

PROCEEDINGS OF SPIE

Automatic Target Recognition XXXII

Riad I. Hammoud
Timothy L. Overman
Abhijit Mahalanobis
Kristen Jaskie
Editors

3–7 April 2022
Orlando, Florida, United States

6–12 June 2022
ONLINE

Sponsored and Published by
SPIE

**Volume
12096**

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 *Automatic Target Recognition XXXII*, edited by Riad I. Hammoud, Timothy L. Overman, Abhijit Mahalanobis, Kristen Jaskie, Proc. of SPIE 12096, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510650688

ISBN: 9781510650695 (electronic)

Published by

SPIE

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

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2022 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

v *Conference Committee*

NONPARAMETRIC SPATIO-TEMPORAL ACTIVITY LEARNING FROM OVERHEAD IMAGERY

12096 02 **Non-parametric spatio-temporal activity learning from overhead imagery (Invited Paper)**
[12096-1]

DETECTION, CLASSIFICATION, AND TRACKING I

12096 03 **Bag-level classification network for infrared target detection** [12096-2]

12096 04 **Performance comparison of online and offline tracking algorithms** [12096-3]

12096 05 **MONCE tracking metrics: a comprehensive quantitative performance evaluation methodology for object tracking** [12096-4]

MACHINE LEARNING FOR ATR I

12096 06 **A geometric statistic for deep learning model confidence and adversarial defense (Invited Paper)** [12096-6]

12096 07 **Common data format** [12096-8]

DETECTION, CLASSIFICATION, AND TRACKING II

12096 08 **Performing visual gait identification for re-identification without specialized labels** [12096-9]

12096 09 **Improving weighted Hausdorff distance loss for small object centroid detection in infra-red and RGB imagery** [12096-10]

12096 0A **Drone detection, recognition, and assistance system for counter-UAV with VIS, radar, and radio sensors** [12096-11]

12096 0B **Efficient multi-attribute image classification through context-driven networks** [12096-7]

RF AND SAR APPLICATIONS

- 12096 0C **Stepped frequency radar target recognition using 1D-CNN** [12096-13]
- 12096 0D **Exploring SAR ATR with neural networks: going beyond accuracy** [12096-14]
- 12096 0E **Open-set recognition for automatic target recognition: practical considerations for obtaining out of distribution examples** [12096-16]

MACHINE LEARNING FOR ATR II

- 12096 0F **Capturing latent 3D representations of parallax-sensitive landmarks** [12096-19]

AERIAL AND SPACE APPLICATIONS

- 12096 0G **Automated detection and classification of military warships in overhead imagery (Invited Paper)** [12096-20]
- 12096 0H **Efficient ATR using contrastive learning** [12096-21]
- 12096 0I **Camouflaged object detection system at the edge** [12096-52]
- 12096 0J **Evolution of SE-Workbench-EO to generate synthetic EO/IR image data sets for machine learning** [12096-31]