SHENGYUN PENG

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EDUCATION

Georgia Institute of Technology *Jan. 2022 - May 2026*
Ph.D. in Computer Science

Georgia Institute of Technology *Jan. 2021 - Dec. 2022*
M.S. in Computational Science & Engineering | GPA: 4.0/4.0

Tongji University *Sept. 2015 - June 2020*
B.Eng. in Civil Engineering | Minor: French | GPA: 92.37/100 | Rank: 1/32
Graduation with honor: Outstanding Graduates Award of Shanghai, 2020

University of California, Los Angeles *July - Sept. 2019*
Cross-disciplinary Scholars in Science and Technology (CSST) Program | GPA: 4.0/4.0

INDUSTRY EXPERIENCE

Shanghai FOREGOER, LLC *Sept. 2020 - Dec. 2020*
Software Engineer Intern
Supervisor: Prof. Weidong Yang | Computer Science | Fudan University

- Develop a vision monitoring software to check the layout in cockpit, and automatically verify the correctness of parameters in airspeed indicator, vertical speed indicator, and attitude indicator.

RESEARCH EXPERIENCE

Graduate Research Assistant *May 2021 - Present*
Prof. Duen Horng Chau | Polo Club of Data Science, CS | Georgia Institute of Technology, Atlanta

- Guaranteeing AI Robustness Against Deception (GARD) project, DARPA
- Working on generating benign and adversarial image pairs from CARLA: an open-source simulator for autonomous driving research
- Improving the robustness of video object tracking: perform the adversarial patch attack on GOTURN tracker and then defend the attack via background subtraction

FPGA-based Processor for Video Object Tracking *July 2019 - Dec. 2019*
Prof. Lei He | Design Automation Lab, ECE | University of California, Los Angeles

- Proposed a novel anchor free tracker, which represented an object by a single point at bounding box center, and other properties such as object size and local offsets were regressed directly from image features at the center location.
- Simulated operation fusion, network slicing, and data quantization for tracking network in PyTorch.
- Worked on the deployment of trackers on FPGA boards with the assistance of an RTL based hand-coded FPGA overlay domain-specific processor unit (OPU) with software programmability and fast compilation time, targeting at general CNN accelerations.

Object Tracking Algorithms with the Fusion of Infrared Images *July 2018 - Jan. 2020*
Prof. Gang Xiao | Advanced Avionics and Intelligent Information Lab | Shanghai Jiao Tong University

- Developed both pixel-level and feature-level visible and infrared fusion methods based on Siamese networks, which solved tracking challenges like partial occlusion, low illumination. The tracker ranked first on large-scale RGBT234 dataset.
- Detailed analyzed four types of occlusion, and built an anti-occlusion correlation filter-based tracker with re-detection mechanism.

Computer Vision-based Structural System Identification *Oct. 2017 - Aug. 2020*
Prof. Ying Zhou | State Key Laboratory of Disaster Reduction in Civil Engineering | Tongji University

- Proposed a novel and complete framework which obtained the natural frequency and modes of vibration with a non-contact measurement method based on optical flow, correlation filter and Siamese network with single UAV.
- Measured the displacements of a five-storey structure and the errors of first order and the second order natural frequency were 0.09% and 1.01%, respectively.
- Verified the accuracy through the first shaking table test of a full scale low-damage concrete wall building in the world at International Joint Research Laboratory of Earthquake Engineering, and the mean squared error of UAV camera and linear variable differential transformers was below 4%.

Simulation of Vertical Launching Missile and Aircraft Based on PID Control *June - Aug. 2017*
Associate Prof. Chao Liu | Institute of Computing Technology | Chinese Academy of Sciences

- Built a Simulink model to simulate missile vertical launch and six-freedom system for aircraft flight control.
- Illustrated the changes in pitch angle and posture adjustment with the involvement of PID control system when disturbed by atmosphere, aiming to realize assistive and full-automatic flight path control.

3D Printing of Concrete Structures and Sample Strength Tests *Apr. 2017 - Apr. 2018*
Prof. Qianrong Yang | School of Materials Science and Engineering | Tongji University

- Finished the mechanical design and manufacture of the 3D printer with automatic pulp feeding systems, assisted by BIM to visualize construction process and cost.
- Performed sample rupture strength and tensile strength tests to modify the working path in order to achieve the desired physical properties.

AWARDS

National Scholarship (top 2%)	*2017 - 2018*
Tongji University Excellent Student (top 5%)	*2017 - 2018*
First Prize of Tongji University Scholarship of Excellence	*2016 - 2017*
Excellent Worker in the ASCE-Tongji-ISG of the Instructional Innovation	*2016 - 2017*
National Undergraduate Innovative Programs Certificate	*2017*
3rd Prize in Contemporary Undergraduate Mathematical Contest in Modeling	*Dec. 2017*
3rd prize in Tongji Undergraduate Mathematical Contest in Modeling	*May 2017*
1st Prize in Mathematics Competition of Chinese College Students	*Nov. 2016*
Championship of SAGE Global Contest, SRB Category	*2012 - 2013*
The Team 5th Place in Princeton University Math Competition(PUMaC)	*Nov. 2013*
High School Mathematical Contest in Modelling (HiMCM) Meritorious	*2013*

PUBLICATIONS

[1] **Shengyun Peng**, Lingfeng Yan, Bin He and Ying Zhou, "A Novel DNN tracking algorithm for structural system identification," *Smart Structures and Systems*, vol. 27(5), pp. 803-818, May 2021.

[2] **Shengyun Peng**, Yunxuan Yu, Kun Wang and Lei He, "Accurate Anchor Free Tracking," *arXiv, 2006.07560*

[3] Xingchen Zhang, Ping Ye, **Shengyun Peng**, Jun Liu and Gang Xiao, "DSiamMFT: An RGB-T fusion tracking method via dynamic Siamese networks using multi-layer feature fusion," *Signal Processing: Image Communication*, vol. 84, pp. 115756, 2020.

[4] Xingchen Zhang, Ping Ye, **Shengyun Peng**, Jun Liu, Ke Gong and Gang Xiao, "SiamFT: An RGB-infrared Fusion Tracking Method via Fully Convolutional Siamese Networks," *IEEE Access*, vol. 7, pp. 122122-122133, 2019.

[5] Xingchen Zhang, Ping Ye, Dan Qiao, Junhao Zhao, **Shengyun Peng** and Gang Xiao, "Object Fusion Tracking Based on Visible and Infrared Images Using Fully Convolutional Siamese Networks," *22th International Conference on Information Fusion (FUSION)*, Ottawa, ON, Canada, 2019, pp. 1-8.

[6] Jun Liu, Gang Xiao, Xingchen Zhang, Ping Ye, Xingzhong Xiong and **Shengyun Peng**, "Anti-occlusion object tracking based on correlation filter," *Signal, Image and Video Processing*, Nov. 2019.

INVITED TALKS AND PRESENTATIONS

International Workshop on Data Science in Civil Engineering *June 2019*
Theme A new Siamese-based tracking for structural health monitoring

GRANTS AND FUNDING

ADP-Gatech HCM Domcument Structure Identification and Recognition Project *2022*
PI: D. H. Chau; Co-Authors: S.Y. Peng
Awarded $120,000, 2022 - 2023

DARPA Guaranteeing AI Robustness against Deception (GARD) Research Grant *2019*
PI: J. Martin; Co-PIs: C. Cornelius, D. H. Chau; Co-Authors: N. Das, S.T. Chen, S. Freitas;
Selected for Award: $8.1M, 2020 - 2023

SERVICE

Reviewer
Pattern Recognition *2020*
IEEE Access *2020*