ZIQI GAO

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EDUCATION

University of Science and Technology of China	September 2022 - now
M.S. in Biomedical Engineering, School of Biomedical Engineering	GPA: 3.87/4.3
RA of MIRACLE Lab, supervisor: Prof. Shaohua Kevin Zhou	
ShanghaiTech University	August 2018 - July 2022
B.E. in Computer Science and Technology, honored graduate in 2022	GPA: 3.73/4
School of Information Science and Technology, supervisor: Dr. Yuyao Zhang	Rank: $12/195$ (6%)
University of Padova, Italy	Aug 2019 - Sep 2019
Visiting student in General Arts and Science	

RESEARCH INTEREST

I am passionate about advancing neuroimaging for both clinical and scientific purposes through the use of generative AI. Currently, my work focuses on reconstructing undersampled MRI images. I consistently follow recent advancements in AI-generated content (AIGC) to develop robust and generalizable solutions for this classical problem.

Keywords: MRI, inverse problems, diffusion models, Vision Transformers, foundation models.

PUBLICATIONS & PREPRINTS

- Ziqi Gao and S. Kevin Zhou. Rethinking dual-domain Undersampled MRI reconstruction: domainspecific design from the perspective of the receptive field. Accepted by ISBI 2024. Guide network design with the computed lower bound of interpolating with undersampled K-space.
- <u>Ziqi Gao</u> and S. Kevin Zhou. U²MRPD: Unsupervised undersampled MRI reconstruction by prompting a large latent diffusion model. In submission. [pdf]
 Zero-shot Stable Diffusion + MRSampler beat SoTA supervised MRI reconstruction methods. MRAdapter improves performance universally given any MR image.
- Ziqi Gao, Yue Zhang, Xinwen Liu, Kaiyan Li, S. Kevin Zhou. *DuDoUniNeXt: dual-domain unified dynamic hybrid model for single and multi-contrast MRI reconstruction*. In submission. Our 3-in-1 unified MRI reconstruction network suits multi-contrast MRI acquisition neatly.
- Yingtai Li, Xiaoqian Zhou, Ziqi Gao, S. Kevin Zhou. *Retrieve2Segment: Patch retrieval for perfor*mant zero-shot cross-modality segmentation. Accepted by MICCAI 2023 BTSD workshop. Course project of Medical Image Analysis, instructed by S. Kevin Zhou.

UNDERGRADUATE PROJECTS

High-Resolution MR Image Reconstruction via Implicit Neural Representation

Instructor: Dr. Yuyao Zhang, ShanghaiTech University Jan 2021 - July 2021 Improves an implicit neural representation algorithm for MRI reconstruction and performs experiments on different types of MR images while discussing and handling the failure cases carefully.

- $\circ\,$ Preprocesses and carries out reconstruction experiments on in-house QSM images.
- Cooperates with Ph.D. students from Prof. Garth Thompson's group for improving MR image quality scanned from mice with arthritis.

Single View 3D Hand Pose Estimation Enhanced by Electromyographic (EMG) Signals Instructor: Prof. Jingyi Yu and Dr. Yuyao Zhang, ShanghaiTech University Oct 2020 - Jan 2021

- Sets up and validates a synchronized data collection system of both EMG signals and images.
- Develops a Python toolkit for data pre-processing and visualization with several gesture recognition methods, including traditional machine learning algorithms and neural networks, implemented.
- $\circ~$ Observes that hard pose estimation with self-occlusion shows typical patterns in EMG signals.

High Performance Image Collection on the Mapper Robot

Robotics course project, instructor: Dr. Sören Schwertfeger, ShanghaiTech University Produces compressed images of higher quality in 2x frame rate by replacing OpenCV-based compression of ROS with Turbo and performing image I/O using the camera's API directly.

Web Crawler with Raspberry Pi

(Co-designed as a TA) Python project of SI100B: Introduction to Information Science and Technology Crawls real-time flight data from websites, uses the processed data to control an external module on Raspberry Pi, and builds a web/command line for visualization and control.

TEACHING & SERVICES

USTC

	TA for BME Math Basics II. Instructor: S. Kevin Zhou. Student propagandist for MIRACLE Lab. Lab leader: S. Kevin Zho	ou.	2023 Fall Sep 2022 - now
	ShanghaiTech University, TA		
•	SI 100B: Introduction to Information Science and Technology	2020 Spring,	2020 Fall, 2021 Fall
•	GEHA 1073: English Lexicology		2020 Summer
•	(CS graduate-level course) CS 240: Algorithm Analysis and Design		2021 Spring
	EE 150: Signals and Systems		2021 Spring

SKILLS

Language	Python (proficient), C++/C, Matlab, RISC-V. TOEFL(106).
System & Tools	Linux, ROS, Pytorch, OpenGL, IATEX, UML

HONORS & ACTIVITIES

- USTC. Second Class in Global Cup Public Speaking Competition in 2022. Interview.
- ShanghaiTech. Outstanding Teaching Assistant of SIST in 2019-2020, Outstanding Student in 2019-2022, Merit Student in 2018, Scholarship for Padova Summer School in 2019.
- Mathematical Contest in Modeling. Second Class of Shanghai in CUMCM, 2020
- Filming. Director of Meet you in summer: Graduation video of class 2022 of SIST, ShanghaiTech. This video was made during the COVID lockdown in Shanghai, where I led the production and worked as the core script writer, interviewer, film editor, music recorder and performer.

REFERRERS

Prof. Shaohua Kevin Zhou Executive dean, distinguished professor, USTC Relationship: supervisor. Email: skevinzhou@ustc.edu.cn

Dr. Yuyao Zhang Assistant professor, ShanghaiTech University Relationship: previous supervisor. Email: zhangyy8@shanghaitech.edu.cn