Dept. of Computer Science & Engineering
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Steven Grosz

RESEARCH INTERESTS

Pattern recognition, computer vision, and machine learning with applications to fingerprint and face recognition.

EDUCATION

2019 – May 2023 (expected) **Michigan State University**, *East Lansing*, MI.
Ph.D., Computer Science and Engineering
- Advisor: Anil K. Jain
- GPA: 4.00/4.00
- Graduate Coursework: Computer Vision (CSE 803, Fall 2019), Computational Foundations of AI & Machine Learning (CSE 891, Fall 2019), Pattern Recognition & Analysis (CSE 802, Spring 2020), Machine Learning (CSE 847, Spring 2020), Design & Theory of Algorithms (CSE 830, Fall 2020), Theory of Probability & Statistics I (STT 861, Fall 2020), Theory of Probability & Statistics II (STT 862, Spring 2021), Distributed Systems (CSE 812, Spring 2021)

2015 – 2019 **Michigan State University**, *East Lansing*, MI.
B.S., Electrical Engineering (Concentration: Biomedical Engineering)
- GPA: 4.00/4.00 (High Honors)

AWARDS AND SCHOLARSHIPS

05/2019 **Michigan State University**, *East Lansing*, MI.
Summa Cum Luade; Board of Trustees award for having the highest scholastic average at graduation; Joseph A. Potchen and James E. Siebert All-University Award for Excellence

2017-2018 **Michigan State University**, *East Lansing*, MI.
Walker Memorial Scholarship

07/2016 **Michigan State University**, *East Lansing*, MI.
Harris, Arthur Jr. Scholarship

2015-2018 **Michigan State University**, *East Lansing*, MI.
College of Engineering High Achiever Award; Yates Memorial Engineering Scholarship; Honors College State Scholarship

EXPERIENCE

08/2019– present **Graduate Research Assistant**, *Department of Computer Science and Engineering*, Michigan State University, Pattern Recognition and Image Processing Lab.
- Advisor: Anil K. Jain
- Conducting research in the area of fingerprint and face biometrics using machine learning and deep learning tools. Proposed a combination of style transfer learning and adversarial representation learning for generalizing fingerprint presentation attack detection across unseen fingerprint sensors and presentation attack materials (supported by an IARPA grant). Developed procedures for white-box evaluations of various Automated Fingerprint Identification System modules, including fingerprint reader, feature extractor, and matcher (supported by a NIST grant).

08/2018– 08/2019 **Undergraduate Research Assistant**, *Department of Computer Science and Engineering*, Michigan State University, Biomedical Ultrasonics and Electromagnetics Laboratory.
- Advisor: Robert J. McGough
- Modeled ultrasound shear wave speed and attenuation from data using statistical curve fitting.

05/2018– 08/2018 **Systems Engineering Intern**, *Aptiv*, Troy, MI.
- Developed and optimized machine learning algorithms in C for use in a network of embedded devices for gender detection of speech and measuring other real-time conversation dynamics.

05/2017– 08/2017 **Electrical Engineering Intern**, *DTE Energy*, Detroit, MI.
- Analyzed multiple factors such as cost, reliability, load capacity, contingency loading, etc. to identify the best method of service for bringing power to various businesses throughout downtown Detroit, MI.

RESEARCH

Fingerprint Presentation Attack Detection.

Proposed a combination of style transfer learning and adversarial representation learning for generalizing fingerprint presentation attack detection across unseen fingerprint sensors and presentation attack materials.

White-Box Evaluation of Fingerprint Recognition Systems.

Developed procedures for white-box evaluations of various Automated Fingerprint Identification System (AFIS) components, including the fingerprint reader, feature extractor, and matcher modules.

Power Law Behavior of Shear Waves Measured in Swine Liver.

Modeled the power law behavior of ultrasound shear wave speed and attenuation from data using statistical curve fitting.

PUBLICATIONS

S. A. Grosz, J. J. Engelsma and A. K. Jain, "White-Box Evaluation of Fingerprint Recognition Systems", Under review, IEEE Trans. Information Forensics and Security, arXiv:2008.00128.

S. A. Grosz, J. J. Engelsma, N. G. Paulter and A. K. Jain, "White-Box Evaluation of Fingerprint Matchers: Robustness to Minutiae Perturbations", IEEE International Joint Conference on Biometrics, Houston, TX, Sept. 2020

S. A. Grosz, T. Chugh and A. K. Jain, "Fingerprint Presentation Attack Detection: A Sensor and Material Agnostic Approach", IEEE International Joint Conference on Biometrics, Houston, TX, Sept. 2020.

S. A. Grosz, R. Pereira, NA Bannon, M. Urban, R. J. McGough, "Power Law Behavior of Shear Waves Measured in Swine Liver", IEEE International Ultrasonics Symposium, Glasgow, Scotland, Oct. 2019

S. A. Grosz, R. Pereira, M. Urban, R. J. McGough, "Measured Power Law Attenuation of Shear Waves in Swine Liver", Journal of the Acoustical Society of America, 145, 1861 (2019).

S. A. Grosz, R. Pereira, M. Urban, T. Humphrey, R. J. McGough, "Measured Fractional Calculus Parameters for Shear Waves in Swine Liver", IEEE International Ultrasonics Symposium, Kobe, Japan, Oct. 2018

SKILLS

Computer Programming	Python, Matlab, C/C++
Frameworks and tools	Tensorflow, PyTorch, LaTex, ROS, Git