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YIKE (NICOLE) ZHANG

PROFESSIONAL SUMMARY

PhD student with experience mentoring undergraduates to develop AI-powered applications and fostering a supportive community. Skilled in leveraging advanced deep learning models and computational resources to conduct impactful research outcomes. Proven track record in leading comprehensive research, presenting critical insights, and publishing in high-impact conferences and journals.

EXPERIENCE

PEER AI COACH **Aug 2024 - Present**
Vanderbilt University ***Nashville, TN***

- Coach 20+ undergraduates to use publicly available deep learning models from the HuggingFace. Promoting knowledge sharing and continuous learning around AI and deep learning, which fostered a supportive community and ongoing project discussions.
- Mentor undergraduates to develop AI-powered applications, leveraging foundational models and university computational resources for impactful project outcomes.
- Focus on AI knowledge-sharing initiatives, encouraging hands-on experience with cutting-edge deep learning models, and promoting continuous learning in the field.
- Guide cross-disciplinary AI projects, connecting students to form groups to solve complex, real-world challenges.

RESEARCH ASSISTANT **Jun 2021 - Present**
Biomedical Image Analysis for Image-Guided Interventions Laboratory - Vanderbilt University ***Nashville, TN***

- End-to-end Interactive Navigation System for Real-world Surgery
  - Designed a self-supervised registration and segmentation network for an ear structure segmentation, achieving state-of-the-art performance

    using only one ground-truth label.
  - Developed an open-source 2D-to-3D Registration and Pose Estimation tool Vision6D to visualize and annotate ground-truth pose labels for 3D objects with a 2D image.
  - Developed a self-supervised ear mastoidectomy shape prediction method for surgical tools, achieving state-of-the-art performance using no labels.
  - Reconstructed realistic surgical scenes using only one post-mastoidetomy CT mesh and generated synthetic multi-view dataset with ground-truth poses.

RESEARCH ASSISTANT **Aug 2019 - May 2021**
Engineering Department - St. Mary's University ***San Antonio, TX***

- Vectorized Efficient Reversible Data Hiding Technique in Encrypted Images
  - Developed a Multi-MSB based method to increase the embedding rate in encrypted images and guarantees high image reconstruction quality after decryption phase. Improve overall performance compared to previous State-Of-The-Art methods.
  - Published research findings to a selective peer-reviewed journal - IEEE Transactions on Circuits and Systems for Video Technology (IEEE TCSVT) with a high-impact factor 8.3.

EDUCATION

PH.D. IN COMPUTER SCIENCE **Jun 2021 - Present**
Vanderbilt University ***Nashville***

Receiving the Full Engineering Graduate Fellowship.

M.S. IN COMPUTER ENGINEERING **Aug 2019 - May 2021**
St. Mary's University ***San Antonio***

Graduated as Summa Cum Laude, received Full Graduate Research Fellowship.

SUMMER VISITING STUDENT **Jun 2020 - Aug 2020**
Stanford University ***California***

Attend the CS229 (Machine Learning) course

B.E. IN COMPUTER SCIENCE AND TECHNOLOGY **Sep 2015 - May 2019**
Chengdu Neusoft University ***Chengdu, China***

Honor Graduate

SKILLS

Artificial Intelligence, Deep Learning, Computer Vision, Augmented Reality, Software Development, Multimodal Learning Analytics, Digital Signal Processing, Technical Writing, Data Analysis, Computer Graphics, Performance Evaluation, Human-Computer Interaction, Pose Estimation, Virtual Reality, Cybersecurity, Parallel Computing, Statistical Analysis, Python, Pytorch, Convolutional Neural Networks, Generative Adversarial Networks, C++, C, Self-supervised Learning, Unsupervised Learning, Imaging Processing, Medical Imaging Analysis.

PROJECTS

VISION6D
User-interactive 6D pose annotation tool

- Design a user-friendly interface for 6D (3DoF rotation and 3DoF translation) pose estimation labeling tool that improves usability and provides labels for various down-steaming tasks.
- Vision6D is an interactive graphics library based on Qt5 and VTK. It is a standardized framework for machine learning labeling that increased consistency across projects; this initiative led to a first-time visualization of 2D to 3D registration in the medical imaging domain.

SMART HOME CONTROL SYSTEM
Senior Project

- Designed a remote-control system with STM32, Django, and Natural Language Processing (NLP).
- Demonstrated the successful operation of the voice control of home lighting and humidity settings.

