JIXIN MA

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EDUCATION

Harbin Institute of Technology (**HIT**), Harbin, China Aug. 2022 - Present

- Master of Engineering in Mechanical Engineering, State Key Laboratory of Robotics and Systems
- Supervisor: *Prof. Zhijiang Du* **GPA: 91.03/100 Rank: 21/371 (Top 6%)**

Harbin Institute of Technology (**HIT**), Harbin, China Aug. 2018 - Jun. 2022

- Bachelor of Engineering in Mechatronics Engineering, School of Mechatronics Engineering
- Supervisor: *Prof. Zhijiang Du* **GPA: 94.58/100 Rank: 2/135 (Top 2%)**

Harbin Institute of Technology (**HIT**), Harbin, China Sept. 2019 - Jun. 2022

- Minor in Artificial Intelligence, School of Computer Science and Technology
- Supervisor: *Prof. Qince Li*

IELTS Score: Overall: 7.0 (Listening: 6.5 Reading: 8.0 Writing: 6.5 Speaking: 6.0)

PUBLICATIONS

[1] MRI Super-Resolution via Hybrid Information Enhancement Network based on Multi-Attention and Adaptive Convolution
Jixin Ma*, Hongjian Yu*, Zhijiang Du, Xin Hua, Zibo Li, Hui Zhao.
2024 IEEE International Conference on Bioinformatics and Biomedicine ***(BIBM 2024, Accepted)***

[2] Multi kernel cross sparse graph attention convolutional neural network for brain magnetic resonance imaging super-resolution *[Paper]*
Xin Hua, Zhijiang Du, **Jixin Ma**, Hongjian Yu.
Biomedical Signal Processing and Control*, 2024, 96: 106444. (JCR Q1, IF=4.9)*

[3] A Lightweight Multi-scale Multi-angle Dynamic Interactive Transformer-CNN Fusion Model for 3D Medical Image Segmentation *[Paper]*
Xin Hua, Zhijiang Du, Hongjian Yu, **Jixin Ma**, Fanjun Zheng, Chen Zhang, Qiaohui Lu, Hui Zhao.
Neurocomputing*, 2024, 608: 128417. (JCR Q1, IF=5.5)*

[4] DFAN: Dual-Frequency Aware Network for 3D MRI Super-Resolution
Jixin Ma, Hongjian Yu, Zhijiang Du, Xin Hua, Zibo Li, Qiaohui Lu, Hui Zhao.
The 39th Annual AAAI Conference on Artificial Intelligence ***(AAAI 2025, Submitted)***

[5] WSC-Trans: A CNN-Transformer Structure-based 3D Multi-structural Automatic Segmentation Model For Temporal Bone CT
Xin Hua*, **Jixin Ma***, Hongjian Yu, Zhijiang Du, Fanjun Zheng, Chen Zhang
2024 IEEE International Conference on Bioinformatics and Biomedicine (Workshop) ***(Submitted)***

RESEARCH EXPERIENCES

3D Medical Image Super-Resolution Algorithm Based on Deep Learning **Aug. 2023 - Present**
State Key Laboratory of Robotics and Systems, HIT Supervisor: Prof. *Zhijiang Du*

- Proposed a dual-frequency aware network for 3D MRI volume super-resolution.
- Proposed an adaptive frequency processing block to extract features of different frequency domains through Fast Fourier Convolution and high-frequency prior, and proposed a novel cross-attention mechanism for feature interaction and aggregation.
- Conducted experiments on two public MRI datasets and outperformed other *SOTA* methods.

2D Medical Image Super-Resolution Algorithm Based on Deep Learning **Sept. 2022 - Aug. 2023**

State Key Laboratory of Robotics and Systems, HIT Supervisor: Prof. *Zhijiang Du*

- Proposed a hybrid information enhanced network based on Transformer for 2D MRI super-resolution.
- Proposed a spatial-channel hybrid attention to enhance specific semantics representation, and proposed a dynamic filter based on content-adaptive convolution to restore high-frequency information.
- Conducted experiments on two public MRI datasets and outperformed other *SOTA* methods.

Robot-Assisted Cochlear Implant Planning and Navigation System **Oct. 2021 - Jun. 2022**

State Key Laboratory of Robotics and Systems, HIT Supervisor: *Prof. Zhijiang Du*

- Developed a planning and navigation software based on C++, VTK and Qt, achieving medical image visualization, 3D reconstruction, demonstration of the cochlear implant channel drilling process and ICP registration.
- Proposed a surgical bone drill registration method for cochlear implant surgery and carried out experiment to verify the feasibility of the new method.
- Conducted drilling experiments using the cochlear implant robot guided by the designed software to verify the drilling accuracy.

Bronchus Segmentation Method based on Deep Learning **Mar. 2022 - Jun. 2022**

Research Center of Perception and Computing, HIT Supervisor: *Prof. Qince Li*

- Proposed an improved network based on V-Net for accurate and efficient bronchus segmentation.
- Trained and tuned hyperparameters on two public bronchus datasets.

PROJECT EXPERIENCES

Robotic Grasping System for Curling-Stones **Sept. 2022 - Nov. 2022**

Institute for Artificial Intelligence, HIT Advisor: *Prof. Jing Jin*

- Established communication between Kinova Robotic Arm and ROS system on Jetson TX2.
- Completed the hand-eye calibration of the robotic arm and the camera based on the eye-in-hand method.
- Achieved the grasping of the curling-stone based on depth information using Kinova Robotic Arm.

Vision-Based Garbage Classification Detection System **Sept. 2021 - May. 2022**

Engineering Innovation Practice Center, HIT Advisor: *Prof. Feng Zhang*

- Trained YOLOv5 on a self-collected and hand-labeled dataset of garbage images.
- Deployed YOLOv5 on Jetson Nano using TensorRT and achieved real-time garbage detection.
- Won the First Prize in the 16th iCAN Innovation Contest (HEILONGJIANG).

AWARDS AND HONORS

- 2019 **National Scholarship for Bachelor Students (8,000 RMB)**
- 2020 **National Scholarship for Bachelor Students (8,000 RMB)**
- 2022 Outstanding Graduate at Harbin Institute of Technology
- 2022 Special Grade Scholarship at Harbin Institute of Technology (22,000 RMB, Top 20%)
- 2023 Special Grade Scholarship at Harbin Institute of Technology (22,000 RMB, Top 20%)
- 2023 **National Scholarship for Master Students (20,000 RMB)**
- 2023 Third Prize in the 19th China Postgraduate Mathematical Contest in Modeling

SKILLS

Tools/Frameworks: Matlab, Solidworks, AutoCAD, Qt, Origin, VTK, ROS, LATEX

Programming: Python, C++, Pytorch