

Selected Works From International Workshop on Biometrics and Forensics 2020

THE 8TH edition of the International Workshop on Biometrics and Forensics (IWBF 2020) was held online, and organized remotely from Porto, Portugal, on 29 and 30 April 2020. The event, organized by the Institute for Systems and Computer Engineering, Technology and Science (INESC TEC), Porto (Portugal), the Norwegian University of Science and Technology (NTNU, Norway), and the European Association of Biometrics (EAB), received technical co-sponsorship from IEEE-Biometrics Council and IAPR—Technical Committee on Biometrics (TC4).

The program chairs of IWBF 2020—Andreas Uhl, Hugo Proen  a and Lena Klas  n—invited the authors of outstanding papers from a total of 27 accepted papers to submit extended versions of their work to a special issue of the IEEE TRANSACTIONS ON BIOMETRICS, BEHAVIOR, AND IDENTITY SCIENCE, based on topical suitability, reviewer scores, and meta-reviewer comments.

These submissions went through the normal rigorous peer-review process at TBIOM leading to a set of three papers appearing in this issue.

The first article of this issue, “On Distinctiveness and Symmetry in Ear Biometrics,” extends the analysis of gender classification based on ear images and analyses bilateral symmetry of human ears. The main goal is to determine the regions of the ear that contribute to its distinctiveness. For this purpose, the authors use model-based analysis and deep learning methods to capitalize on structure and performance, respectively. This work addresses the question as to whether it is possible that given an image of one ear, a person can then be recognized from their other ear. The results show that there is actually a high chance that there exists symmetry between a person’s ears and that it would be advantageous for recognition systems to concentrate on the inner ear rather than the outer ear.

The second of these papers, “E-ComSupResNet: Enhanced Face Super-Resolution Through Compact Network,” proposes a compact and computationally efficient Convolutional Neural Network (CNN) to increase the spatial resolution of a Low-Resolution (LR) face image to obtain a High-Resolution (HR) face image with an upscaling factor of up to 8 times. The newly proposed approach, E-ComSupResNet, is an enhanced

architecture with a compact network which focuses on extracting both low-frequency and high-frequency features along with a reconstruction module. The experimental evaluations demonstrate the gain in high fidelity reconstruction in terms of Structural Similarity Index Metric (SSIM) and Peak-Signal-to-Noise Ratio (PSNR) measures despite the compactness of the model.

The third article, “Secure Triplet Loss: Achieving Cancelability and Non-Linkability in End-to-End Deep Biometrics,” reformulates the previously proposed Secure Triplet Loss, which focused on template cancelability, to address the problem of template linkability. The proposed method is evaluated on biometric verification with off-the-person electrocardiogram (ECG) and unconstrained face images, proving to be successful in training secure biometric models from scratch and being able to adapt a pretrained model to make it secure. The experimental results corroborate that the proposed novel formulation of the Secure Triplet Loss succeeds in optimizing end-to-end deep biometric models to impart template cancelability, non-linkability, and non-invertibility.

We congratulate the authors for having their work published in TBIOM, and we thank the reviewers and the proceeding editors for their comments and suggestions during both the IWBF2020 and TBIOM review processes. We hope the readers will enjoy reading these papers and gain new insights into the latest advances in biometrics security, forensics, and analysis.

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