LINKS

Google Scholar: scholar.google.com, GitHub: github.com, ORCID: orcid.org, OpenReviewNet: openreview.net.

REVIEWER EXPERIENCE

REVIEWER FOR JOURNALS:

Special Issue in Neural Networks Journal: LLM-Compression

REVIEWER FOR CONFERENCES:

International Conference on Learning Representations (ICLR) 2025

Medical Imaging with Deep Learning (MIDL) 2025

European Molecular Imaging Meeting (EMIM) 2025

Association for the Advancement of Artificial Intelligence Undergraduate Consortium (AAAI UC) 2025

NeurIPS Workshop on Bayesian Decision-making and Uncertainty (BDU) 2024

NeurIPS Workshop on Mathematical Reasoning and AI (MATH-AI) 2024

Machine Learning for Health (ML4H) 2024

IEEE Global Engineering Education Conference (IEEE EDUCON) 2025

PUBLICATIONS

- ***Yike Zhang**, Eduardo Davalos, Dingjie Su, Ange Lou, Jack H. Noble. "Monocular microscope to CT registration using pose estimation of the incus for augmented reality cochlear implant surgery." Medical Imaging 2024: Image-Guided Procedures, Robotic Interventions, and Modeling. SPIE, **2024**.*

- *Ange Lou, Yamin Li, Xing Yao, **Yike Zhang**, Jack Noble. "SAMSNeRF: segment anything model (SAM) guides dynamic surgical scene reconstruction by neural radiance field (NeRF)." Medical Imaging 2024: Image-Guided Procedures, Robotic Interventions, and Modeling. SPIE, **2024**.*

- *Joyce Fonteles, Eduardo Davalos, Ashwin T. S., **Yike Zhang**, Mengxi Zhou, Efrat Ayalon, Alicia Lane, Selena Steinberg, Gabriella Anton, Joshua Danish, Noel Enyedy, Gautam Biswas. "A First Step in Using Machine Learning Methods to Enhance Interaction Analysis for Embodied Learning Environments." **(2024)***

- *Su Dingjie, Yubo Fan, **Yike Zhang**, and Benoit Dawant. '3D Shape Correspondence for Medical Applications Using Neural Descriptor Fields'. In 2024 IEEE International Symposium on Biomedical Imaging (ISBI), 1–5, **2024**. https://doi.org/10.1109/ISBI56570.2024.10635748.*

- ***Yike Zhang**, Jack H. Noble. "Self-supervised registration and segmentation on ossicles with a single ground truth label." Medical Imaging 2023: Image-Guided Procedures, Robotic Interventions, and Modeling. **2023**.*

- *Davalos Eduardo, Umesh Timalsina, **Yike Zhang**, Jiayi Wu, Joyce Horn Fonteles, Gautam Biswas. "ChimeraPy: A Scientific Distributed Streaming Framework for Real-time Multimodal Data Retrieval and Processing." 2023 IEEE International Conference on Big Data (BigData). **2023**.*

- ***Yike Zhang**, Wenbin Luo. "Vector-Based Efficient Data Hiding in Encrypted Images via Multi-MSB Replacement". IEEE Transactions on Circuits and Systems for Video Technology 32. 11**(2022)**: 7359-7372.*

- *Lou Ange, Yamin Li, **Yike Zhang**, Robert F. Labadie, and Jack Noble. 'Zero-Shot Surgical Tool Segmentation in Monocular Video Using Segment Anything Model 2'. arXiv [Eess.IV], 2024. arXiv. http://arxiv.org/abs/2408.01648.*

- *Davalos Eduardo, **Yike Zhang**, Ashwin T. S., Joyce H. Fonteles, Umesh Timalsina, and Guatam Biswas. '3D Gaze Tracking for Studying Collaborative Interactions in Mixed-Reality Environments'. arXiv [Cs.CV], **2024**. arXiv. http://arxiv.org/abs/2406.11003.*

- ***Yike Zhang**, Eduardo Davalos, Dingjie Su, Ange Lou, and Jack H. Noble. 'M&M: Unsupervised Mamba-Based Mastoidectomy for Cochlear Implant Surgery with Noisy Data'. arXiv [Cs.CV], 2024. arXiv. http://arxiv.org/abs/2407.15787.*

INVITED TALKS AND LECTURES

- Guest lecturer for the course "Special Topics – Engineering for Surgery" at Vanderbilt University Department of Electrical Engineering (Fall 2023)

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