SHENGTING (STEVEN) CAO

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EDUCATION

The University of Alabama, Tuscaloosa, AL — Aug. 2019 – Nov. 2024 (expected)
Ph.D. in Electrical Computer Engineering (ECE), GPA: 3.86/4.0
Research focus: Image Processing, Generative AI (image, graph), XR, Machine Learning

The University of Alabama, Tuscaloosa, AL — Jan. 2016 - May 2019
B.S. in Computer Science (CS), GPA: 3.71/ 4.0
Minor: Advertising

EXPERIENCE

The University of Alabama, Tuscaloosa, AL — May 2019 – Present
Research Assistant

360-degree View Generation of Humans from a Monocular Video

- Designed a deep learning algorithm to extract a 3D human model based on a single image and generate a 360-degree view (displayed in Hololens 2) of the human while doing rehabilitation.

Intelligent Treadmill Project (Patented)

- Designed a self-supervised intra-gait classification neural network to predict the current walking gait phases that achieves 98% progression accuracy on 34 testing subjects
- Deployed the server-client control between AI model and treadmill (Bertec and KineAssist) that makes the single-belt treadmill (~$1k) achieve comparable functionality as the split-belt treadmill (~$400k) for post-stroke patient rehabilitation

2D-3D Building Energy Anomaly Registration

- Detected and reconstructed building energy leaking anomaly from thermal image and register the anomaly to 3D mesh and rendering with Neural Randiance Field technique

Human Gaze Prediction

- Developed an Inverse Reinforcement Learning model to predict the human gaze scanpath on math problems based on the problem image and brain EEG signal

Biomedical Image Processing Projects

- Developed software to auto-detect the saturation artifacts according to spectrum information of (Optical Coherence Tomography) OCT images
- Developed a Super Resolution Generative Adversarial Network (SR-GAN) to increase both optical and digital resolution of human coronary OCT images

Body Information Retrieve Project

- Developed an Android app to measure the height, waistline, and hipline of humans by taking a picture of them

Mercedes-Benz U.S. International, Vance, AL — Jan. 2019 – May 2019
Capstone Computing

Method Time Measurement (MTM) for well-trained assembly line workers

- Built an desktop application with Unity3D and RGBD camera to capture and auto-divide the assembly process into basic operations (MTM code) defined by Mercedes-Benz manufacture standard.

Gongbing Technology, Shenzhen, China — May 2018-August 2018
Software Development Intern

Add-on features for an eyeglasses management and inventory system on iPad

- Extracted the landmark of the human face and superimposed a virtual eyeglass to the front for the previous purpose
- Added the speech recognition feature to the top search bar

SKILLS

|| C || C++ || CUDA|| Python ||TensorFlow||Pytorch ||MATLAB||C#||Java || JavaScript || PHP || SQL||NoSQL||
||Ladder Logic||ScadaBR||Arduino Uno||Android||iOS||Google Cloud|| AWS||Scheme||Unity||rapidminer||

PATENTS

- Simulating a Split-Belt with a Single-Belt Treadmill (No.: US 2022/0111249 A1)
- Real-Time, Fine-Resolution Human Intra-Gait Pattern Recognition Based on Deep Learning Models (US Patent App. 17/749,754, 2023)

PUBLICATIONS

- **S Cao**, J Zhao, F Hu, Y Gan, "Metaverse-Oriented Telerehabilitation with Single-Camera-based, Avatar-Free Rendering," *IEEE Transactions on Visualization and Computer Graphics* **(In proceeding)**
- **S Cao**, M Ko, C Li, D Brown, X Wang, F Hu, Y Gan, "Single-Belt vs. Split-Belt: Intelligent Treadmill Control via Micro-Phase Gait Capture for Post-stroke Rehabilitation," *IEEE Transactions on Human Machine System* (**Accepted)**
- F. Hu, Y.Gan, S.Cao, X. Wang, "Real-Time, Fine-Resolution Human Intra-Gait Pattern Recognition Based on Deep Learning Models", U.S. Patent Application No. 17/749,754.
- DA Brown, CY Li, M Ko, **S Cao**, X Wang, F Hu, Y Gan, L Zhang, "Simulating a split-belt with a single-belt treadmill" *US Patent App. 17/498,986* (**I am the software developer**)
- X Li, **S Cao**, H Liu, X Yao, BC Brott, SH Litovsky, X Song, Y Ling, Y Gan, "Multi-scale reconstruction of undersampled spectral-spatial OCT data for coronary imaging using deep learning*." IEEE Transactions on Biomedical Engineering*
- H Liu, **S Cao**, Y Ling, Y Gan, "Inpainting for saturation artifacts in optical coherence tomography using dictionary-based sparse representation," *IEEE photonics journal 13 (2)*
- **S Cao**, X Yao, N Koirala, B Brott, S Litovsky, Y Ling, Y Gan, "Super-resolution technology to simultaneously improve optical & digital resolution of optical coherence tomography via deep learning," *2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*
- X Chen, A Miller, **S Cao**, Y Gan, J Zhang, Q He, RQ Wang, X Yong, P Qin, ..., "Rapid Escherichia coli Trapping and Retrieval from Bodily Fluids via a Three-Dimensional Bead-Stacked Nanodevice," *ACS applied materials & interfaces 12 (7), 7888-7896* (**Featured cover)**
- MV Fedewa, K Sullivan, CJ Holmes, B Hornikel, **S Cao**, Y Gan, MR Esco, "Test-retest Reliability of Total Body Volume Derived From A Single 2-dimensional Digital Image: 3196 Board# 17 May 29 1: 30 PM-3: 00 PM", *Medicine & Science in Sports & Exercise 52 (7S), 869* (**I am the software developer**)
- K Sullivan, CJ Holmes, B Hornikel, **S Cao**, Y Gan, MR Esco, MV Fedewa, "Validity Of A 3-Compartment Body Composition Model Derived From A Single 2-Dimensional Digital Image: 3199 Board# 20 May 29 1: 30 PM-3: 00 PM", *Medicine & Science in Sports & Exercise 52 (7S), 870* (**I am the software developer**)

AWARD

Association of Chinese Student and Scholars at UA (ACSSUA) Jan. 2017-Present

Held roles as President, Vice President and Media Manager in the organization. Secured an annual sponsorship of $6,000 from various companies and organizations for event hosting

1st place in the Google Earth Engine Challenge Nov. 2020

Hosted by the University of Alabama Cyber Initiative and Brown University Data Science Initiative, Organizing committee: Prof. Sergei Gleyzer

Innovation Corps Program ($NSF-ICorps^{TM}$) July 2020 – September 2020

Entrepreneurship training certification awarded. Program director: Ruth Shuman and Andre Marshall, I-Corp faculty: Blake Petty, Max Green, and Alejandro Tortoriello

Conference & Research Support Funding Aug. 2020

$250 for an Invited presentation about Super Resolution at the University of West Alabama Symposium

TEACHING/LEADERSHIP

Instructor/Project manager Sep. 2020-Present

ECE 409/ECE509: Communication Labs, ECE 380: Digital Logic, ECE492/494 Capstone Design I/II, Data Science Summer Bootcamp

Tutor Sep. 2018-Aug. 2019

CS100/CS101: Programming for first-year college students (C/C++); CS201: Data Structures and Algorithm