Mahsa Mitcheff

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I am a PhD candidate in Computer Science specializing in **generative AI, deep learning, and machine learning**, with a focus on enhancing iris presentation attack detection using **synthetically generated images** while preserving individual privacy. My research advances controlled iris **image augmentation** through exploration of generative models' latent spaces, enabling privacy-safe data synthesis for robust biometric security. I am skilled in **Python (PyTorch, NumPy, pandas, Matplotlib, scikit-learn)**, with additional experience in **MATLAB, TensorFlow, and SQL**. I regularly use tools such as **OpenCV and imgaug**, as well as advanced **generative models** including **StyleGAN** and **diffusion models**.

Education

Ph.D. in Computer Science and Engineering *GPA: 3.93*
University of Notre Dame, Notre Dame, IN, USA *2021 - Present*

M.S. in Computer Science *GPA: 3.65*
University of Minnesota Duluth, Duluth, MN, USA *2018 - 2020*

M.S. in Industrial Engineering- System Management and Productivity *GPA: 3.32*
University of Tafresh, Tafresh, Iran *2009 - 2012*

B.S. in Hardware Engineering *GPA: 3.43*
Azad University, Arak, Iran *2001 - 2005*

Work Experience

Graduate Research Assistant, University of Notre Dame – IN, USA *Jan 2021 – Present*
- Developing a privacy-preserving iris PAD pipeline reliant exclusively on synthetic data, actively increasing sample diversity and working to close the remaining 4% performance gap relative to authentic-data models.

Graduate Teaching Assistant, University of Notre Dame – IN, USA *Jan 2021 – Aug 2022*

Graduate Research and Teaching Assistant, University of Minnesota – MN, USA *Aug 2019 – Jan 2021*
- Studied physiological and psychological effects of listening to nursery rhymes using EEG and EDA signals.

Projects

Iris Image Synthesis (funded by WVU) *May 2023 – Ongoing*

- Trained conditional StyleGAN and diffusion models to synthesize iris images under 8 different conditions.
- Designed a gradient-guided exploration of generative models' latent spaces for controlled iris image augmentations `https://github.com/CVRL/PrivacySafeIrisPAD`.
- Conducted and analyzed two human-subject study (N=263) using Qualtrics to evaluate participants' ability to distinguish authentic vs. synthetic iris-image pairs.

Gender Bias in Iris Presentation Attack (funded by WVU) *May 2022 – May 2023*

- Evaluated deep learning based iris PAD performance differences between males and females across 3 datasets and 6 architectures.
- Identified gender-related bias in iris PAD performance and proposed mitigation strategies.

Human Emotional Responses to DeepDream-Generated Images *Jan 2022 – May 2022*

- Analyzed and visualized how DeepDream-generated image properties affect human emotional responses (valence, arousal).

Detection and Localization of Forgeries in CT Scan Images *Aug 2021 – Dec 2022*

- Investigated deep learning approaches for detecting and localizing forged regions in liver CT images.
- Trained and optimized the Single Shot MultiBox Detector (SSD) for medical image tampering detection.

RV Trip Pattern Recognition (funded by Lippert Components Team) *May 2021 – Aug 2021*

- Analyzed large-scale RV data using SQL to identify travel behavior pre- and post-COVID-19.
- Visualized trends and provided actionable insights for data-driven business decisions.
- Recommended strategic investment opportunities based on travel pattern analytics.

Publications

Mahsa Mitcheff, Siamul Karim Khan, and Adam Czajka, "Gradient-Guided Exploration of Generative Models' Latent Spaces for Controlled Iris Image Augmentations", submitted to WACV 2026.

Mahsa Mitcheff, Afzal Hossein, Sam Webster, et al., "Iris Liveness Detection Competition (LivDet-Iris) – The 2025 Edition," IEEE/IAPR International Joint Conference on Biometrics (IJCB), Osaka, Japan, 2025, `https://github.com/CVRL/livdet-iris-2025`.

Agnieszka Marczak-Czajka, Timothy Redgrave, **Mahsa Mitcheff**, Michael Villano, Adam Czajka, "Assessment of human emotional reactions to visual stimuli "deep-dreamed" by artificial neural networks," Frontiers in Psychology, 2024.

Mahsa Mitcheff, Patrick Tinsley, Kevin Bowyer, Patrick Flynn, Adam Czajka, "Privacy-Safe Iris Presentation Attack Detection," accepted for presentation at the IEEE/IAPR International Joint Conference on Biometrics (IJCB), 2024.

Patrick Tinsley, Sandip Purnapatra, **Mahsa Mitcheff**, et al., "Iris Liveness Detection Competition (LivDet-Iris) – The 2023 Edition," IEEE/IAPR International Joint Conference on Biometrics (IJCB), pp. 1-10, Ljubljana, Slovenia, 2023.

Mahsa Soufineyestani, Arshia Khan, and Mina Sufineyestani. "Impacts of music intervention on dementia: A review using meta-narrative method and agenda for future research," Neurology International, Vol. 13, No. 1, pp. 1-17, 2021.

Mahsa Soufineyestani, Dale Dowling, and Arshia Khan. "Electroencephalography (EEG) technology applications and available devices," Applied Sciences, Vol. 10, No. 21, 2020.

Relevant Coursework

- Artificial Intelligence, Computer Vision, Deep Learning, Machine Learning, Neural Networks

Other Activities

- Organizer of LivDet-Iris-2025.
- Teaching iris presentation attack concepts in biometrics to K–12 students.
- Organizer of GO Team Resource Fairs for the 2025 Graduate Student Orientation.