Ange Lou

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Goole Scholar: zUwelkUAAAAJ

EDUCATION

Vanderbilt University Nashville, TN.
Doctor of Philosophy in Electrical Engineering August 2021 – Present

The George Washington University Washington, D.C.
Master of Science in Electrical Engineering August 2017 – May 2019

Wuhan University of Technology Wuhan, Hubei, China
Bachelor of Engineering in Energy and Power Systems September 2013 – June 2017

RESEARCH EXPERIENCE

Biomedical Image Analysis for Image Guided Interventions Laboratory—Vanderbilt University Nashville, TN

Research Assistant August 2021 – Present

3D Surgical Scene Understanding
- Contrastive Semi-supervised surgical instrument segmentation from surgical video.
- Unsupervised 3D surgical tools reconstructions from single frame.
- Weakly supervised surgical tools localization. (MICCAI 2022 EndoVis Challenge)
- Self-supervised monocular depth, ego-motion estimation and camera parameters estimation.
- Dynamic surgical scene reconstruction by segment anything model (SAM) and neural radiance field (NeRF).
- Zero-shot depth estimation for surgical scene.

Medical Imaging & Image Analysis Laboratory – The George Washington University Washington, DC

Research Scientist September 2018 – August 2021

Efficient Biomedical Image Segmentation
- Efficient neural network design for medical image segmentation .

INDUSTRY EXPERIENCE

United Imaging Intelligence Cambridge, Massachusetts, USA

Research Intern May 2023 – August 2023

Efficient Dynamic Neural Radiance Field
- Proposed sparse directional-aware representation based neural radiance field (NeRF) to improve the quality of both static and dynamic scene reconstruction.

Human Body Reconstruction
- Recover body part mesh from partially visible human images.

Video Phase Recognition
- Neural finite-state machine for surgical and non-surgical video phase recognition

SKILLS

Programming Languages: Python, MATLAB, C++
Packages and Frameworks: PyTorch, Tensorflow, Keras, OpenCV, scikit-learn
Research Area: Geometric Computer Vision (SfM, pose estimation, NeRF and 3D Reconstruction), Image Segmentation, Deep Learning, Semi/Self-supervised learning, Time-Series Analysis, Self-Supervised Learning (SSL)

PUBLICATIONS

[C1] **Ange Lou**, Benjamin Planche, Zhongpai Gao, Yamin Li, Tianyu Luan, Hao Ding, Terrence Chen, Jack Noble, Ziyan Wu, "DaReNeRF: Direction-aware Representation for Dynamic Scenes". *Accepted by* **CVPR 2024**

[C2] Tianyu Luan, Zhongpai Gao, Abhishek Sharma, Hao Ding, Benjamin Planche, **Ange Lou**, Terrence Chen, Junsong Yuan, Ziyan Wu, "Divide and Fuse: Body Part Mesh Recovery from Partially Visible Human Images". Submitted to ECCV 2024

[C3] Hao Ding, Zhongpai Gao, Tianyu Luan, Benjamin Planche, Abhishek Sharma, **Ange Lou**, Terrence Chen, Mathias Unberath, Ziyan Wu, "Neural Finite-State Machines for Video Phase Recognition". Submitted to ECCV 2024

[C4] **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)". *Accepted by* SPIE Medical Imaging 2024

[C5] Xing Yao, Han Liu, Dewei Hu, Daiwei Lu, **Ange Lou**, Hao Li, Ruining Deng, Gabriel Arenas, Baris Oguz, Nadav Schwartz, Brett C Byram, Ipek Oguz, "False Negative/Positive Control for SAM on Noisy Medical Image". *Accepted by* SPIE Medical Imaging 2024

[C6] Yamin Li, **Ange Lou**, Catie Chang, "Leveraging sinusoidal representation networks to predict fMRI signals from EEG". *Accepted by* SPIE Medical Imaging 2024

[C7] Yike Zhang, Eduardo Davalos, **Ange Lou**, Jack Noble, "Monocular Microscope to CT Registration using Pose Estimation of the Incus for Augmented Reality Cochlear Implant Surgery". *Accepted by* SPIE Medical Imaging 2024

[C8] **Ange Lou**, Jack Noble, "WS-SfMLearner: Self-supervised Monocular Depth and Ego-motion Estimation on Surgical Videos with Unknown Camera Parameters". *Accepted by* SPIE Medical Imaging 2024

[C9] Ziteng Liu, Yubo Fan, **Ange Lou**, Jack Noble, "SRSegN: Super-resolution Segmentation network for inner-ear tissue segmentation". In *International Workshop on Simulation and Synthesis in Medical Imaging* (pp. 11-20).

