

# SOTAMD

## STATE OF THE ART OF MORPHING DETECTION



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### Problem Statement



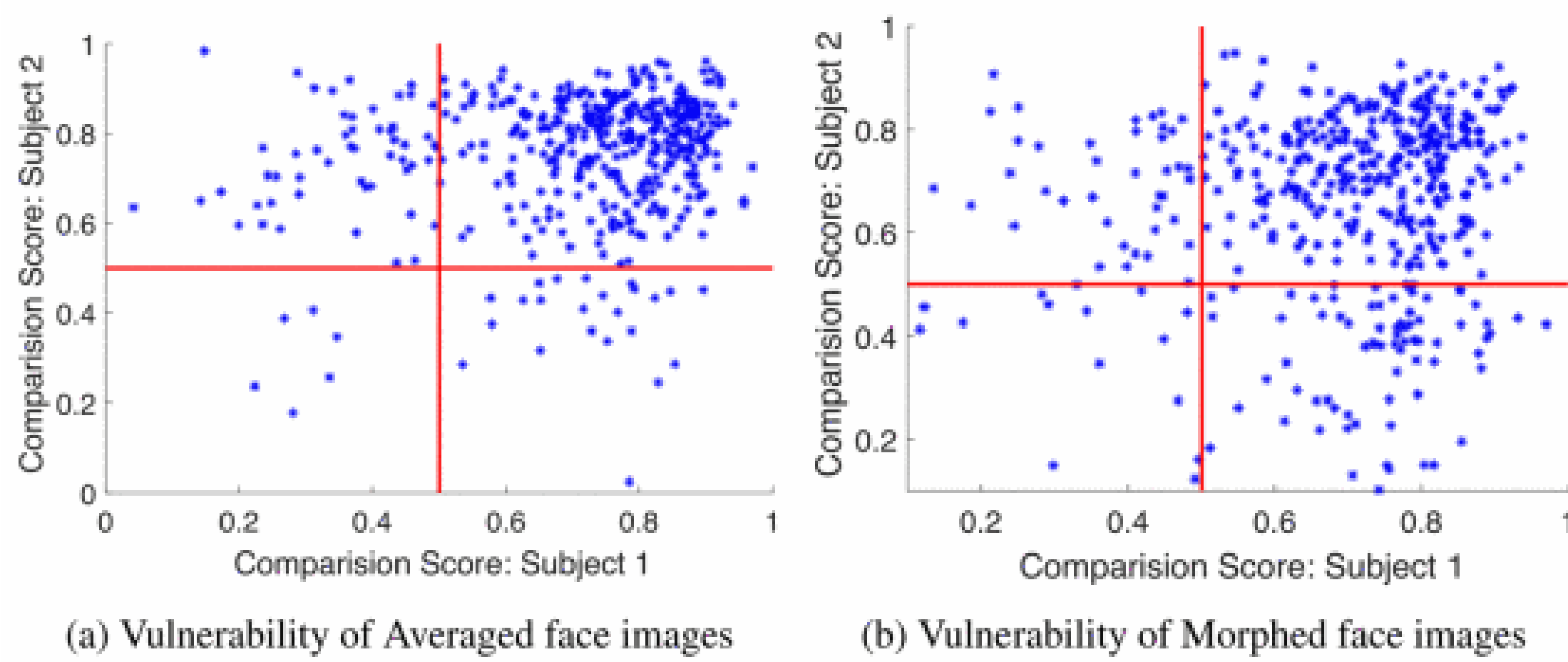
Genuine Subject 1

Morphed Identity

Genuine Subject 2

- **Morphed faces** can be easily created to **circumvent** Face Recognition Systems (FRS)
- FRS need reliable **Morphing Attack Detection (MAD)** Schemes

