European Association for Biometrics

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Human Identity in Europe

Report of the NIST conference:

International Face Performance Conference (IFPC)

November 27-29, Gaithersburg, USA

Organized by NIST in parthership with EAB

NIST

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International Face Performance Conference (IFPC)

The International Face Performance Conference (IFPC) has followed the series of the International Biometrics Performance Conference (IBPC) events, which were running from 2010 to 2016. The conference took place from November 27 to 29 at NIST campus Gaithersburg, U.S.

The conference was focused on technical factors affecting the deployment and use of high performance face recognition applications, including applications, standards, advanced and rapid capture, quality assessment, age and ageing effects, demographic effects, datasets, their preparation, training and tuning, presentation attack detection, non-cooperative uses, accuracy measurement, and performance tests.

Sponsored by the U.S. Department of Homeland Security's Science and Technology Directorate, the conference assembled 307 participants from across the globe involved in face recognition development, procurement, deployment, and operations. The overarching goal was to bring greater maturity to face recognition by improving performance, transparency, and trustworthiness.

In the opening of the conference, it was indicated that face recognition has recently seen an increasing market momentum due to its relevance for border control applications but also for convenience functionality like smartphone unlocking. These applications were emphasized by Arun Vemury (DHS), as almost 5 million Google searches per year are devoted to the term "face recognition". In the presentation of the U.S. Customs and Border Protection, the increasing importance of facial recognition was demonstrated. Following the revised system design, deployed from 2018 on, the border control

will be based on biographic data and face comparison against generated galleries, which makes repeated capturing of fingerprints obsolete. U.S. customs will continue to collect fingerprints but only for first time visitors. The concept is now implemented with numerous airports and international airlines but also launched at land border.

The European counterpart is the Entry Exit System (EES) that is under deployment, which was presented by Oliver Bausinger (BSI). He outlined functionality of Manual Border Control (MBC) as well as Self Service Systems (SSS) and e-Gates, which are combined for Automated Border Control (ABC). The EES will be complemented with the new ETIAS system that will have equivalent functionality as the U.S. ESTA system.
Markus Nuppeney (BSI) augmented the German presentation with a report on 4 years operational experience with the ABC system EasyPASS, that is linked to the National Public Key Directory (NPKD) to verify the validity of certificates. The EasyPASS system is now not only serving the citizens of 32 EU member and associated countries, but also registered travellers from U.S., Hong Kong, and South Korea. Today, 190 e-Gates are operated at 7 airports in Germany with more than 400.000 travellers per week. The average transaction time is 12,6 seconds with an operational success rate are 94,4%. The biometric rejects are in total 2,6% of the transactions, which are caused by biometric comparison resulting in a score below the defined threshold, failure to acquire errors and presentation attack detection.

Jim Wayman talked about the 15 years experience with the Australian SmartGate system, which has shown that it turns its investment into economic value. For the investment of AUD 96 million from 2015 to 2020, the system enables a passenger volume to increase up to 26 million (out of 46 million travellers) reaching Australia in 2018. Jim illustrated that the human factors are far more important than the pattern recognition aspects. Privacy has been a prime focus of the SmartGate team since 2003 and that awareness resulted now in opt-in for arrival and opt-out for departure SmartGate. The expectation is that 90% of the outgoing travellers will use SmartGate. Jim explained that facial quality is due to the environmental constraints (background light from shopping areas etc.) and consequently poor probe image quality highly impacting the comparison scores.

Geoff Whitaker (DSTL) reported on face recognition with video surveillance and discussed the challenges, like frame rate, multiple subjects per frame, off-angle images and moving subjects, occluded faces and last not least uncontrolled and variable lighting. These aspects are covered in the ISO/IEC 30137 multi-part standard on the use of biometrics with video surveillance system. These standards provide a harmonized system design and best practices.

Mark Branchflower (Interpol) informed about face recognition applications in the operational procedures working on unsolved crimes, on-going investigations and illegal immigrants. The new operational system was launched in November 2016, which links 179 countries but only half of them have a significant number of images contributed to the IFRS database, currently holding 60.000 images. Functionality needed is to identify unknown person of interest and to verify suspects. Again quality is a critical factor, which is in the Interpol system specified as 40 pixels inter eye distance (IED).

IFPC devoted several talks to the relevant topics of demographics in face recognition system. It was discussed to what extent sex, gender, and age impact biometric recognition performance and what measures can be taken to not discriminate capture subjects. Various speakers reported that face recognition systems perform better for male than for female data subjects. Patrick Grother (NIST) talked about image quality and face recognition bias as revealed in the FRVT 2018 testing recently published as NIST IR 8238. FRVT 2018 was being conducted to assess state-of-the-art face recognition accuracy. Most notably, the remarkable improvement, obtained on images with imperfect ISO/IEC 19794-5 quality conformance.

Lars Ericson (IARPA) presented the IARPA ODIN program and the research activities related to face recognition presentation attack detection. In Phase 2 of the ODIN program, three teams (Michigan State University, CrossMatch, and University of Southern California) are continuing research on presentation attack detection. Deep Learning for detection algorithms and Multi-Spectral Imaging and Laser Speckle Contrast Imaging (LSCI) as sensor technologies are pursued. The key concept in the on-going Phase 2 is that unknown presentation attacks must be detected at low detection errors (APCER below 10% at a BPCER below 0,2%). IARPA will launch a prize challenge

based on data that will be released from the Government Controlled Test (GCT) data.

A further focus point of IFPC covered face recognition system vulnerability by photo morphing fraud. This a realistic threat to documents such as MRTD and driver licenses. Morphing Attack Detection (MAD) mechanism are needed that can serve (1) detection during enrolment, e.g. the passport application process, where the MAD mechanism processes a single image, referred to as no-reference morphing attack detection and (2) detection at the time of authentication, e.g. the usage of Automated Border Control (ABC) gates at borders, where a live capture from an authentication attempt serves as additional source of information for the MAD mechanism, referred to as differential morphing detection. Testing methodologies, intermediate morphing attack detection evaluation results have been presented at the conference and new testing programs were introduced.

Human aspects in recognition have been discussed in the light of biometric versus forensic applications. Richard Bruegge (FBI) and others discussed the question on how you can fuse the opinion of human examiners and super-recognizers and which tasks (detection, recognition, memory) are consistently suited for super-recognizers. He explained the ACE model, which is including the Analyses of quality and content of evidence (Observations) Compare observations (Similarities and Differences) and Evaluate significance of these (Conclusions). Richard emphasized that unlike for forensic fingerprint analysis, the state of the art face recognition systems are not yet mature for lights-out processing.

The slides and recordings from the conference will be available at the NIST website:

www.nist.gov/news-events/events/2018/11/international-face-performance-conference-ifpc-2018

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The EAB's mission is to tackle the complex challenges facing ID in Europe, ranging from migration to privacy rights. Our role is to promote the responsible use and adoption of modern digital identity systems that enhance peoples lives and drive economic growth.

Through a series of EAB initiatives we support all sections of the ID community across Europe, including governments, NGO's, industry, associations and special interest groups and academia. Our initiatives are designed to foster networking and debate, whether at an EAB hosted event across Europe, or in providing impartial advice & support to individual members

We ultimately serve the citizens of Europe in the advancement of modern digital identity systems that are fair, accessible, secure & private.

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