

Guest Editorial

Introduction to the Special Issue on Best Biometrics Papers at ICPR 2020

THIS Special Issue hosts extended versions of best articles shortlisted from accepted ICPR 2020 papers matching the topics of Track 2: *Biometrics, Human Analysis and Behavior Understanding*. Out of 136 submitted papers, 52 were accepted and only 19 of them were selected to be proposed for a journal special issue.

The three papers appearing in this special issue, although all related to face recognition, each present a somewhat different point of view. As Guest Editors feel that this variety of approaches should be nurtured and commended, as this helps in keeping this field of research lively and interesting. Therefore, we are pleased to present three papers resulting from a careful review process and timely edited for the special issue.

Usually, deep learning-based face recognition techniques decrease their performance on low-quality face images acquired in the wild. In this regard, the paper [A1] by Méndez-Llanes *et al.* proposes a new strategy that considers the quality of the face regions in images and videos in order to obtain a local deep-based face representation. To enhance the discriminative capabilities of the model, the proposed technique has been combined with four pre-trained CNN models: Vgg-Face, Dlib, MobileFaceNet and ResNet50. The experimental results obtained from several benchmark datasets show that the proposed strategy is extremely effective.

The paper [A2] by Mahdi *et al.* focuses on Matching 3D Facial Shape to Demographic Properties using a neural network. The network is a metric learner that exploits geometric deep learning techniques and extract facial information regarding the properties of interest. The metric learner is combined with a SVM classifier and a naive Bayes score fuser. The experimental results obtained by a 10-fold cross-validation for biometric verification and identification scenario demonstrated the robustness of the proposed strategy.

The third paper [A3] by Bisogni *et al.*, within the context of 2D face biometrics, exploits a common approach to both pose estimation and feature matching, where fractal encoding is used to extract a feature vector and to compare it to a reference template through a metric distance for both HPE and facial recognition. The experimental results obtained from

both BIWI and AFLW2000 datasets, for the HPE component provides pose accuracy comparable to the state of the art. The proposed strategy enables to boost the efficiency of face recognition.

The Guest Editors wish to express their gratitude to Prof. Kevin Bowyer as past Editor in Chief of the IEEE TRANSACTIONS ON BIOMETRICS, BEHAVIOR, AND IDENTITY SCIENCE. The continued support of the current IEEE-T-BIOM Editor-in-Chief, Prof. Nalini K. Ratha, is gratefully acknowledged. Finally, the GEs want to thank the authors, the reviewers and the Journal staff for all of the efforts devoted to produce this special issue.

MASSIMO TISTARELLI
Computer Vision Laboratory
University of Sassari
Sassari, Italy

MICHELE NAPPI
Department of Computer Science
(First-Ranked Department of Excellence)
Università di Salerno
84084 Fisciano, Italy

YUNHONG WANG
School of Computer Science and Technology
Beihang University
Beijing, China

APPENDIX: RELATED ARTICLES

- [A1] N. Méndez-Llanes, K. Castillo-Rosado, H. Méndez-Vázquez, and M. Tistarelli, "On the use of local fixations and quality measures for deep face recognition," *IEEE Trans. Biom., Behav., Ident. Sci.*, early access, Mar. 2, 2022, doi: [10.1109/TBIOM.2022.3153391](https://doi.org/10.1109/TBIOM.2022.3153391).
- [A2] S. S. Mahdi *et al.*, "Matching 3D facial shape to demographic properties by geometric metric learning: A part-based approach," *IEEE Trans. Biom., Behav., Ident. Sci.*, early access, Jun. 29, 2021, doi: [10.1109/TBIOM.2021.3092564](https://doi.org/10.1109/TBIOM.2021.3092564).
- [A3] C. Bisogni, M. Nappi, C. Pero, and S. Ricciardi, "PIFS scheme for HEAd pose estimation aimed at faster face recognition," *IEEE Trans. Biom., Behav., Ident. Sci.*, early access, Oct. 22, 2021, doi: [10.1109/TBIOM.2021.3122307](https://doi.org/10.1109/TBIOM.2021.3122307).