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Contents

- v *Authors*
- vii *Conference Committee*
- ix *Introduction*

AI IN INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (JOINT SESSION 5)

- 11169 02 **Real-time CNN-based object detection and classification for outdoor surveillance images: daytime and thermal (Invited Paper) [11169-1]**
- 11169 03 **A deep neural network model for hazard classification [11169-3]**
- 11169 04 **Edge vs. cloud computing: where to do image processing for surveillance? [11169-28]**

OBJECT DETECTION (JOINT SESSION 6)

- 11169 05 **Spatiotemporal detection of maritime targets using neural networks [11169-4]**
- 11169 06 **Ship detection in synthetic aperture radar (SAR) images by deep learning [11169-29]**
- 11169 07 **Multi-modal object detection using unsupervised transfer learning and adaptation techniques (Best Student Paper Award) [11169-5]**
- 11169 08 **Detecting and classifying small objects in thermal imagery using a deep neural network [11169-6]**
- 11169 09 **Detecting unseen targets during inference in infrared imaging [11169-7]**

SEGMENTATION (JOINT SESSION 7)

- 11169 0A **See clearer at night: towards robust nighttime semantic segmentation through day-night image conversion [11169-8]**
- 11169 0B **Semantic segmentation of panoramic images using a synthetic dataset [11169-9]**
- 11169 0C **A comparative study of high-recall real-time semantic segmentation based on swift factorized network [11169-10]**

AI FOR DEFENCE APPLICATIONS

- 11169 OE **Applicability of AI methods to JISR resource planning** [11169-12]
- 11169 OF **Drone localization and identification using an acoustic array and supervised learning** [11169-13]
- 11169 OG **Towards information extraction and semantic world modelling to support information management and intelligence creation in defense coalitions** [11169-14]
- 11169 OH **Transparent object sensing with enhanced prior from deep convolutional neural network** [11169-15]

IMAGE ENHANCEMENT, FUSION, AND BACKGROUNDS

- 11169 OJ **Deep learning for software-based turbulence mitigation in long-range imaging (Invited Paper)** [11169-16]
- 11169 OK **Adversarial camouflage for naval vessels** [11169-17]
- 11169 OL **On the robustness of compressive sensing hyperspectral image reconstruction using convolutional neural network** [11169-18]
- 11169 OM **Analysis of different background subtraction methods applied on drone imagery under various weather conditions in the UAE region** [11169-19]
- 11169 ON **A novel approach for spectrum decomposition for Raman spectroscopy** [11169-20]
- 11169 OO **Object-based multispectral image fusion method using deep learning** [11169-21]

POSTER SESSION

- 11169 OP **The challenges and some thinking for the intelligentization of precision guidance ATR** [11169-22]
- 11169 OQ **Semantic scene understanding on mobile device with illumination invariance for the visually impaired** [11169-23]
- 11169 OS **Rain and snow removal using multi-guided filter and anisotropic gradient in the quaternion framework** [11169-26]
- 11169 OU **Analysis of the controllers of the vessel's course control systems in difficult conditions of navigation** [11169-31]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Abbott, Rachael, 07
Almarzooqi, Abdulrahman, 0M
AlSaadi, Abdullah Hasan, 0M
Asahi, Ippei, 0N
Aurdal, Lars, 0K
Ayhan, Öner, 06
Baan, Jan, 05
Bai, Jian, 0H, 0Q
Baron, Valentin, 0F
Barros-Gavilanes, Gabriel, 04
Baussard, Alexandre, 09
Boldyreff, Anton S., 0U
Bouley, Simon, 0F
Brattli, Alvin, 0K
Cheng, Ruiqi, 0Q
Connor, Barry, 07
d'Acremont, Antoine, 09
Den Hollander, Richard J. M., 05
Dijk, Judith, 05
Dobbins, Peter J., 03
Eto, Shuzo, 0N
Fablet, Ronan, 09
Fan, Jinxiang, 0P
Fu, Jia, 0B
Gedalin, Daniel, 0L
Gil, Sungho, 0O
Ha, Namkoo, 0O
Hammarstrøm Løkken, Kristin, 0K
Heiser, Yaron, 0L
Hemström, Fredrik, 08
Heredia, Andrés, 04
Higo, Takayuki, 0N
Hoffmann, Almuth, 0G
Hou, Jing, 0H
Huang, Xiao, 0H
Ichikawa, Yuji, 0N
Ignatyev, Vladimir V., 0U
Ignatyeva, Alexandra S., 0U
Jackwerth, André, 0E
Jang, Hyunsung, 0O
Jung, Hyungjoo, 0O
Karlholm, Jörgen, 08
Klausen, Runhild Aae, 0K
Kodama, Hiromi, 0N
Kruithof, Maarten, 05
Kuwertz, Achim, 0G
Kwon, Kuyong, 0O
Le Du, Thibault, 09
Lee, Seungha, 0O
Levental, Maksim, 03
Liu, Jia, 0P
Mars, Jérôme, 0F
Martinez del Rincon, Jesus, 07
Muschinowski, Matthieu, 0F
Nässtrom, Fredrik, 08
Nicolas, Barbara, 0F
Nieuwenhuizen, Robert, 0J
Oiknine, Yaniv, 0L
Palm, Hans Christian, 0K
Park, Sungsoon, 0O
Pruim, Raimon H. R., 05
Quin, Guillaume, 09
Reinert, Frank, 0E
Robertson, Neil, 07
Rodenbeck, Roland, 0E
Sander, Jennifer, 0E, 0G
Sayadi, Slim, 0M
Schutte, Klamer, 0J
Semenishchev, E., 0S
Şen, Nigar, 06
Sizyakin, R., 0S
Sohn, Kwanghoon, 0O
Soloviev, Viktor V., 0U
Spanier, Assaf B., 02
Stern, Adrian, 0L
Sun, Dongming, 0B
Sun, Lei, 0A
Swamidoss, Issacniwas, 0M
Toska, Ferit, 03
Van den Broek, Sebastiaan P., 05
Van der Stap, Nanda, 05
Van Opbroek, Annegreet, 05
Voronin, V., 0S
Wang, Jing, 0H
Wang, Kaiwei, 0A, 0B, 0C, 0Q
Wilson, Joseph N., 03
Xiang, Kaite, 0A, 0C
Xu, Chengyou, 0Q
Xu, Yuanyou, 0B
Yan, Kun, 0H
Yang, Kailun, 0A, 0B, 0C, 0H, 0Q
Yeon, Yoonmo, 0O
Zelenskii, A., 0S
Zhao, Lei, 0H
Zhdanova, M., 0S
Zhou, Xiangdong, 0H
Zilkha, Meir, 02

