

SHANGQING TONG

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EDUCATION

ShanghaiTech University, Pudong, Shanghai, China 2021 – Present

Master student in Electronics Engineering (EE), expected March 2024

Jiangnan University, Wuxi, Jiangsu, China 2017 – 2021

B.S. in Communication Engineering

PUBLICATIONS

Score-based Generative Models for Photoacoustic Image Reconstruction with Rotation Consistency Constraints

IEEE Transactions on Medical Imaging, IF 10.6, Under Review

First Author Collaborated with Dr. Hengrong Lan, Department of Biomedical Engineering, School of Medicine, Tsinghua University.

Reconstructing photoacoustic tomography images with score-based diffusion models.

- Trained with only ground truth images, our method achieved competitive performance against supervised U-Net, while ours has higher generalization capability;
- A constraint is designed following the rotation equivariance between PAT measurements and images, which is used to guide the Langevin sampling process;
- Our method achieved 35.06 PSNR, 0.913 SSIM in uniform sampling with 32 measurements; and 29.69 PSNR, 0.823 SSIM in limited view with 32 measurements (128 in total).

Review of photoacoustic imaging plus X

Journal of Biomedical Optics, IF 3.5, Under Review

Co-first Author Work with teammates in Hybrid Imaging System Laboratory, ShanghaiTech University.

A brief review of deep learning applications in photoacoustic imaging among recent years.

Interpreting Infrared Thermography with Deep Learning to Assess the Mortality Risk of Critically Ill Patients at Risk of Hypoperfusion

Reviews in Cardiovascular Medicine, IF 2.7

Co-first Author Collaborated with Department of Critical Care Medicine, Zhongshan Hospital, Fudan University.

The aim of this study was to assess the mortality risk of critically ill patients at risk of hypoperfusion in a prospective cohort by infrared thermography combined with deep learning methods.

- Compared the classification capability of several widely used vision backbones;
- Combined conventional cross-entropy loss with focal loss and label smoothing, which further improved the performance on the imbalanced dataset.

Benign and Malignant Classification of Human Colorectal Tissue by Acoustic-Resolution Photoacoustic Microscopy

2022 *IEEE International Ultrasonics Symposium*, Oral Presentation

Co-first Author Collaborated with the First Medical Centre, Chinese PLA General Hospital.

Classifying the benign and malignant tissues using wavelet transform of the PAM signals.

- Signals of cancer, polyp and normal tissues were obtained by scanning the *ex-vivo* colorectal samples;
- Classify the cancer and normal regions with wavelet transform.

Machine-Learning-based Colorectal Tissue Classification via Acoustic Resolution Photoacoustic Microscopy

Preprint, arXiv:2307.08556

First Author Collaborated with the First Medical Centre, Chinese PLA General Hospital.

Comparison of the classification capability of several machine learning algorithms using the PAM signals of benign and malignant colorectal tissues.

- Further improved the signal dataset, involving more tissues and improved the accuracy of the dataset;
- Classify the cancer and normal signals with several machine learning algorithms, with several metrics calculated and compared.

Frequency-selected Adaptive Matched Filter De-noising for Photoacoustic Imaging

2023 IEEE International Ultrasonics Symposium, Oral Presentation, In Press

Third Author Work with teammates in Hybrid Imaging System Laboratory, ShanghaiTech University. PAM signal denoising with designed matched filter.

SKILLS

- Research Interests
 - Solving inverse problems in medical imaging with generative models,
 - Self-supervised representation learning and other pre-training methods,
 - Computer vision in biomedical applications.
- Platform: Linux.
- Programming Languages: Python, MATLAB, L^AT_EX.
- DL framework: PyTorch > JAX.

INTERNSHIP

Central Research Institute, United Imaging Healthcare Group, Shanghai

Oct. 2023 – Present

During my internship at United Imaging, my work mainly focused on the reconstruction and enhancement of positron emission tomography images using generative models like diffusion-based models.

MISCELLANEOUS

- Link to my Google Scholar profile.
- Languages
 - English: Fluent (CET-4 610, CET-6 509),
 - Mandarin: Native speaker.