Di Liu

(443) 941-5971
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My Google Scholar Page
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Research Interests

My current research interests lie primarily in (1) interpretable shape representations with learning-based parameterized deformable models, (2) multimodal object detection and segmentation using Transformers, with their applications to modeling human actions/cardiac motions, and (3) egocentric multimodal video generation with vision-language models.

Education

Rutgers University, *Ph.D. in Computer Science | GPA:4.0/4.0* 09/2021 — Present

Advisor: Dimitris N. Metaxas (Distinguished Professor)

The Johns Hopkins University, *Research Assistant in Computer Science* 01/2020 — 08/2021

Advisor: Jerry L. Prince

Beijing Institute of Technology, *M.S. in Information and Communication Engineering | GPA:3.9/4.0* 09/2018 — 06/2021

Advisor: Ran Tao

Experience

Research Intern, SenseTime Research **06/2022 — 09/2022**

Host: Dr. Mu Zhou *San Jose, CA*

- A Data-scalable Transformer and Benchmark for Medical Image Segmentation. [TPAMI, under review]

Research Assistant, Rutgers University **09/2021 — Present**

Advisor: Dimitris N. Metaxas *Piscataway, NJ*

- Deep Physics-based Deformable Models for Efficient Shape Abstractions. [ICLR'23, under review]
- Multimodal Object Detection and Segmentation with Transformers. [MICCAI'22, MICCAI'22, STACOM'21]
- Region Proposal Rectification Towards Robust Instance Segmentation of Biological Images. [MICCAI'22]

Research Assistant, The Johns Hopkins University **01/2020 — 08/2021**

Advisor: Jerry L. Prince *Baltimore, MD*

- Label Super Resolution for 3D Magnetic Resonance Images. [SPIE'21]
- Domain Adaptation and Automatic Identification of Circulating Tumor Cells (CTC).

Research Assistant, Beijing Institute of Technology **09/2018 — 06/2021**

Advisor: Ran Tao *Beijing, China*

- Dispersion Correction for Optical Coherence Tomography (OCT) using Fractional Fourier Transform. [Optics Express] [ICMA'19]
- Automated Recognition of Arrhythmia with Fractional Time–frequency Domain Extension. [JMIHI]

Selected Publications

Conferences:

[1] **Liu, Di**, *et al*. "Deep Physics-based Deformable Models for Efficient Shape Abstractions." In *International Conference on Learning Representations*, 2023, under review.

[2] **Liu, Di**, *et al*. "Transfusion: Multi-view Divergent Fusion for Medical Image Segmentation with Transformers." In *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, pp. 485-495. Springer, Cham, 2022. [Student Travel Award]

[3] Zhangli, Qilong, Jingru Yi, **Di Liu**, *et al*. "Region Proposal Rectification towards Robust Instance Segmentation of Biological Images." In *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, pp. 129-139. Springer, Cham, 2022.

[4] Chang, Qi, Zhennan Yan, Mu Zhou, **Di Liu**, *et al*. "Deeprecon: Joint 2D Cardiac Segmentation and 3D Volume Reconstruction via A Structure-specific Generative Method." In *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, pp. 567-577. Springer, Cham, 2022.

[5] **Liu, Di**, *et al*. "Refined Deep Layer Aggregation for Multi-Disease, Multi-View & Multi-Center Cardiac MR Segmentation." In *International Workshop on Statistical Atlases and Computational Models of the Heart (STACOM)*, pp. 315-322. Springer, Cham, 2021.

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[6] **Liu, Di**, *et al*. "Label Super Resolution for 3D Magnetic Resonance Images using Deformable U-Net." In *Medical Imaging 2021: Image Processing (SPIE)*, vol. 11596, p. 1159628. International Society for Optics and Photonics, 2021.

[7] **Liu, Di**, *et al*. "Dispersion Correction for Optical Coherence Tomography by Parameter Estimation in Fractional Fourier Domain." In *2019 IEEE International Conference on Mechatronics and Automation (ICMA)*, pp. 674-678. IEEE, 2019.

Jounals:

[8] Gao, Yunhe, Mu Zhou, **Di Liu**, *et al*. "A Data-scalable Transformer for Medical Image Segmentation: Architecture, Model Efficiency, and Benchmark." *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)* , 2022, under review.

[9] **Liu, Di**, *et al*. "Dispersion Correction for Optical Coherence Tomography by the Stepped Detection Algorithm in the Fractional Fourier Domain." *Optics Express (OE)* 28, no. 5 (2020): 5919-5935.

[10] Ge, Chuanbin, **Di Liu**, *et al*. "Automated Recognition of Arrhythmia using Deep Neural Networks for 12-lead Electrocardiograms with Fractional Time–frequency Domain Extension." *Journal of Medical Imaging and Health Informatics (JMIHI)* 10, no. 11 (2020): 2764-2767.

Skills

Programming Languages	Python, C/C++, Matlab, HTML/CSS
Frameworks	PyTorch, TensorFlow, OpenCV
Tools and Platforms	Linux/Unix/Mac OSX, MySQL, Git, LaTeX, AWS

Academic Services

Conference Reviewer:

IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022.

European Conference on Computer Vision (ECCV), 2022.

International Conference on 3D Vision (3DV), 2022.

Journal Reviewer:

Medical Image Analysis (MIA)

Optics Express (OE)

Honors & Activities

MICCAI Student Travel Award, 2022.

The National Scholarship for Graduate Student, 2020.

The Second Prize in The 3rd PLAGH-MIT Critical Data Conference and Datathon, 2018.

The Second Prize in COMAP's Mathematical Contest In Modeling(MCM), 2016.