[C10] **Ange Lou**, Xing Yao, Ziteng Liu, Jintong Han, Jack Noble, "Self-Supervised Surgical Instrument 3D Reconstruction from a Single Camera Image". *Medical Imaging 2023: Image-Guided Procedures, Robotic Interventions, and Modeling.* Vol. 12466. SPIE, 2023 (**Oral**)

[C11] Xing Yao**, Ange Lou,** Hao Li, Dewei Hu, Han Liu, Jiacheng Wang, Zachary Stoebner, Hans Johnson, Jeff D. Long, Jane S. Paulsen, Ipek Oguz, "Novel application of the attention mechanism on medical image harmonization". *Medical Imaging 2023: Imaging Processing.* Vol. 12464. SPIE, 2023 (**Oral**)

[C12] **Ange Lou**, Shuyue Guan, Hanseok Ko, Murray Loew, "CaraNet: Context Axial Reverse Attention Network for Segmentation of Small Medical Objects". *SPIE Medical Imaging 2022: Image Processing.* (**Oral**)

[C13] **Ange Lou**, Shuyue Guan, Murray Loew, "CFPNet: Channel-wise Feature Pyramid Network for Real-Time Semantic Segmentation". *International Conference on Image Processing (ICIP) 2021*

[C14] **Ange Lou**, Shuyue Guan, Murray Loew, "DC-UNet: Rethinking the U-Net Architecture with Dual Channel Efficient CNN for Multimodal Biomedical Image Segmentation". *SPIE Medical Imaging 2021: Image Processing.*

[C15] **Ange Lou**, Shuyue Guan, Nada Kamona, Murray Loew, "Segmentation of Infrared Images Using MultiResUnet Neural Networks", *IEEE Applied Imagery Pattern Recognition Workshop (AIPR), Washington, D.C, USA,* 2019. (**Oral**)

[J1] **Ange Lou**, Kareem Tawfik, Xing Yao, Ziteng Liu, Jack Noble, "Min-Max Similarity: A Contrastive Semi-Supervised Deep Learning Network for Surgical Tools Segmentation". *IEEE Transactions on Medical Imaging (2023)* (***IF=11.037***)

[J2] **Ange Lou**, Shuyue Guan, Murray Loew, "CFPNet-M: A Light-weight Encoder-Decoder Based Network for Multimodal Biomedical Image Segmentation". *Computers in Biology and Medicine* (2023): 106579 (***IF=7.7***)

[J3] **Ange Lou**, Shuyue Guan, Murray Loew, "CaraNet: context axial reverse attention network for segmentation of small medical objects". *Journal of Medical Imaging*, *10*(1), 014005. (***IF=2.4***)

ACADEMIC SERVICE

Reviewer for Journals   Reviews: 8

- iScience, Cell Press
- Journal of Medical Imaging (JMI)
- Imaging Science Journal
- Neural Regeneration Research (NRR)
- IEEE Journal of Biomedical and Health Informatics (JBHI)
- Image and Vision Computing
- Automatika

Reviewer for Conferences   Reviews: 10

- 2023 International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)

EDUCATIONAL ACTIVITIES

2023	**Guest lecturer** for the course "Intelligent Systems and Robotics" at *Vanderbilt University Department of Electrical Engineering* (Spring)

2023	**Invited Speaker** for *George Washington University* and *Children's National Hospital* Joint Informatics Seminar, "CFPNet-M: A Lightweight Encoder-Decoder Based Network for Multimodal Biomedical Image Real-Time Segmentation"

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