

Norwegian Biometrics Laboratory (NBL) is a distinguished research lab contributing actively to the biometrics research across Europe. NBL spans its expertise over physiological and behavioral biometrics including 2D & 3D face, iris, fingerprint, hand vein, gait, keystroke, gesture and mouse dynamics recognition.

Master Thesis Face Morphing Attack Detection based on segmentation

OBJECTIVES & GOALS:

Face morphing attack targets deceiving the face recognition system by mixing biometric characteristics from multiple identities into a face image of a single subject. Common morphing attack detection algorithms are considered as binary classification problem with score-level loss functions (bona fide or attack). Researchers have also proposed to use binary segmentation mask and fine-grained classification loss for feature level supervision [1]. Meanwhile, in the field of image forgery detection, researcher have proposed to use advanced image segmentation model for deepfake detection [2]. For semantic segmentation specifically for face data, face parsing method¹ from NFIQ has been suggested in ISO/IEC CD2 29794-5 [3]. Based on above works, in this project you need to develop a Morphing Attack Detection (MAD) algorithm based on segmentation.

TASKS:

- Develop a MAD algorithm based on NFIQ face parsing method.
- Benchmark the detection error rate of the developed algorithm

PREREQUISITES:

• Background knowledge of deep learning and experience with implementation tools **FURTHER READING**:

- L. Qin, F. Peng and M. Long, "Face Morphing Attack Detection and Localization Based on Feature-Wise Supervision," in IEEE Transactions on Information Forensics and Security, vol. 17, pp. 3649-3662, 2022.
- [2] Y. Lai, Z. Luo, and Z. Yu, "Detect Any Deepfakes: Segment Anything Meets Face Forgery Detection and Localization," in arXiv:2306.17075.
- [3] ISO/IEC JTC1 SC37 Biometrics: Consultation on 2nd CD 29794-5, Information technology Biometric sample quality — Part 5: Face image data, ISO/ IEC Standard 29794–5, 2023, <u>https://www.iso.org/home.isoDocumentsDownload.do?t=6jKO2KiKLRpVV9JugAuglHywPUQoX2DyM</u> <u>nOgPthWkOTC9i8BDG23MdV6nIJKTHS3&CSRFTOKEN=FEFW-N0H5-2800-IWRZ-11V4-M704-T930-6IVX.</u>

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NOTE: Highly qualified foreign students can get financial support to cover cost of an internship.

¹ <u>https://github.com/zllrunning/face-parsing.PyTorch</u>