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Wolfgang Osten
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Introduction

16th ICMV 2023, Hybrid Conference, November 15th – 18th, 2023

It was on occasion of the 15th ICMV in Rome where we discussed the next topics and location for the forthcoming 2023 conference. Among the conference chairs there was an agreement to put stronger attention to recent findings in tomography and to use as conference place the Russian Armenian University in Yerevan where important contributions to the field were delivered. Thus we had 3 interesting days in Armenia filled with nice presentations and stimulating discussions.

82 participants from 12 countries took actively part on the 2 Plenary Sessions, 7 oral and 1 poster sessions. We started again with 2 keynote lectures and 1 invited talk, all given by recognized international experts in machine vision. Ehrenfried Zschech from DeepScan GmbH, Germany, talked about "*High-resolution X-ray Imaging – Challenges to Experiment and Data Analysis*". The 2nd keynote was presented by Valery Tuchin, a recognized scientist in the field of bio-medical imaging from the Saratov State University, Russia. He reported about "*Advanced Biomedical Imaging and Tomography at Tissue Optical Clearing*". Flavio Piccoli from the University of Milano, Italy, turned his invited talk to the topic of Deep Learning. His speech was entitled "*From Black-Box to White-Box Image Enhancement: Leveraging Deep Learning and User-Centric Adaption*". For the first time the organizers offered a Tutorial. Wolfgang Osten from the Stuttgart University, Germany, talked on "*The Meaning and Partial Misuse of Some Frequently Applied Terms in Optical Sensor Technologies*". Terms such as "artificial intelligence", "autonomous vehicles", "superresolution", "digitization" and "holographic displays" were discussed with respect to their meaning and potential but also in relation to unrealistic expectations.

The conference ended as usual with an award ceremony for the best papers given in all sessions. 7 awardees could be recognized for their outstanding presentations.

These proceedings include 47 papers and provide thus a good overview of the content of this latest conference on the subject of Machine Vision.

For the structure of that volume we used the following classification into 7 topics:

- 1 – Pattern recognition with 7 papers,
- 2 – Image Segmentation with 3 papers,
- 3 – Image classification 6 papers,
- 4 – Image detection and detection models with 8 papers,
- 5 – Image analysis and processing methods with 9 papers,
- 6 – Digital photography technology and computer vision based on imaging with 8 papers,
- 7 – Data -based intelligent computing and algorithm 6 papers.

We hope that the reader gets this way a good impression about the wide diversity of new approaches and applications in Machine Vision. In fact, Machine Vision is not a very young but nevertheless an emerging field. Many aspects of the Digitization and Artificial Intelligence hype such as the Internet of Things IoT, the digital factory, universal public safety, machine learning, deep learning, computer vision, computational imaging, active vision, robotics, and autonomous vehicles are affected by new technologies that are actually developed and implemented in this field. Therefore we look ahead with great interest to the 17th International Conference on Machine Vision which will take place as hybrid event again in the autumn 2024. The location is already chosen. We will meet middle of October in the beautiful city of Edinburgh. Prof. Wei Wang from the Heriot Watt University in Edinburgh will act as the local chair of the next ICMV. Until then, the collection of articles presented in this volume will hopefully find an interested audience and will be a source of new inspirations for future innovations and findings. But actually our thanks go to all participants of the 16th conference and especially to the organizers. Here we would like to express our thanks to the local organizers represented by Prof. Parkev Avetisyan, Vice Rector for Science of the Russian-Armenian University in Yerevan, and Dr. Mikayel Avanesyan, the Chief Specialist for Scientific and Technical Cooperation at this university. Their great organization contributed very much to the stimulating and friendly atmosphere of the 16th ICMV.

Stuttgart and Moscow, December 2023
Wolfgang Osten and Dmitry Nikolaev on behalf of the Organizing Committee