Editorial: Emerging approaches and advances in biometric human identification

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Biographical notes: Michał Choraś is a Professor at University of Science and Technology (UTP) in Bydgoszcz, where he is the Chair of Teleinformatics Systems Division. He received his Doctor of Science (habilitation) degree in Computer Science from AGH Cracow in 2014. In 2005, he finalised his PhD thesis focused on ear biometrics. His interests include pattern recognition in several domains, such as image processing, security (network security, urban security, biometrics) and safety (crisis management, critical infrastructures). He has been involved in many EU projects and he has coordinated the FP7 project CAMINO. He is an author of over 150 reviewed scientific publications.

Biometric human identification techniques and tools are now popular in large-scale and small-scale applications in our everyday life (from control access to laptops to travel documents and international migration programs). Those applications usually concern traditional and well proved methods and modalities like fingerprints and faces. However, still there is a need and ongoing research in the new directions and approaches searching for the improved solutions including new or multimodal biometrics. One of the new promising modality is based on palm veins. Therefore, Zarina Mohd Noh et al. give an overview of the state-of-the-art in palm vein biometric systems, and also discuss current challenges and possible trends in this modality. The second paper concerns a new approach for face recognition. Xi Chen et al. propose the multi-resolution elongated centre-symmetric local directional pattern (ME-CS-LDP) as the extension to the previously used CS-LDP. The goal of this method is to increase the number of directions in order to provide more discriminant information from the analysed texture. In the third paper, Sajeeda R. Inamdar and Yogesh H. Dandawate propose multimodal biometric system which can be applied to increase the security of automated teller machines (ATM). The authors designed the hardware system using the following biometric modalities: face, fingerprints and palm veins. The authors report very good results for palm veins and also use cryptography to increase the security of the proposed system. In the next paper, similarly to the second paper, authors propose further improvements to local directional pattern (LDP), a known method for face recognition. Hereby, R. Srinivasa Perumal and P.V.S.S.R. Chandra Mouli present two-level dimensionality reduced local directional pattern (TL-DR-LDP) in order to reduce the feature vector. Lastly, in the additional paper by Paweł Krotewicz, the new method for 3D face recognition is presented. The author proposed the innovative region-based ear-assisted method based on the iterative closest point (ICP) algorithm. The method is applied for 3D face recognition in expression changing scenario.