

Muhang He

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EDUCATION

Case Western Reserve University, Cleveland, OH, USA

Sep 2024-present

Ph.D. Student, Biomedical Engineering

- Department of Biomedical Engineering
- Research Focus: Ultrasound and Photoacoustic Imaging

Shanghai Jiao Tong University (SJTU), Shanghai, China

Sep 2020 - June 2024

Bachelor of Engineering, Biomedical Engineering

- Core GPA: 87.95/100 (Top 10%)

RESEARCH EXPERIENCE

Intelligent Precision Disinfection Robot System for Complex Indoor Environment | Main Researcher

Supervisor: Professor **Yao Guo**, Department of Biomedical Engineering, SJTU

Oct 2022 - Present

- Muhang He, the first author, *Intelligent Disinfection Robot with High-Touch Surface Detection and Dynamic Pedestrian Avoidance*
- Accepted by 2024 IEEE International Conference on Robotics and Automation.

Main contributions:

- We design an automated disinfection robot system, which has high disinfection efficiency and robust navigation skills, and thus is more suitable for crowded scenarios with high disinfection needs such as hospitals.
- A dedicated deep model for key area detection is introduced to detect the target objects with high disinfection needs (such as door handles and switches).
- Deep learning-based pedestrian detection and dynamic obstacle avoidance are combined to predict the movement trend of pedestrians, so as to achieve real-time path planning and dynamic avoidance of pedestrians and other obstacles.

Research on Cardiac PET/MR Joint Registration Algorithm Based on Deep Learning | Team Leader

Supervisor: Professor **Chenxi Hu**, Department of Biomedical Engineering, SJTU

Feb 2023 - Jun 2023

- Developed deep learning-based algorithm to integrate the cardiac PET and MR imaging technologies, which can provide clinicians with a more comprehensive and accurate basis for diagnosing heart diseases
- Focused on the challenge of differences between non-rigid motion and cross-modal imaging; Targeted for automated registration of cardiac PET and MR in the cardiac region
- Analyzed the feasibility of optimal registration algorithm based on deep learning from aspects of the classful network, segmentation network, adversarial generation network
- Practiced and updated the assessment of deep learning-based registration algorithms when applied to 57 patient datasets.

3D Gait Analysis System Based on Mobile Vision Perception | Main Researcher

Supervisor: Professor **Yao Guo**, Department of Biomedical Engineering, SJTU

Nov 2021 - May 2022

- Developed and configured the Robot Operating System (ROS) for the robot's functionalities, including joint gait analysis, visual Simultaneous Localization and Mapping (SLAM), and robot operation control system.
- Created a simulated environment for the robot to replicate real-world control scenarios (Coppeliasim), enabling comprehensive testing and evaluation of the robot's performance.
- Integrated human posture recognition and gait analysis techniques to assess the normalcy of human postures.

PROJECT EXPERIENCE

Project of a novel three-dimensional imaging system for organoid analysis | Researcher

Supervisor: Professor **Hui Yu**, Department of Biomedical Engineering, SJTU

Apr 2021 - Mar 2022

- Built a control circuit to operate a LED lamp array with high positioning accuracy successfully. The LED lamp array is used to provide precise illumination for solid models.
- Conducted data collection of diffraction holograms from samples at various angles. Utilized filtered inverse projection techniques to perform two-dimensional reconstruction of the collected holograms.
- Implemented layer stacking of the reconstructed two-dimensional images to generate a three-dimensional representation of the sample. This process enables the creation of a comprehensive and detailed visual representation of the sample's structure.

SKILLS

- Language: Chinese (Native), English (Fluent)
- Programming language: Python (Pytorch), C++, MATLAB
- Professional Tools and Frameworks: Solidworks, Comsol, Latex

SCHOLARSHIPS & AWARDS

- Outstanding Undergraduate Graduate of Shanghai | Shanghai Jun 2024
- Suzhou Yucai Scholarship | Suzhou Government Nov 2022
- Alumni Scholarship for Undergraduates | SJTU Nov 2021