Kechun Liu

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Research Interest

I am a fifth-year Ph.D. student in the GRAIL lab at the University of Washington, Seattle, advised by Prof. Linda Shapiro. My research interests are in the area of generative models, representation learning, real-world computer vision tasks, and medical image analysis.

Education

2019 – present ◇ **Ph.D. student**, Computer Science & Engineering, University of Washington.
Advisor: Linda Shapiro

2019 – 2021 ◇ **M.S.**, Computer Science & Engineering, University of Washington.
Overall GPA: 3.87/4.0

2015 – 2019 ◇ **B.Eng.**, Electronic Engineering, Tsinghua University.
Overall GPA: 3.73/4.0 (Rank 20/216)

Publications

1. **Liu**, **K.**, Jiang, Y., Choi, I., & Gu, J. (2023). Learning image-adaptive codebooks for class-agnostic image restoration. In *Proceedings of the ieee/cvf international conference on computer vision (iccv)* (pp. 5373–5383).
2. **Liu**, **K.**, Li, B., Wu, W., May, C., Chang, O., Knezevich, S., … Shapiro, L. (2023). Vsgd-net: Virtual staining guided melanocyte detection on histopathological images. In *Proceedings of the ieee/cvf winter conference on applications of computer vision* (pp. 1918–1927).
3. Nofallah, S., Shapiro, L. G., Wu, W., **Liu**, **K.**, Ghezloo, F., & Elmore, J. (2022). Automated analysis of whole slide digital skin biopsy images. *Frontiers in Artificial Intelligence*, 209.
4. **Liu**, **K.**, Mokhtari, M., Li, B., Nofallah, S., May, C., Chang, O., … Shapiro, L. (2021). Learning melanocytic proliferation segmentation in histopathology images from imperfect annotations. In *Proceedings of the ieee/cvf conference on computer vision and pattern recognition* (pp. 3766–3775).
5. Zong, Z., Feng, J., **Liu**, **K.**, Shi, H., & Li, Y. (2019). Deepdpm: Dynamic population mapping via deep neural network. In *Proceedings of the aaai conference on artificial intelligence* (Vol. 33, pp. 1294–1301).

Research Experience

Ongoing Research

2023.6 – 2023.9 ◇ **Software Engineer Intern**
Rivian, Infotainment team.
• **NeRF on Fisheye Camera**: Perform thorough analysis and experiments on applying NeRF to fisheye camera data. Implement state-of-the-art NeRF models in NeRFstudio. Improve Instant-NGP on unknown camera pose learning task.

Research Experience (continued)

2019.7 – present ◇ **Research Assistant**
Paul G. Allen School of Computer Science and Engineering, Advisor: Linda Shapiro
In-depth knowledge in deep learning (DL) and statistical machine learning (ML). Expertise in delivering ML technologies and image processing skills in curating medical image dataset based on domain knowledge. I'm currently pursuing 3 directions:
• **Representation Learning on Pathology Images**: Propose novel data augmentation to help CNN and Transformer backbones achieve better robustness and performance on pathology images, and improve the downstream diagnosis performance. [Ongoing]
• **Melanocyte Detection on Skin Biopsy Images**: Propose a GAN-based detection model to detect certain types of cells on histopathological images. The model can produce reliable virtual staining and cell detection results which achieves the state-of-the-art performance. [paper]
• **Segmenting Melanocytic Proliferations on Skin Biopsy Images**: Propose a melanocytic proliferation segmentation framework by leveraging noisy and sparse labels. Achieved state-of-the-art performance on this specific task. [paper]

Previous Research

2022.6 – 2022.12 ◇ **Research Intern**
Sensebrain Technology, Advisor: Inchang Choi, Jinwei Gu
• **Real-World Blind Super-Resolution**: Work on class-agnostic image restoration via adaptive codebooks. Perform thorough data and model analysis. (Paper published in ICCV2023) [paper][github][website]
• **Low-light Portrait Enhancement on Mobile Devices**: Train deep learning models to enhance low-light portraits in Bayer format. Integrate the models to mobile device camera pipeline.

Teaching Experience

2023 ◇ **CSE 473 Artificial Intelligence**, TA, University of Washington, Seattle
2023, 2021 ◇ **CSE 576 Computer Vision**, TA, University of Washington, Seattle
2023 ◇ **CSE 416 Intro to Machine Learning**, TA, University of Washington, Seattle

Academic Service

2022 ◇ **Reviewer**, IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)

Awards

2019 ◇ **Excellent Honors Graduate**, Tsinghua University.
2018 ◇ **Outstanding Student Award**, Electronic Engineering, Tsinghua University.
◇ **ICBC Scholarship**, Industrial and Commercial Bank of China.
2017 ◇ **Jiang Nanxiang Scholarship**, Tsinghua University.
2016 ◇ **National Scholarship**, the government of China.

Skills

Languages ◇ English, Mandarin Chinese.
Programing ◇ Python, C/C++, MATLAB, shell scripts, JavaScript, R, Verilog
Technology ◇ PyTorch, LaTeX, Tensorflow, OpenCV
Relevant Coursework ◇ Computer Vision, Deep Learning, Image Processing, Data Visualization, Statistical Learning, Data Structure, Machine Learning, Probability, Linear Algebra, Calculus.