JIAXUAN LI

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Homepage: https://jiaxuan-li.github.io

Education

The University of Tokyo — Tokyo, Japan
Apr. 2022 - Mar. 2025 (Expected)
Ph.D. in Creative Informatics,
Supervisor: Prof. Hideki Nakayama
Graduate Research Assistant in Machine Perception Group
Research Direction: Trustworthy AI for Healthcare

Shanghai Jiao Tong University — Shanghai, China
Sept. 2019 - Mar. 2022
M.Eng. in Electronic Engineering
Supervisor: Prof. Yuye Ling
Graduate Research Assistant in John Hopcroft Center for Computer Science
Research Direction: OCT Image Processing

Shanghai University — Shanghai, China
Sept. 2015 - Jul. 2019
B.Eng. in Communication Engineering
Supervisor: Prof. Zhi Liu
Undergraduate Research Assistant in Image Video Processing Lab

Publications

Multi-scale sparse representation-based shadow inpainting for retinal OCT images *2022*
- Yaoqi Tang, Yufan Li, Hongshan Liu, **Jiaxuan Li**, Peiyao Jin, Yu Gan, Yuye Ling, and Yikai Su
- in SPIE Medical Imaging 2022, San Diego, USA. (Image Processing Student Paper Award)

Multi-scale GCN-assisted two-stage network for joint segmentation of retinal layers and disc in peripapillary OCT images *2021*
- **Jiaxuan Li**, Peiyao Jin, Jianfeng Zhu, Haidong Zou, Xun Xu, Min Tang, Minwen Zhou, Yu Gan, Jiangnan He, Yuye Ling, and Yikai Su
- Biomedical Optics Express, vol. 12, no. 4, 2021, pp. 2204-2220

A GCN-assisted deep Learning method for peripapillary retinal layer segmentation in OCT images *2021*
- **Jiaxuan Li**, Yuye Ling, Jiangnan He, Peiyao Jin, Jianfeng Zhu, Haidong Zou, Xun Xu, Yu Gan, and Yikai Su
- in SPIE Photonics West 2021, San Francisco, USA. (Oral presentation)

Key Academic Projects

Learning to Disentangle Representations for Debiased Medical Image Classification
Advisor: Prof. Hideki Nakayama, The University of Tokyo *Jul. 2022 - present*
- Develop an algorithm for learning from real-world biased dataset and apply it into medical image classification to improve the robustness of diagnosis model
- The project is underway

Automated Quantitative Feature Generation for Atrophy Myopic Maculopathy Grading
Advisors: Prof. Yuye Ling, Shanghai Jiao Tong University *Sept. 2021 - Mar. 2022*
- Propose new OCT features by machine learning for quantifying macular changes and impact on atrophy degree of high myopia, which can be applied in clinic atrophy myopic maculopathy grading
- Build a preliminary classification model and find regions of interest in macular OCT images by employing the class activation maps in deep learning
- Collaborate with physicians to analyse the rationality of the detected regions of interest in macular OCT images
- Extract quantitative features to construct new OCT features relevant to atrophy myopic maculopathy

Shadow Inpainting for OCT Images

Advisors: Prof. Yuye Ling, Shanghai Jiao Tong University *Dec. 2020 - Aug. 2021*

- Joint with Yaoqi Tang and Yufan Li design an accurate and convenient shadow inpainting algorithm to suppress artifacts caused by vessels in retinal OCT images
- My contribution: proposed a multi-scale processing scheme to handle wider shadows
- The PSNR obtained by the proposed method on synthetic shadows reached 35.99 dB, which was 17.00% and 4.70% higher than that of spline interpolation and total variation

Peripapillary OCT Image Segmentation

Advisor: Prof. Yuye Ling, Shanghai Jiao Tong University *Sept. 2019 - Mar. 2021*

- Project website: http://www.yuyeling.com/project/mgu-net
- Proposed a scheme for peripapillary OCT image segmentation, which could be used in the diagnosis of retinal diseases
- Cooperated with physicians to collect peripapillary OCT images in the Ophthalmology Department of Shanghai General Hospital
- Provided public access to the collected dataset, which is the first public dataset for peripapillary OCT image segmentation
- Designed a novel GCN-assisted segmentation network to exploit the prior knowledge existed in the peripapillary OCT image
- The Dice score of the proposed segmentation network was 0.820 ± 0.001 and the pixel accuracy was 0.830 ± 0.002 on the collected dataset, both of which outperformed those from other state-of-the-art techniques

Obstacle Avoidance Algorithm and Command System for Autonomous Navigation

Advisor: Prof. Zhi Liu, Shanghai University *Dec. 2018 - Jun. 2019*

- Built an real-time obstacle avoidance system to enable the autonomous underwater vehicle to safely avoid obstacles located on its navigation route
- Designed an threshold based segmentation algorithm to extract obstacle contours in sonar images and developed an obstacle avoidance algorithm technique
- The threshold based segmentation algorithm for sonar images improved the segmentation speed by 10% compared with Otsu algorithm

Detecting Niacin Skin-Flushing

Advisor: Prof. Zhi Liu, Shanghai University *Sept. 2017 - Sept. 2018*

- Built a automated Niacin skin-flushing area detection algorithm to assist psychiatrist in the diagnosis and treatment of schizophrenia
- Trained a Faster-RCNN model based on about 3,700 Niacin skin-flushing images for accurate skin-flushing area recognition
- Achieved 95.2% and 80.5% under mAP and detection rate in the testing set respectively

Honors and Awards

- Support for Pioneering Research Initiated by Next Generation (SPRING GX), the University of Tokyo *2022*
- Outstanding Graduates of Shanghai Jiao Tong University, Shanghai Jiao Tong University *2022*
- COSCO Shipping Scholarship, Shanghai Jiao Tong University *2021*
- Second Prize in "Huawei Cup" The 17^{th} China Post-Graduate Mathematical Contest in Modeling *2020*
- Second Class Academic Scholarship, Shanghai University *2016*

Positions of Responsibility

- **Student Member** for *Society of Photographic Instrumentation Engineers (SPIE)* *2021*
- **Teaching Assistant** for *AI 2614 Digital Signal and Image Processing* *Spring 2021*
- **Teaching Assistant** for *EE 367 Fundamentals of Communication Circuits* *Spring 2020*

Technical Strengths

- **Programming Languages:** Python, C/C++, Matlab, LaTeX
- **Developer Tools:** VS Code, Visual Studio, PyCharm
- **Libraries:** PyTorch, NumPy, Matplotlib, Pandas