Simon Han YANG

Research Assistant · Computer Science

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Research Interests

Micromanipula, Cell Surgery, 3D Reconstruction, Depth Estimation, Robotics, Computer Graphics, Computer Version

Education

Hong Kong Baptist University United International College (Zhuhai) *Zhuhai Guangdong, China*

Bachelor's degree *2019.9 - 2023.6*

- Bachelor of Engineer in **Computer Science**
- Supervisor: **Prof. Amy (Hui Zhang)**

The Chinese University of Hong Kong (Shenzhen) *Shenzhen Guangdong, China*

Ph.D. Candidate *2023.9 - now*

- Ph.D. of Engineer in **Computer Information Engineering**
- Supervisor: **Prof. Zhuoran Zhang**

Professional/Research Experience

Medical Micro-Robotics Labs[MMRL] at CUHK(shenzhen) *Director: Prof. Zhuoran Zhang*

Research Assistant *2022.12-present*

Goal: Specializing in micro and nano robotic automation systems and microscopic image depth estimation and visual feedback.

- An automated system for cell selection, cell injection, and contact detection was designed and completed to improve the efficiency and accuracy of microscopic cell manipulation.
- Designed and developed the first microscope-based sparse depth information dataset and the Diffusion Model-based depth information complementation algorithm.
- Participated in and optimized an automated system for microscopic sperm preference.
- A multi-frame fusion sperm tail segmentation algorithm was designed and developed.

Guangdong Key Lab of Interdisciplinary Research and Application for Data Science *Director: Prof. Amy (Hui ZHANG)*

Research Assistant *2021.10-2023.6*

Goal: Research on 3D reconstruction and related vision problems using computer graphics and Deep Learning methods.

- An efficient Convolutional Neural Network for multi-view 3D Wind Turbine Blade (WTB) reconstruction is designed for contour-based WTB reconstruction.
- Use computer graphics-based, rendering methods(NeRF-based algorithm) to reconstruct wind turbine scenes and large scenes such as in and around schools)
- Use Transformer-based methods to have research on object detection.
- Lead the design and development of algorithms and assist other project teams in competitions.

Mark Space Robotics Lab *Director: Dr. Yanyan Ji*

Research Assistant *2022.3-2022.12*

Goal:Focusing on the creation of robotic automatic navigation systems and related robotic operations

- Designing a robot autonomous navigation system with portability and combining 3D reconstruction algorithms for campus reconstruction
- Led the team in design and development, and participate in the artificial intelligence competition, winning excellent results
- Designed and developed an automated drug application system based on the UR5 robotic arm.

Publications

Published

Han, YANG, Teoh Teik Toe. 2022. HQNet: An Efficient Convolutional Neural Network for Cervical Cancer Classification. *IEEE International Conference on Biomedical Imaging, Signal Processing 2022.* (IEEE).

Han, YANG, Linchuan TANG, Hui MA, Rongfeng DENG, Hui ZHANG. 2022. WTBNeRF: Wind Turbine Blade 3D Reconstruction by Neural Radiance Fields. *The Efficiency and Performance Engineering Network 2022* (Springer).

In Prep

Fine-grained classification for Depth Estimation during Micromanipulation. First Author, Finished. Under review to Cyborg and Bionic Systems (CBS), Nature. **[IF≈11]**

Contact Detection automated system for constructing sparse depth dataset. First Author, Finished. Under review to IEEE Transactions on Automation Science and Engineering(T-ASE) [CCF-B].

Weekly-Supervised Depth Estimation during Micromanipulation. First Author, Finished. Under review to ICRA [CCF-B] 2024.

Fractional order optimizer. Co-Author, In Peer, Under review to ICASSP [CCF-B] 2024.

Machine Learning in Micro-Robotics, A Review. Co-Author. In Peer, Aimed to Nature Methods.

Awards, Fellowships, & Grants

2022	**China University Student Computer Design Competition**, CCF (China Computer Federation)	*National Third prize*
2022	**China University Student Computer Design Competition** , CCF (China Computer Federation)	*Provincial Third Prize*
2021	**The Interdisciplinary Contest in Modeling**, COMAP (the Consortium for Mathematics and Its Applications)	*Honorable Mention*
2020	**Enactus Social Innovation Competition China Cup**, Enactus China	*Most Business Value Award*
	Enactus Social Innovation Competition China Cup, Enactus China	*Most Innovation Award*
	Enactus Social Innovation Competition China Cup, Enactus China	*Most Potential Award*
2019	**Zhuhai Xiangzhou District Innovation and Entrepreneurship Competition**, Yu Foundation	*Third Prize*
2022	**UIC Leadership Awards & Registration for Leadership Awards**, UIC SSLDT	*Bronze Medal*

Outreach & Professional Development

Development

YOLOv5-based Mask Detection, Build real-time mask detection system using YOLO series algorithm. Runs on multiple platforms including cell phones and computers. ***Best Course Program.***

Object reconstruction based on SFS (Shape from Shading) method, 3D reconstruction of objects using Shape From Shading algorithm combined with image expansion and erosion, image edge extraction and enhancement. ***Best Course Program.***

Raspberry Pi-based face-tracking car, Using Raspberry Pi to control Basic Stamp Manual cart chassis and differential motor. And use the camera for real-time face movement tracking, to achieve the purpose of real-time movement of the cart according to the face. ***Best Course Program.***

Upotato WeChat Mini-app, WeChat mini-app, daily course deadline reminder for university students, and collection of various notifications, participated in the project back-end programming and database construction, and acted as the **project founder and leader** to promote the program and PR. The program has **1000+** active daily users.

Image segmentation based on traditional image processing and deep learning methods, Based on traditional image processing methods, the Wind Turbine Blade scene image is segmented to obtain an accurate Wind Turbine Blade foreground and to perform camera calibration and reconstruction. Image pre-processing using image expansion and erosion, binarization, Sobel, Canny operator for edge enhancement, segmentation. Reconstruction using SFM and acquisition of camera pose. ***Best Course Program.***

Professional Memberships

China Society of Image and Graphics, Student Member

Service and Outreach

2022	**NTU AI Lab**, Summer School	*Singapore*
2022	**VALSE**, Listener	*Tianjin, China*
2021	**Funplus Company**, Python Engineer	*Beijing, China*
2021	**GUANGDONG-HONG KONG-MACAO Greater Bay Area Artificial Intelligence Summit Forum** , Volunteer	*Zhuhai, GuangDong*
2020-2022	**UIC Computer Science Masyarakat Profesional**, Technology Director	*BNU-HKBU College*
2020-2022	**UIC Peer Mentor**, Mentor	*BNU-HKBU College*
2022	**Yu Foundation**, Entrepreneurial Mentor	*Zhuhai, Guangdong*
2021-2022	**Upotato Technology Program(Entrepreneurial Projects)**, Founder & Leader	*Zhuahai, Guangdong*
2019-2021	**Cybernetics Academy(Entrepreneurial Projects)**, Manager	*Enactus China*