SAMUEL J WEBSTER

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EDUCATION

UNIVERSITY OF NOTRE DAME   Notre Dame, IN
    Computer Science and Engineering   May 2025 - Present
    Ph.D. Student
    Advisor: Prof. Walter J. Scheirer

UNIVERSITY OF NOTRE DAME   Notre Dame, IN
    M.S. in Computer Science   August 2024 - May 2025
    GPA: 4.0/4.0
    Advisor: Prof. Adam Czajka

UNIVERSITY OF NOTRE DAME   Notre Dame, IN
    B.S. in Computer Science   August 2020 – May 2024
    GPA: 3.5/4.0

RESEARCH EXPERIENCE

UNIVERSITY OF NOTRE DAME   Notre Dame, IN
Graduate Research Assistant, Computer Science and Engineering   May 2024 - Present

    June 2024 – May 2025: Explored the application of saliency-guided training to fingerprint presentation attack detection (discerning real versus fake fingerprints). Conducted a 50-participant fingerprint annotation study to produce human saliency. Proposed algorithmically-sourced 'pseudosaliency' as an effective alternative to human-sourced methods. Demonstrated significant gains in performance using saliency-guided training, capable of exceeding first place accuracy in the 2021 Fingerprint Liveness Detection Competition.

    February – April 2025: Explored Eigenfaces and Fisherfaces, two classical dimensionality reduction-based facial recognition techniques, as methods for domain-agnostic saliency generation. This poses various benefits over existing saliency generation methods, including its low cost, lack of human or domain requirement, easy scaling to new datasets, and full resolution.

    September 2024 – February 2025: Explored the application of saliency-guided training to iris recognition, the first verification-based task explored by the technique. Trained iris recognition models using autoencoder-generated and iris segmentation pseudosaliencies, demonstrating significant improvements in recognition accuracy over known irises.

UNIVERSITY OF NOTRE DAME   Notre Dame, IN
Undergraduate Research Assistant, Computer Science and Engineering   January – May 2024

January – May 2024: Researched optimization of saliency maps for saliency-guided training of biometric attack detection models. Processed and generated saliency granularities, trained models, and performed comparative analysis among explored configurations. Demonstrated that simple saliency optimization can significantly improve generalization in multiple domains and CNN architectures. Coauthored work accepted to International Joint Conference on Biometrics (IEEE IJCB 2024). Individually presented paper content in oral spotlight and poster sessions.

RESEARCH INTERESTS

Human-Inspired Learning
Computer Vision/Pattern Recognition
Machine Learning/Artificial Intelligence
Biometrics

PROFESSIONAL EXPERIENCE

WALMART GLOBAL TECH   Sunnyvale, CA
Software Engineering II Intern, Advertising Relevance   May 2023 – August 2023

Developed and implemented Java Spring Boot back end for 'Triad', a cloud-native internal diagnostic tool for Walmart's advertisement ecosystem.

Optimized asynchronous data ingestion from AzureSQL, Cassandra, and protocol buffer integrations. Improved retrieval speed by more than 500% throughout development.

CAKTUS AI   Palo Alto, CA
Machine Learning Data Analyst Intern   January 2023 – May 2023

Developed a Django application for efficiently comparing text generated by various large language models to evaluate fit for Caktus's services.

Performed qualitative analysis using the designed tool on hundreds of sample prompts in the academic domain, assessing features like text quality, factual accuracy, and tone.

TECHNICAL SKILLS

Programming Languages: Python, C/C++, Java, JavaScript, SQL, Bash, HTML/CSS
Operating Systems: Windows, MacOS, Linux
Tools & Frameworks: LaTeX, Git, PyTorch, Docker, Microsoft Office

PUBLICATIONS

S. Webster and A. Czajka, "Saliency-Guided Training for Fingerprint Presentation Attack Detection," arXiV pre-print (awaiting peer review), May 2025.

C. R. Crum, **S. Webster**, and A. Czajka, "Grains of Saliency: Optimizing Saliency-based Training of Biometric Attack Detection Models," presented at the *IEEE International Joint Conference on Biometrics (IJCB 2024)*, September 2024, Buffalo, NY.

PRESENTATIONS

C. R. Crum, S. Webster, and A. Czajka, "Grains of Saliency: Optimizing Saliency-based Training of Biometric Attack Detection Models," oral spotlight session at the *IEEE International Joint Conference on Biometrics (IJCB 2024)*, September 2024, Buffalo, NY.

POSTERS

S. Webster and A. Czajka, "Saliency-Guided Training for Fingerprint Presentation Attack Detection," presented at the *University of Notre Dame Interdisciplinary Graduate Research Symposium*, April 2025, Notre Dame, IN.

S. Webster and A. Czajka, "Saliency-Guided Training for Fingerprint Presentation Attack Detection," presented at the *3rd MSU-ND Computer Vision and Biometrics Workshop*, April 2025, Notre Dame, IN.

C. R. Crum, S. Webster, and A. Czajka, "Grains of Saliency: Optimizing Saliency-based Training of Biometric Attack Detection Models," presented at the *University of Notre Dame CSE Poster Competition and Recruitment Event*, March 2025, Notre Dame, IN.

C. R. Crum, S. Webster, and A. Czajka, "Grains of Saliency: Optimizing Saliency-based Training of Biometric Attack Detection Models," presented at the *IEEE International Joint Conference on Biometrics (IJCB 2024)*, September 2024, Buffalo, NY.

C. R. Crum, S. Webster, and A. Czajka, "Grains of Saliency: Optimizing Saliency-based Training of Biometric Attack Detection Models," presented at the *University of Notre Dame College of Science Joint Annual Meeting (COS-JAM)*, May 2024, Notre Dame, IN.

TEACHING EXPERIENCE

UNIVERSITY OF NOTRE DAME   Notre Dame, IN
Teaching Assistant, Computer Science & Eng.   August 2023 – May 2025

Spring 2025, Graduate TA; CSE 30124 "Introduction to Artificial Intelligence"; 59 students; graded assignments and hosted weekly office hours

Fall 2024, Graduate TA; CSE 40535/60535 "Special Studies: Computer Vision"; 41 students; graded assignments, graded components of semester projects, hosted weekly office hours

Fall 2023, Undergraduate TA; CSE 30124 "Introduction to Artificial Intelligence"; 81 students; graded assignments and exams, hosted weekly office hours

LEADERSHIP AND SERVICE

Volunteer Poster Judge, University of Notre Dame, College of Science Joint Annual Meeting (COS-JAM), 2025

Lab Representative, University of Notre Dame, Computer Vision Research Laboratory, First-Year Engineering CSE Lab Visit Day, 2024

Volunteer Teaching Assistant, University of Notre Dame, US Department of Education TRIO Program, 2024.