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# ***Artificial Intelligence and Machine Learning in Defense Applications***

**Judith Dijk**  
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## 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**

