SHENGTING CAO

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EDUCATION

The University of Alabama, Tuscaloosa, AL — Aug 2019-May 2023 (expected)
Ph.D. in Electrical Computer Engineering (ECE), GPA: 3.88/4.0

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

EXPERIENCE

Mercedes-Benz U.S. International, Vance, AL — Jan. 2019-May 2019
Research Intern

Used RGB-D camera to build a human motion trace system to support project manager to analyze well-trained workers disassembling and assembling cars.

- Divided each assembling operation into basic operations with Mercedes-Benz Method-Time Measurement (MTM) standard and labeled with MTM code
- Extracted the human skeleton joints with Kinect and designed rules to calculate the Method Time
- Designed a graphic interface and rendered human motion with Unity3D allowing MTM manager to obtain the Method Time by a simple click

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

Integrated Voice and Facial Recognition into an eyeglass sale platform

- Integrated the voice recognition on the search bar by converting the Swift code into Objective-C
- Used official Facial Recognition API to extract the landmark of face and superimpose virtual glasses on the face for preview purpose

RESEARCH

Automatic, Low Cost, Realtime Intelligent Treadmill Control System — March 2021-Present

- Collected and managed 34 sagittal videos of healthy subjects walking on a split-belt treadmill at different speed
- Selected, cropped, and labeled the intra-gait phases that consist of ~102000 video frames under the instruction of physical therapists
- Proposed a control system utilizing self-supervised learning and spatial temporal model that achieved 0.9 average accuracy and 0.98 average progression correctness
- Incorporated novel algorithms into Bertec treadmill with python, MATLAB and C++

Saturation Artifacts Inpainting Using Dictionary-Based Sparse Representation — Oct. 2020-Feb. 2021

- Wrote a MATLAB script to automatically detect the saturation artifacts according to spectrum information of (Optical Coherence Tomography) OCT images

Super-Resolution to Improve Optical & Digital Resolution Simultaneously — Sep 2019-July 2020

- Modified existing Super Resolution Generative Adversarial Network (SR-GAN) to simultaneously improve the optical and digital resolution of human coronary OCT images, and showed a high Structural Similarity (SSIM) and Peak Signal to Noise Ratio (PSNR)
- Compared denoising performance of our method with Block-Matching and 3D filtering (BM3D) and Denoising Convolutional Neural Network (DnCNN)

Smart Android Application to Measure Body Volume from 2D Image — Jan. 2019-May 2019

- Used Otsu thresholding, Canny edge detection, dilation, erosion, and k-mean clustering method to separate the human body and background with Java and OpenCV
- Located head, feet, waist, and hip of the human body by looping through the contour and calculated the width of waistline and hipline yield near-perfect reliability, with no difference between measures

PUBLICATION

- **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". *in 2020 42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*
- H. Liu, **S. Cao**, Y. Ling, and Y. Gan, "Inpainting for saturation artifacts in optical coherence tomography using dictionary-based sparse representation", *IEEE Photonics Journal*, vol. 13, no. 2, pp. 1–10 [code]
- X. Chen, A. Miller, **S. Cao**, Y. Gan, J. Zhang, Q. He, R. Wang, X. Yong, P. Qin, B. Lapizco-Encinas, K. Du. Rapid Escherichia coli (E. coli) Trapping and Retrieval from Bodily Fluids via a Three-Dimensional (3D) Beads Stacked Nano-Device. *ACS Applied Materials & Interfaces*. 2020 Jan 15 (**Featured complementary cover**).

PATENT

Real-Time, Fine-Resolution Human Intra-Gait Pattern Recognition Based on Deep Learning Models (under review)
Simulating A Split-Belt with A Single-Belt Treadmill (under review)

AWARD

The 1st place in the Google Earth Engine Challenge Nov. 2020
Hosted by 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
Support for conference presentation about Super Resolution at University of West Alabama Symposium

PROJECTS

Natural Language & Text Analytics API Hackathon Jan 2021-Feb 2021

- Developed a Heroku web application with Flask to track the NASDAQ stock which mentioned in posts or comments on Reddits Wallstreetbets group and accumulate the sentimental score of them to predict the next skyrocket stock such as Game Stop (GME)

Programming Language Design Jan. 2018-May 2018

- Designed and implemented a programming language called STC in C that is able to handle basic math calculation, array manipulation, conditions, recursion, iteration, function, lambda function and objects

TEACHING

Instructor:
ECE 409/ECE509: Communication Labs
Mentor:
CS100: Computer Science Programming I for Majors
CS101: Computer Science Programming II for Majors
CS201: Data Structure and Algorithm

SKILLS

|| C || C++ || Python || TensorFlow||Keras ||MATLAB|| C# ||Java || JavaScript || PHP || SQL || Scheme||