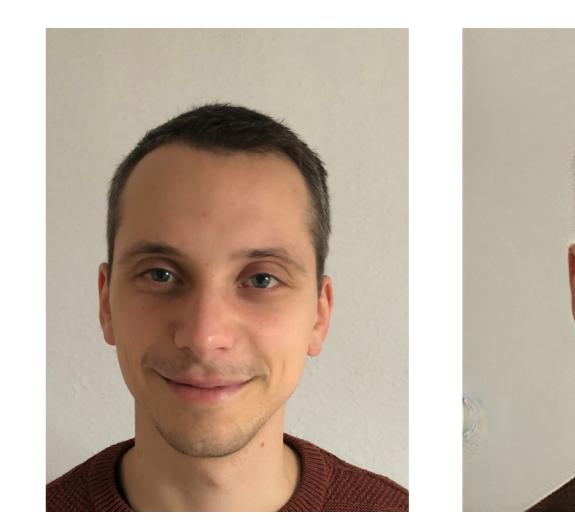# Synthetic Face Image Generation for Biometric Recognition
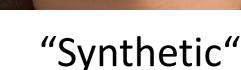
Objective

- The study investigates the suitability of synthetic face images for training and testing face recognition systems.
- The application of deep generative adversarial networks is evaluated for both generating synthetic images and mated samples.
- Assessment of the synthetic face images in terms of image quality and demographic bias is an essential part of this research project.

"Real"   "Synthetic"

Research Questions

- Is it possible to re-design existing face image generation architectures in order to improve the latent space's disentanglement properties and increase the visual fidelity of the generated images?
- Is it possible to assess the quality of synthetic face images in order to reliably predict the accuracy of face recognition systems?
- Is it possible to create a dataset of synthetic face images that is either balanced in terms of the distribution of soft characteristics, such as ethnicity, gender, or age?

Approach

- Synthetic face images are generated with style-based GAN-architectures.
- Mated samples are created by manipulating latent vectors in a well-structured latent space of an existing GAN-architecture.
- The quality of synthetic face images is evaluated with deep learning-based (low explainability) and standard-based (high explainability) quality assessment algorithms.
- Dedicated quality metrics are applied to analyse differences between the generated face images in terms of ethnicity, gender, or age.

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