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Henri Bouma, TNO (Netherlands)
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Yitzhak Yitzhaky, Ben-Gurion University of the Negev (Israel)

- 1 AI in Intelligence, Surveillance, and Reconnaissance (Joint Session 5)
Judith Dijk, TNO Defence, Security and Safety (Netherlands)
- 2 Object Detection (Joint Session 6)
Judith Dijk, TNO Defence, Security and Safety (Netherlands)
- 3 Segmentation (Joint Session 7)
Judith Dijk, TNO Defence, Security and Safety (Netherlands)
- 4 AI for Defence Applications
Judith Dijk, TNO Defence, Security and Safety (Netherlands)
- 5 Image Enhancement, Fusion, and Backgrounds
Judith Dijk, TNO Defence, Security and Safety (Netherlands)

Introduction

A main application of military imaging systems is situational awareness: knowing who and what is in the vicinity and what is their behavior. Image analysis techniques support in the key tasks that enable situational awareness: detection, tracking (follow), classification, identification and behavior recognition of targets or objects. Artificial Intelligence and Machine Learning are increasingly used to assist in these tasks, as the amount of sensor data increases while there are fewer operators and camera operators available.

The first conference on *Artificial Intelligence and Machine Learning in Defense Applications* was held in Strasbourg (France) on 10-12 September 2018, in the framework of the SPIE Security + Defence 2019. The focus of this conference was technology development on Artificial Intelligence and Machine Learning techniques for automatic and machine assisted EO/IR image analysis for defense applications. As for civil applications the algorithms must be able to deal with noisy data and varying conditions.

The first part of the program consisted of joint sessions with the conference on Counterterrorism, Crime Fighting, Forensics, and Surveillance Technologies. In the sessions organized by this conference the topics of Unmanned Sensors and Systems, Image Enhancement, Detection and Tracking, Privacy Enhancing Surveillance Techniques and Action and Behavior Recognition were covered. In the *Artificial Intelligence and Machine Learning in Defense Applications* conference the joint sessions covered the topics on AI in Intelligence, Surveillance, and Reconnaissance, Object Detection and Segmentation. The conference closed with sessions on AI for Defence Applications and Image Enhancement, Fusion, and Backgrounds, respectively. The conference provided an overview of state-of-the-art approaches and new research on these approaches. It discussed possibilities of several neural nets and the lack of operational data for training, testing and evaluation. This volume contains contributions for *Artificial Intelligence and Machine Learning in Defense Applications*.

Launching this new conference was a great pleasure. I would like to thank the SPIE staff for their efforts in preparing the conference and publishing the proceedings. Next, to that, I would like to thank the Program Committee and others who advised in formulating the call for papers. And, of course, thanks to all the authors and the audience for inspiring presentations and interesting discussions. I'm looking forward to next year's conference.

Judith Dijk

