PROCEEDINGS OF SPIE

2nd International Conference on Computer Vision, Image, and Deep Learning

Badrul Hisham bin Ahmad
Fengjie Cen
Editors

25–27 June 2021
Liuzhou, China

Organized by
AEIC—Academic Exchange Information Centre (China)

Sponsored by
Guangzhou Computer Society (China)
Universiti Teknikal Malaysia Melaka (Malaysia)

Published by
SPIE

Volume 11911

Proceedings of SPIE 0277-786X, V. 11911

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 *2nd International Conference on Computer Vision, Image, and Deep Learning*, edited by Badrul Hisham bin Ahmad, Fengjie Cen, Proc. of SPIE 11911, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510646810
ISBN: 9781510646827 (electronic)

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time)
SPIE.org
Copyright © 2021 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.

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

COMPUTER VISION AND IMAGE PROCESSING TECHNOLOGY

11911 02 **Texture image recognition based on feature layer fusion and double probabilistic neural network** [11911-56]

11911 03 **Research on classification and application of sports images based on visual attention analysis** [11911-84]

11911 04 **Improved object detection algorithms for optical aerial images based on region proposal network** [11911-22]

11911 05 **Development and application of computer image recognition technology** [11911-86]

11911 06 **Infrared and visible image fusion algorithm based on three-layer guided filter and composition analysis CNN** [11911-36]

11911 07 **A new method for duplicate document image detection with page layout** [11911-69]

11911 08 **Research on color method of image based on computer data** [11911-65]

11911 09 **Pedestrian detection and positioning for component hoisting based on millimeter wave radar and monocular vision sensor** [11911-5]

11911 0A **Emoji can improve university students' enthusiasm perception with their counselor: evidence from behavior and eye movements** [11911-48]

11911 0B **Research on the design and production of 3D animation** [11911-87]

11911 0C **Remote sensing image matching method based on neural network** [11911-81]

11911 0D **Application and verification of DSP+FPGA in SINS navigation computer circuit design** [11911-74]

11911 0E **Using the moving trapezoid body interpolation to reconstruct 3D meteorological radar image** [11911-60]

11911 0F **Emoji can improve university students' intimate perception with their counselor: evidence from behavior and eye movements** [11911-46]

11911 0G **Image inpainting with gradient guidance** [11911-32]

11911 0H **Target detection of automobile engine connecting rod image based on sub-pixel level** [11911-11]

11911 0I **Image mosaic based on improved SPHP mesh optimization method** [11911-43]

11911 0J **A novel strategy of multi-scale conditional super-resolution** [11911-78]

11911 0K **Brain MRI based on Otsu and region growth for ventricle segmentation** [11911-34]

11911 0L **A novel structured light coding and decoding method for fast 3D reconstruction** [11911-24]

11911 0M **Hyperspectral image classification based on parallel-branch expectation-maximization attention mechanism** [11911-42]

11911 0N **A new method of image classification with photography composition** [11911-63]

11911 0O **A review of self-encoding language models for bidirectional representation** [11911-17]

11911 0P **Improved image-based lung opacity detection of VGG16 model** [11911-6]

IMAGE PROCESSING TECHNOLOGY AND INTELLIGENT RECOGNITION AND DETECTION

11911 0Q **Intelligent global geo-environmental change detection by multi-modal image fusion** [11911-20]

11911 0R **A new method of target change detection based on network in network structure** [11911-44]

11911 0S **Target detection and recognition of radar spectrum image based on deep learning** [11911-76]

11911 0T **Object detection of face mask recognition based on improved faster R-CNN** [11911-7]

11911 0U **Application of lightweight YOLOv4 in aircraft skin fault detection** [11911-54]

11911 0V **Scene text detection with improved receptive field and adaptive feature fusion** [11911-10]

11911 0W **Nighttime vehicle detection on highway based on improved faster R-CNN model** [11911-47]

11911 0X **Light and fast: multiple object tracking based on lightweight architecture** [11911-70]

11911 0Y **Research on unstructured terrain semantic recognition of outdoor mobile robot** [11911-15]

11911 0Z **Automatic identification and extraction of impact craters in the landing area of Chang'e-5 based on HOG features and SVM** [11911-55]

