2021 International Conference of the Biometrics Special Interest Group (BIOSIG 2021)

Virtual Conference
15 – 17 September 2021
## Table of Contents

### BIOSIG 2021 – Regular Research Papers

1. **John McCauley, Sobhan Soleymani, Brady Williams, John Dando, Nasser Nasrabadi, Jeremy Dawson**
   *Identical Twins as a Facial Similarity Benchmark for Human Facial Recognition* ………..1

2. **Christian Rathgeb, Pawel Drozdowski, Marcel Obel, André Dörsch, Fabian Stockhardt, Nathania E. Haryanto, Kevin Bernardo, Christoph Busch**
   *Impact of Doppelgängers on Face Recognition: Database and Evaluation* ………...6

3. **Pedro C. Neto, Fadi Boutros, João Ribeiro Pinto, Mohsen Saffari, Naser Damer, Ana F. Sequeira, Jaime S. Cardoso**
   *My Eyes Are Up Here: Promoting Focus on Uncovered Regions in Masked Face Recognition* ………………………………………………………………....….……………………10

4. **Brady Williams, John McCauley, John Dando, Nasser Nasrabadi, Jeremy Dawson**
   *Interoperability of Contact and Contactless Fingerprints Across Multiple Fingerprint Sensors* ………………………………….……………………………………...15

5. **Labib Chowdhury, Mustafa Kamal, Najia Hasan, Nabeel Mohammed**
   *Curricular SincNet: Towards Robust Deep Speaker Recognition by Emphasizing Hard Samples in Latent Space* ……………………………………………………………...22

6. **Enrique Argones Rúa, Tim Van hamme, Davy Preuveneers, Wouter Joosen**
   *Gait Authentication based on Spiking Neural Networks* ……………………………………………………………………………………………………………….N/A

7. **Alperen Kantarcı, Hasan Dertli, Hazım, Kemal Ekenel**
   *Shuffled Patch-Wise Supervision for Presentation Attack Detection* …………………………………………..…………………....….……………………26

8. **Xingbo Dong, Zhe Jin, Zhenhua Guo, Andrew Beng Jin Teoh**
   *Towards Generating High Definition Face Images from Deep Templates* ……………………………………………………………………………………………...31

9. **Tamas Bisztray, Nils Gruschka, Thirimachos Bourlai, Lothar Fritsch**
   *Emerging biometric modalities and their use: Loopholes in the terminology of the GDPR and resulting privacy risks* ………………………………………………………………………………………………………………………………………………………………………………………..42

10. **Hiroto Tamiya, Toshiyuki Isshiki, Kengo Mori, Satoshi Obana, Tetsushi Ohki**
    *Improved Post-quantum-secure Face Template Protection System Based on Packed Homomorphic Encryption* ………………………………………………………………………………………………………………………………47
Amina Bassit, Florian Hahn, Chris Zeinstra, Raymond Veldhuis, Andreas Peter
Bloom Filter vs Homomorphic Encryption: Which approach protects the biometric data and satisfies ISO/IEC 24745? ........................................................................................................52

Kazuya Kakizaki, Taiki Miyagawa, Inderjeet Singh, Jun Sakuma
Toward Practical Adversarial Attacks on Face Verification Systems .....................................58

Zohra Rezgui, Amina Bassit
Transferability Analysis of an Adversarial Attack on Gender Classification to Face Recognition.................................................................64

Claudio Yáñez, Juan Tapia
Image Quality Assessment on Identity Documents............................................................71

João Tremoço, Iurii Medvedev, Nuno Gonçalves
QualFace: Adapting Deep Learning Face Recognition for ID and Travel Documents with Quality Assessment...........................................................76

Tim Oblak, Rudolf Haraksim, Laurent Beslay, Peter Peer
Fingermark Quality Assessment: An Open-Source Toolbox ................................................82

BIOSIG 2021 – Further Conference Contributions ...........................................................89

Biying Fu, Noémie Spiller, Cong Chen, Naser Damer
The effect of face morphing on face image quality ............................................................89

Jan Czarnocki
Will new definitions of emotion recognition and biometric data hamper the objectives of the proposed AI Act? ................................................94

Mustafa Ekrem Erakın, Uğur Demir, Hazım Kemal Ekenel
On Recognizing Occluded Faces in the Wild ........................................................................98

Inderjeet Singh, Satoru Momiyama, Kazuya Kakizaki, Toshinori Araki
On Brightness Agnostic Adversarial Examples Against Face Recognition Systems ........103

Tomoaki Matsunami, Hidetsugu Uchida, Narishige Abe, Shigefumi Yamada
Learning by Environment Clusters for Face Presentation Attack Detection ......................108

Biying Fu, Cong Chen, Olaf Henniger, Naser Damer
The relative contributions of facial parts qualities to the face image utility .......................113
DeWayne Halfen, Srinivasan Rajaraman, James L. Wayman
Biometric Recognition in a Multi-sample Multi-Subject Facial Image Database:
The 1:M:N System Model.................................................................118

Shigefumi Yamada, Tomoaki Matsunami
Evaluation on Biometric Accuracy Estimation Using Generalized Pareto (GP)
Distribution......................................................................................123

Teodors Eglitis, Emanuele Maiorana, Patrizio Campisi
Influence of Test Protocols on Biometric Recognition Performance Estimation........127

Parisa Rezaee Borj, Kiran Raja, Patrick Bours
Detecting Sexual Predatory Chats by Perturbed Data and Balanced Ensembles Effects...132

Michael Linortner, Andreas Uhl
On the Relevance of Minutiae Count and Distribution for Finger Vein Recognition
Accuracy..........................................................................................137

Victor Bros, Ketan Kotwal, and Sébastien Marcel
Vein Enhancement with Deep Auto-Encoders to improve Finger Vein Recognition....142

Michael Linortner, Andreas Uhl
VeinPLUS+: A Publicly Available and Free Software Framework for Vein
Recognition........................................................................................147

Bernhard Promegger, Georg Wimmer, Andreas Uhl
Rotation Tolerant Finger Vein Recognition using CNNs..................................152

Felix Marattukalam, Waleed H. Abdulla, Akshya Swain
N-shot Palm Vein Verification Using Siamese Networks................................157

Christof Kauba, Simon Kirchgasser, Robert Jöchl, Andreas Uhl
Assessment of Sensor Ageing-Impact in Air Travelled Fingerprint Capturing Devices.....162