]
- 14251 1E **Remote sensing small sample target identity recognition based on SHK-LPP feature transformation** [14251-86]

- 14251 1F **Diagnosing premise-validation weakness in a small vision-language model for visual question answering under resource constraints** [14251-18]

IMAGE PROCESSING AND OPTICAL IMAGING

- 14251 1G **Machine learning aided band gap prediction and design of chemical pressure-modified BaTiO₃-based SHG materials** [14251-49]
- 14251 1H **Numerical study on silicon-based broadband achromatic metalenses in the terahertz regime** [14251-16]
- 14251 1I **Versatile nanofibrous membrane for multiband stealth, thermal management and electromagnetic interference shielding** [14251-31]
- 14251 1J **Improved DQN-based resource allocation method for multiuser device networks** [14251-48]
- 14251 1K **MTD-TCN: a ModernTCN-based model with static weight fusion of TimesNet and DeepTime for long-term time series forecasting** [14251-77]
- 14251 1L **A 3D dynamic display method for ethnic costumes** [14251-29]
- 14251 1M **Deep learning based semantic segmentation of falling glass panels in high-rise buildings from UAV imagery** [14251-42]
- 14251 1N **Enhanced multifeature fusion network for Photometric Stereo** [14251-24]
- 14251 1O **Deep background synthesis detection based on texture distribution consistency features** [14251-37]
- 14251 1P **AnchorSeg: hierarchical instance-level segmentation with 3D Gaussian splatting** [14251-93]
- 14251 1Q **GHT: a group-aware hierarchical transformer for hyperspectral image classification** [14251-61]
- 14251 1R **Quantitative detection of fruit sugar content by spectroscopy optimized by XGBoost algorithm** [14251-22]
- 14251 1S **High-fidelity monocular head reconstruction via prior-guided latent refinement** [14251-17]
- 14251 1T **Infrared hyperspectral imaging detection based on phase-change material metasurfaces** [14251-79]
- 14251 1U **Research on the selection of guided filter regularization factors in image detail enhancement algorithm based on filter layering** [14251-54]
- 14251 1V **Hyperspectral technology coupled with MSDF-SE-CNN for estimating moisture content in beef** [14251-55]

- 14251 1W **Image forgery localization algorithm based on noise-combined CFA interpolation fingerprints** [14251-72]
- 14251 1X **Human reconstruction with Gaussian splatting and human foundation models** [14251-33]
- 14251 1Y **An edge-enhancement-based method for knee MRI image segmentation** [14251-67]
- 14251 1Z **A low-light image enhancement method combining multiscale detail enhancement and multidimensional illumination perception** [14251-56]
- 14251 20 **Contour extraction of human body method based on improved canny operator** [14251-75]
- 14251 21 **SymmFormer: point cloud completion via decoupled global-local symmetry learning** [14251-71]