### Vulnerability of FRS



(a) Vulnerability of Averaged face images

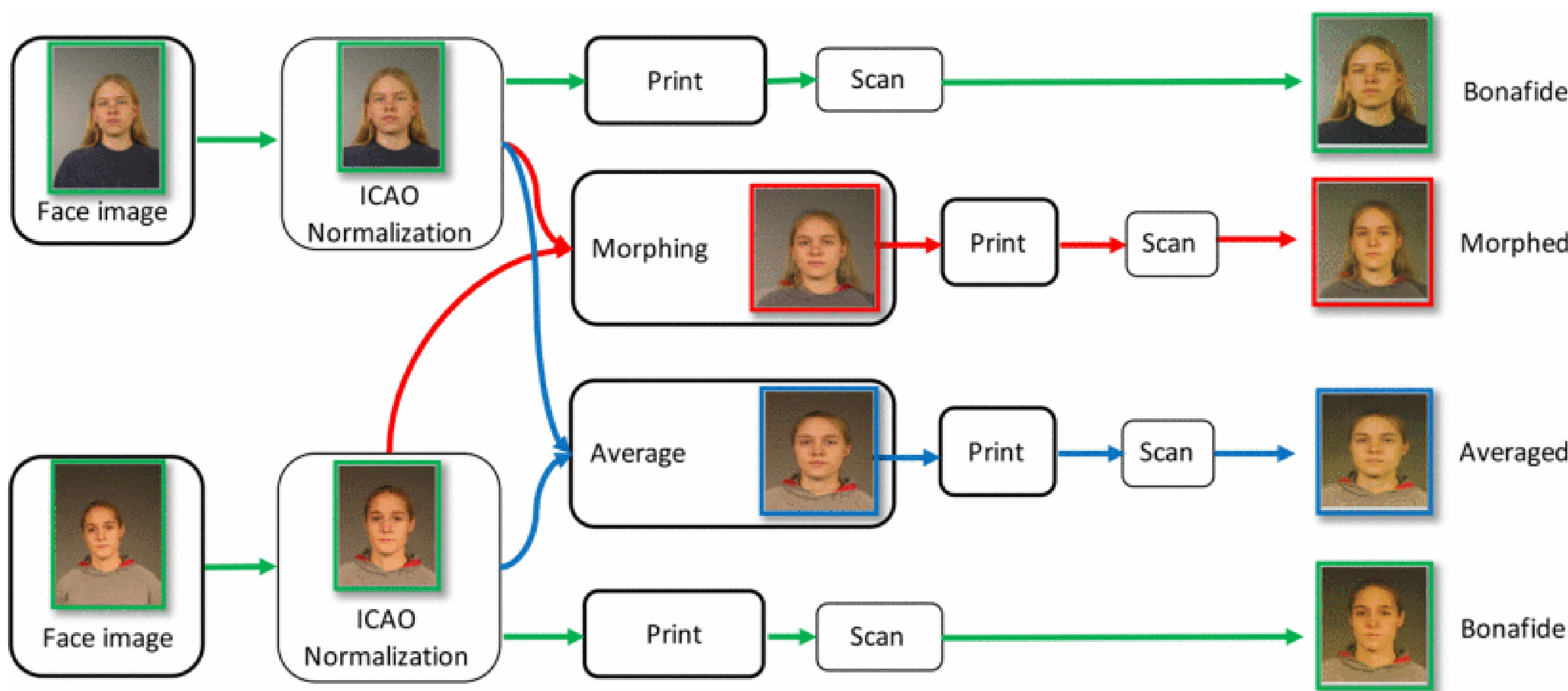
(b) Vulnerability of Morphed face images

- Vulnerability of FRS by analysing the comparison scores calculated using Cognitec Face VACS

### SOTAMD - Objectives

- The objective of the project is to **identify the state-of-the-art of MAD** mechanisms and to analyse their detection accuracy on a sequestered dataset, collected by the participants in a distributed effort.
- The dataset will include morphed face images and bona fide (not morphed) face images and will serve as the basis for **repeatable operational testing** of MAD mechanisms.
- A **database** of morphed face images will be constructed from bona fide face images that comply with the **ICAO and EU Regulation 2252/2004**.

