Yongtai Zhuo

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Education

Shanghai Jiao Tong University (SJTU), School of Bio-medical Engineering Shanghai, China
M.S. in Electronic and Information Engineering *Sep 2022 – March 2025*

- Main Courses: Computer Vision, Advanced Biomedical Image Processing, Computer Vision in Biomedical Engineering, Data Mining in Biomedical Engineering, Advanced Intraoperative Imaging and Navigation
- GPA: 3.71/4.0

Shenzhen University, Webank Institute of Fintech Guangdong, China
B.S. in Finance, Computer Science and Technology *Sep 2018 – June 2022*

- Main Courses: Data Structure and Algorithms, Operating Systems, Computing Principles and Theory of Big Data, Database Systems, Artificial Intelligence and Machine Learning, Computer Network, Optimization Methods, Numerical Analysis
- GPA: 3.79/4.5 (Rank: 8/55, 15%)

Experience

Fast Medical Image Registration SJTU, China
Research Assistant *Apr 2023 – Present*

- Proposed a Framework for Iterative to Non-iterative Distillation (FIND), including a teacher assistant, to improve the distillation efficacy from the iterative teacher to the non-iterative lightweight student.
- Introduced self-distillation to enhance the performance of the non-iterative teacher assistant, bringing it closer to the iterative teacher.
- Proposed a non-iterative network with a novel lightweight design to achieve fast registration on resource-limited devices.
- Achieved up to 70 times faster inference speed on CPU and up to 3.5 points higher Dice score than compared methods (i.e., VoxelMorph, VTN and DualPR) on four datasets.

Transparent Medical Image Registration SJTU, China
Research Assistant *Nov 2023 – Jun 2024*

- Introduced a diffusion-based method that denoises deformation fields for improved transparency.
- Proposed a novel denoising network based on the Swin Transformer, integrating moving and fixed images with diffusion time steps throughout the process.
- Introduced similarity consistency regularization on denoised deformation field to enhanced control over the denoising registration.
- Achieved 1.32% higher Dice score than compared methods (i.e., VoxelMorph, DiffuseMorph, FSDR) on ACDC dataset and enabled real-time adjustability.

Real-time Lung Deformation Estimation SJTU, China
Research Assistant *Oct 2022 – Dec 2023*

- Modeled lung tissue deformation by estimating 3D voxel motion as linear displacement along a direction vector.
- Embedded absolute position information by Coordinate Convolution (CoordConv) and multimodal feature fusion for estimating accurate voxel phase.
- Incorporated front and side views as well as previous phase views as input to enhance accuracy and robustness of estimation.
- Achieved 2.11mm and 1.36mm TRE on DIR-Lab and 4D-Lung datasets respectively, with 7ms per frame on GPU.

Enhanced Classifier Ensemble via Trinary Exploration Shenzhen University, China
Research Assistant *Dec 2020 – Apr 2021*

- Generated three potential feature subsets to ensure diversity and achieve higher quality feature subsets.
- Developed a three-way co-decision model to enhance performance by ensembling the three obtained feature subsets.
- Achieved 6% higher classification accuracy than compared feature selection methods on UCI datasets.

Publication

[1] **Yongtai Zhuo** and Lixu Gu. *Registration methods, systems, and lightweight methods for non iterative lightweight network distillation*. CN117934569A. University Science and Technology Park, Genghis Khan East Street, Xincheng District, Hohhot City, Inner Mongolia Autonomous Region, 2024, p. 20.

[2] **Yongtai Zhuo**, Lixu Gu and Jingyang Zhang et al. "FIND: A Framework for Iterative to Non-iterative Distillation via Teacher Assistant for Lightweight Deformable Registration". In preparation for Journal of Biomedical and Health Informatics.

[3] **Yongtai Zhuo** and Yiqing Shen. "DiffuseReg: Denoising Diffusion Model for Obtaining Deformation Fields in Unsupervised Deformable Image Registration". In: *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*. Springer. 2024.

[4] Mingkang Liu and **Yongtai Zhuo** et al. "Real-time estimation of lung deformation from body surface using a general CoordConv CNN". *Computer Methods and Programs in Biomedicine* 244 (2024), p. 107998.

[5] **Yongtai Zhuo**, Youming Dong, and Can Gao. "Three-Way Feature Selection Based on Neighborhood Mutual Information". In: *Computer Engineering and Applications* 58 (2022), pp. 159–164. issn: 1002-8331.

Awards

Outstanding Innovative Talents Scholarship (2019), Shenzhen University

Outstanding Innovative Talents Scholarship (2020), Shenzhen University

Outstanding Innovative Talents Scholarship (2021), Shenzhen University

Skills

Libraries & Tools: Pytorch, NumPy, Pandas, Scikit-learn, SciPy, OpenCV, SimpleITK, Monai

Language: TOEFL: 101

Reference

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