

Shijie (CJ) Li

Machine Learning Researcher

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Summary

Experienced machine learning researcher and engineer with five years of expertise in generative models, multi-modal AI applications, and real-world AI implementations. Currently an ORISE Fellow at FDA and PhD in Computer Science focused on cutting-edge image generative models, including diffusion models and GANs. Proven ability to transform research concepts into practical applications through multiple patents and publications. Specialized in Python coding and developing AI solutions for complex problems, particularly in self-supervised and weakly-supervised environments where complete annotation is challenging. Expert in multi-modal AI applications combining image, segmentation, and structured data. Quick learner with strong collaborative skills and a dedication to solving real-world problems through innovative AI applications.

Education

- Sep 2019 - **Ph.D. in Computer Science**, *New York University*, Brooklyn, NY
Aug 2024 *Relevant Focus*: Generative Models, Multi-Modal AI Systems, Computer Vision, Natural Language Processing
- Sep 2016 - **M.S. in Electrical Engineering**, *New York University*, Brooklyn, NY
May 2018 *Relevant Courses*: Machine Learning, Image & Video Processing, System Optimization Methods
- Sep 2012 - **B.Eng. in Communication Engineering**, *Beijing Jiaotong University*, Beijing, China
May 2016

Professional Experience

- July 2024 - **Machine Learning Researcher**, *Division of Imaging, Diagnostics, and Software Reliability, U.S. FDA*
Present
 - Engineered advanced digital pathology image and segmentation mask generative models utilizing shape-based constraints, with architecture designed for seamless extension to 3D volumetric applications.
 - Pioneered high-fidelity digital pathology image synthesis techniques implementing denoising diffusion probabilistic models, achieving superior texture and clinical feature preservation.
 - Developed robust evaluation metrics for synthetic medical images to assess their utility in downstream machine learning tasks, leveraging large-scale foundation models to ensure reliable performance benchmarking.
- Jun 2018 - **Research Assistant**, *Visualization, Imaging and Data Analysis Lab, NYU Tandon School of Engineering*, Supervisor: Prof. Guido Gerig
Aug 2024
 - Implemented a self-supervised 3D medical image denoising framework integrating slice-to-slice registration and reconstruction, combining domain expertise with machine learning. This innovation enabled clinicians to detect fine anatomical details without costly equipment while eliminating manual annotation requirements.
 - Developed a point-supervised GAN framework for generating paired images and segmentation masks, achieving accuracy comparable to fully-annotated training approaches while significantly reducing clinical annotation burden. This breakthrough enabled large-scale automation of 3D medical image segmentation.
 - Implemented an advanced noise correction system for large language model outputs using area under the margin (AUM) ranking methodologies, enhancing model performance and reliability in critical applications.

- May 2022 - **Research Intern**, *Canon Medical Research Institute USA, Inc.*, Supervisor: Dr. Yi Hu
 Dec 2022
 - Developed a deep learning algorithm for X-ray image noise reduction and signal enhancement
 - Transformed research concept into patent-worthy technology to be deployed in next-generation Alphenix/Evolve Edition
 - Patent filed with USPTO (Attorney Docket Number: 546053US, 547638US)
- May 2021 - **Research Intern**, *AI Optics*, Supervisor: Dr. Benjamin Villard
 Aug 2021
 - Built automatic cup-to-disk ratio calculation system based on retina images
 - Implemented model explanation techniques for deep learning-based glaucoma detection

Teaching & Leadership

- 2023 **Lecturer**, *CS-GY 6643, Computer Vision, NYU Tandon School of Engineering*
 - Designed and delivered lectures on computer vision fundamentals and deep learning applications
 - Mentored graduate students on research projects and practical implementations
- 2022 **Invited Talk on Multi-Modal AI**, *Canon Medical Research, USA*
 - Presented research on integrating multiple data modalities in medical imaging AI applications
 - Demonstrated practical implementation strategies for clinical deployment

Selected Publications & Projects

- ISBI 2024 **Self-supervised OCT Image Denoising with Slice-to-Slice Registration and Reconstruction**
 Built practical image enhancement application using self-supervised learning
- MICCAI Workshop 2023 **Microscopy Image Segmentation via Point and Shape Regularized Data Synthesis**
 Developed data synthesis techniques to address data scarcity in specialized domains
- ISBI 2021 **Point-supervised Segmentation of Microscopy Images and Volumes via Objectness Regularization**
 Oral Presentation, Best Student Paper-3rd Place, Implemented innovative approach for segmentation with minimal supervision
- SPIE 2018 **Multi-modal Image Fusion for Multispectral Super-resolution in Microscopy**
 Developed multi-modal fusion techniques for practical imaging applications

Skills

- Languages Python, C++
- Frameworks PyTorch, TensorFlow, SimpleITK
- AI Focus Generative Models (Diffusion, GANs), Multi-modal AI Applications, LLMs, Self-supervised Learning
- Research to Production Prototype development, System integration, Research implementation

Awards & Service

- 2021 Oral Presentation and Best Paper (3rd place), IEEE ISBI 2021
- 2022-2021 Reviewer: IEEE Transactions on Medical Imaging (2022), IEEE ISBI (2021)
- 2017 Top MS Student for the Year of 2017, NYU Electrical and Computer Engineering