### Morphing Attack Pipeline



### Acknowledgements for Funding

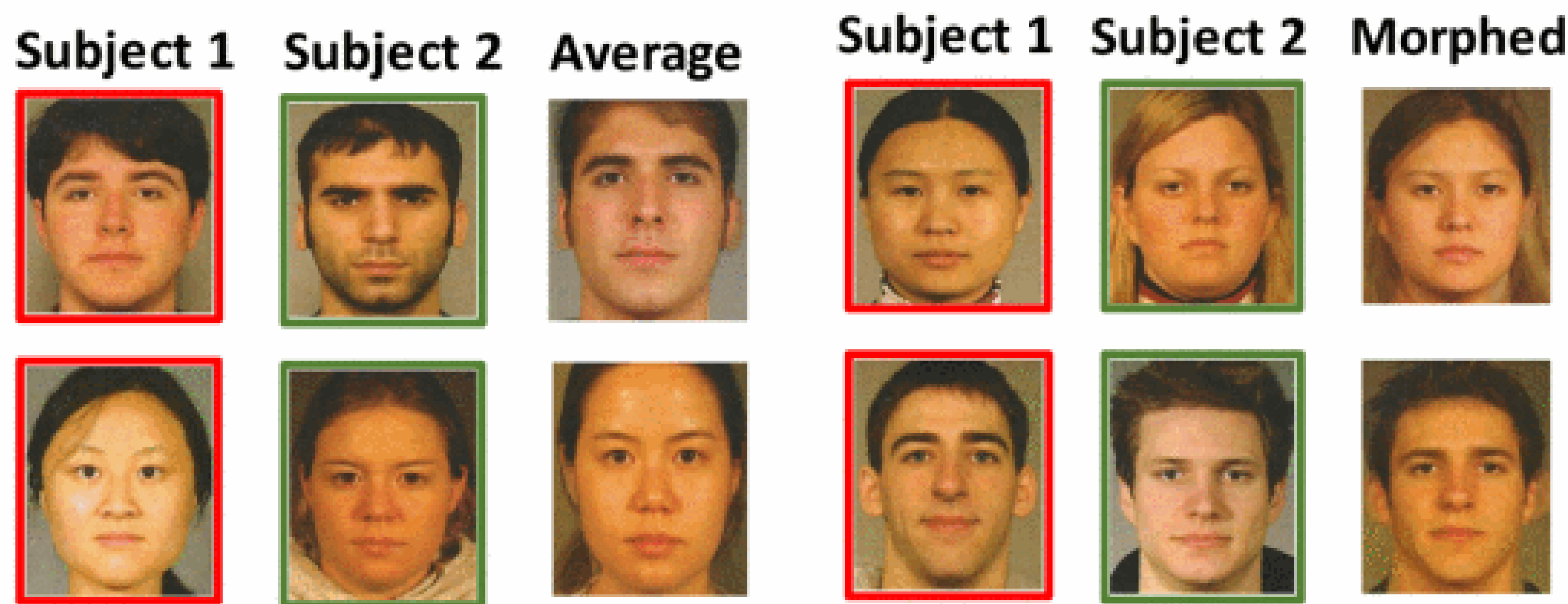


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### SOTAMD - Consortia

- The **National Office for Identity Data (NOI)** of the Ministry of the Interior and Kingdom Relations, the central identity authority of the Netherlands.
- The IT Forensics and Document Section of the Federal Criminal Police Office (**Bundeskriminalamt, BKA**) in Germany.
- The Biometric System Laboratory (BioLab), active at the **University of Bologna (UBO)**, an internationally known research center for its studies and publications in the field of biometrics.
- The da/sec Biometrics and Internet Security research group affiliated with **Hochschule Darmstadt (HDA)** and CRISP, focused on highly innovative and applied IT security research in the special fields of biometrics, Internet security and digital forensics.
- The Biometric Pattern Recognition (BPR) group of **The University of Twente (UTW)**, which performs research in 2D and 3D facial recognition, other biometrics and the theoretical background of biometric pattern recognition.
- The Norwegian Biometrics Laboratory (NBL) of the **Norwegian University of Science and Technology (NTN)**, focused on privacy enhancing technologies such as biometric template protection and presentation attack detection (including enrolment attacks).

### Efficient Morphing Process



(a) Averaged face images

(b) Morphed face images

- Factors like gender, age and ethnicity/appearance need to be considered for conducting successful morphing attacks.
- Morph attacks fail when the factors of gender, age and ethnicity/appearance are not considered, i.e., result in very low verification scores. The images labelled as Average and Morphed illustrate some unsuccessful attacks.

### SOTAMD - Current Status

- A **new dataset** of 150 subjects collected at multiple sites.
- Enrolment face images captured in high quality capture setting.
- Probe images captured from **live/simulated Automated Border Control (ABC)** gates.

### SOTAMD - Ongoing work

- Simulating the pipeline of the actual process, i.e., print-scan of morphed images.
- **Heterogeneous** family of **printers and scanners** to be used to study the impact of morphing against FRS.
- **Morphing Attack Detection (MAD)** algorithms to be tested on **sequestered** morphed image dataset.
- Development of an **evaluation platform** that will be made available to the scientific community at the end of the project.

#### Disclaimer

The content of this publication represents the views of the consortia only and is its sole responsibility. The European Commission does not accept any responsibility for use that may be made of the information it contains.