

Guojian Yuan

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Education

Master of Science , Major in Biomedical Engineering	2024 - 2025
<i>College of Design and Engineering (CDE), National University of Singapore, Singapore</i>	

Research Experience

Undergraduate Research Assistant with Prof.Yongjin Zhou	November 2019 - Present
<i>Marshall Laboratory of Biomedical Engineering</i>	

- **Project 1: Development of automatic quantification system for skeletal muscle structural elements in ultrasound images based on deep learning** January 2021 – January 2022
 - Label the muscle region segmentation mask and muscle fiber texture orientation field of ultrasound image.
 - Use the deep learning method to predict the segmentation mask and texture orientation field simultaneously, and the measurement error is smaller than that reported in the literature.
 - Combine the segmentation mask and texture orientation field to calculate the muscle structure elements. The performance was better than the full-automatic measurement method reported in the literature.
- **Project 2: Development of software for automatic quantification of structural elements of ultrasonic skeletal muscle images** October 2021 - January 2022
 - Use C ++ programming language to develop software systems, and use OpenCV and LibTorch libraries to implement the algorithm.
 - Encapsulate the developed algorithm into a C ++ DLL toolkit, which is available for developers to directly call the quantitative function of muscle structure.
 - Use QT5 for graphical interface development, and finally realize automatic quantitative software systems in the skeletal muscle structure element in ultrasonic images.
 - This software can be embedded in ultrasonic imaging instruments and has been put into use in the market at present.
- **Project 3: Plug-and-play ultrasound images restoration based on SwinIR** November 2022 - Present
 - A highly flexible and effective ultrasonic denoising network was constructed based on SwinIR network
 - We then plug the deep denoiser prior as a modular part into a half quadratic splitting based iterative algorithm to solve various image restoration problems.
 - We provide a thorough analysis of parameter setting, intermediate results and empirical convergence to better understand the working mechanism.
 - Experimental results on two representative image restoration tasks, removal of speckle noise and super resolution, show that the proposed plug-and-play ultrasonic image restoration method is significantly superior to other most advanced model-based methods.
- **Project 4: Radiomics study of Alzheimer's disease based on muscle ultrasound** November 2021 – January 2023
 - Collect and process the ultrasound skeletal muscle data from mice with early Alzheimer's disease.
 - Extract radiomics signatures (including first order features, texture features, and transformation features)
 - Make statistical analysis to find features that are highly correlated with increasing AD specificity, and obtained inspiring discoveries, which are expected to become early AD predicted imaging basis.
 - Use machine learning and deep learning methods to build early AD prediction model.

Publications

- **Guojian Yuan**, Zengtong Chen, *Yongjin Zhou. Quantifying skeletal muscle structure parameters in ultrasound images using deep learning without linear assumptions. (Biomedical Signal Processing and Control, 2024, 91: 106050)
- Miaoqin Deng¹, **Guojian Yuan**¹, *Yongjin Zhou. Early prediction of Alzheimer Disease based on muscle ultrasound (Manuscript in prep.)
- Patent for invention. "Automatic quantification of muscle structure elements in ultrasound images" (Granted.)
- Miaoqin Deng¹, Liying Zhou¹, Zengtong Chen, **Guojian Yuan**, *Yongjin Zhou, *Yang Xiao, An ex-vivo validation of the modulus-length framework to characterize passive elastic properties of skeletal muscle. (Ultrasonics, 2023, 129: 106904.)

Honours and Awards

- The "LWPOCT Special Scholarship"
The Excellence Award March 2023
- "Challenge Cup" National College Student Business Plan Competition
University-level second prize July 2021 – July 2022
- Presided over the School-level College Student' Innovation and Entrepreneurship Training Program
"Early prediction of Alzheimer's disease based on radiomics" . June 2021 – Present
The final acceptance score of the program is Good.
- Participated in the 2022 MCM/ICM contest and obtain a S award. April 2022

Work Experience

- Internship of Algorithm Engineer in Shenzhen Fitfaith Technology Co.,Ltd
July 2022 – September 2022
- Internship of Algorithm Engineer in ZMO.AI Technology Co.,Ltd
January 2023 – February 2023
- Internship of Algorithm Engineer in MagicLight Technology Co.,Ltd
July 2024 – September 2024