11911 10 **An improved face recognition algorithm based on extended local binary pattern** [11911-38]

11911 11 **Recognition system for masked face based on deep learning** [11911-73]

11911 12 **CDC-Wasserstein generated adversarial network for locally occluded face image recognition** [11911-40]

11911 13 **Multi-scale representation with graph learning for video-based person re-identification** [11911-68]

11911 14 **Real-time fire detection network for intelligent surveillance systems** [11911-30]

11911 15 **Research on rainfall prediction based on LSTM, RF, and SVM models** [11911-23]

11911 16 **SHIP target image recognition based on FAST detector and faster R-CNN** [11911-12]

11911 17 **Classification of hyperspectral image based on multi-scale convolutional neural network and attention mechanism** [11911-28]

11911 18 **Pose-attention: a novel baseline for person re-identification** [11911-58]

11911 19 **Preparing and simplifying method for pedestrian object training set based on surveillance video** [11911-21]

11911 1A **A new method of surface defect detection of steel ball based on pre-trained YOLOv4 model** [11911-14]

11911 1B **Remote sensing aircraft detection method based on lightweight YOLOv4** [11911-31]

11911 1C **Overview of research on marine target recognition** [11911-13]

11911 1D **Neural network to predict probabilistically possible mutations in hemagglutinins from Eurasia H1 influenza A virus** [11911-1]

11911 1E **Improved blind motion deblurring method** [11911-41]

11911 1F **Description of evolution of neuraminidase from influenza A virus** [11911-39]

IMAGE CLASSIFICATION ALGORITHMS AND DEEP LEARNING APPLICATIONS

11911 1G **An efficient transformer algorithm for image recognition based on ensemble learning methodology** [11911-35]

11911 1H **RGB-infrared fusion tracking algorithm based on Siamese network** [11911-27]

11911 1I **Stereo matching network based on AANet+ improved attention mechanism** [11911-37]

11911 1J **GSnet: combine Ghostnet and Shufflenetv2 to get better performance** [11911-25]

11911 1K **Tracing segmentation for satellite partial components under low-light environment** [11911-75]

11911 1L **Human pose recognition based on multiple features and random forest algorithm** [11911-45]

11911 1M **Analysis of an image encryption algorithm based on Henon chaotic map** [11911-4]

11911 1N **Residualpath-res-dense-net for retinal vessel segmentation** [11911-71]

11911 1O **Research on IPv6 mobility management mechanism based on SDN** [11911-79]

11911 1P **Application research of college English autonomous learning based on cloud computing** [11911-80]

11911 1Q **Dual-band fire image fusion algorithm based on NSST and feature weighting** [11911-64]

11911 1R **Research on the emotional balance, resilience, and mental health of adolescents during the epidemic** [11911-2]

11911 1S **Prior knowledge guided few-shot classification with class disentanglement** [11911-59]

11911 1T **Application of BM3D algorithm in CT image denoising of liver cancer** [11911-3]

11911 1U **Improved model search based on distillation framework** [11911-85]

11911 1V **A U-net and K-means-based method for brain tumor segmentation and measurement** [11911-57]

11911 1W **Improved DUDnCNN-based noise reduction method for seismic data** [11911-33]

11911 1X **Survey of image classification algorithms based on deep learning** [11911-9]

11911 1Y **Research of reading system of the pointer instrument based on embedded system** [11911-26]

11911 1Z **Single task fine-tune BERT for text classification** [11911-83]

11911 20 **Bi-LSTM-based sentiment analysis on the reviews of several mobile phone brands** [11911-82]

11911 21 **Extraction method of weld centerline based on fast median filtering and morphological processing** [11911-8]

11911 22 **spcl++: overall improvement of spcl algorithm** [11911-16]

11911 23 **Construction of multi-source geospatial vector data association relation based on topic maps** [11911-49]

11911 24 **Research on blood type card image automatic recognition algorithm** [11911-51]

11911 25 **Innovative research on the interactive design of serious games under the family wisdom rehabilitation system** [11911-72]

11911 26 **Analysis of deep learning-based applications in grid device identification** [11911-77]