Yunfei (Mike) Lu

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EDUCATION

University of Notre Dame, IN, USA — Aug 2023 - Present
Ph.D. Student Computer Science and Engineering
- GPA: 3.92/4.00
- Research Interests: multimodal learning, computer vision, 3D vision, machine learning

Xidian University, Xi'an, China, — Aug 2019 - Jun 2023
B.Eng. Artificial Intelligence
- GPA: 3.9/4.0 | Ranking: 1/157

SKILLS

Programming Languages: C/C++, Python, MATLAB, JavaScript
Machine Learning & Data Science: PyTorch, Pandas, Numpy, Scikit-Learn, Scipy
Full Stack Development: HTML, CSS, Bootstrap, jQuery, Node, Express, EJS, React, Git, PostgreSQL, MySQL, Flask
Languages: Chinese (Native), English (Proficient; TOEFL 112; GRE 332)
Others: Unix & Linux Systems, Markdown, LaTeX, OpenCV, Paraview

PUBLICATIONS

Lu, Y., Gu, P., & Wang, C. (2024). FCNR: Fast Compressive Neural Representation of Visualization Images. *2024 IEEE Visualization and Visual Analytics (VIS)*. [Paper] [Code]

Yao, S., **Lu, Y.**, & Wang, C. (2024). ViSNeRF: Efficient and Flexible Visualization Synthesis Using Neural Radiance Fields. *IEEE Transactions on Visualization and Computer Graphics.* Under review.

RESEARCH

FCNR: Fast Compressive Neural Representation of Visualization Images — Aug. 2023 – Jun. 2024
- Generated a large collection of visualization images for scientific data using both **direct volume rendering** and **isosurface rendering**.
- Built a model based on **stereo attention**, **stereo context modules** and **joint context transfer modules** to compress the visualization images with given parameters.
- Achieved significant improvements in speed and compression quality. Accepted by ***IEEE VIS 2024***.

ViSNeRF: Efficient and Flexible Visualization Synthesis Using Neural Radiance Fields — Jun. 2022 – Jan. 2024
- Proposed **ViSNeRF** based on **TensoRF** to efficiently reconstruct direct volume or isosurface rendering visualizations with a sparse set of labeled image samples.
- Generalized the architecture to enable flexible parameter-space exploration over timesteps, isovalues, and transfer functions with an **18.60% average PSNR gain** over SOTA.
- Submitted to ***IEEE Transactions on Visualization and Computer Graphics***. Under peer review now.

EXPERIENCE

Graduate Research Assistant, University of Notre Dame, IN, USA — Aug 2023 - Present
Conduct full-time research in
- SciVis image compression through deep learning methods;
- Transfer function optimization in volume rendering through multimodal learning;
- Medical image synthesis through diffusion model.

Computer Vision Engineer Intern, Vanyi Technology Co. Ltd., Vanke, Shenzhen, China — Aug 2022 - Oct 2022
- Implemented image preprocessing and mask generation for architectural plan datasets.
- Enhanced a Stable-Diffusion-based model in **PyTorch** for generating complete architectural plans from partial sketches.
- Developed a system for converting incomplete sketches into detailed architectural plans.

PROJECTS

Telegram Chats Analyzer [Code]
- Developed a web application for uploading, analyzing, and visualizing telegram chats. Built the frontend interface with **React** and beautified the style with **Bootstrap**. Enhanced the navigation with **React-Router-DOM**.
- Implemented the backend via **Flask**, conducted data processing with **Pandas** and managed the database via **PostgreSQL**. Realized the client-server communication using **axios**.

LSTMIS: LSTM-based Quantitative Portfolio Investment Strategy — Feb. 2022
- Implemented an LSTM-based model to predict the price of gold and bitcoin with historical data using **PyTorch**.
- Optimized the investment strategy with predicted data, EMA and Markowitz Mean Variance Model. Evaluated the strategy with backtesting using **backtrader**.

SERVICES & LEADERSHIPS

Graduate Teaching Assistant, University of Notre Dame: for CSE-40166: *Computer Graphics* — Aug 2023 - Dec 2023
Football Team Leader, School of Artificial Intelligence, Xidian University — 2021 - 2022
Peer Mentor, Xidian University: designed and held lectures for students struggling with courses — 2020 - 2022

ACHIEVEMENTS

Graduate School Professional Development Award, University of Notre Dame — Aug. 2024
Outstanding Graduate of Shaanxi Province, Top 5% Graduates, Department of Education of Shaanxi — Jun. 2023
First-Class Graduate Scholarship, Top 5% Graduates, Xidian University — Jun. 2023
Meritorious Winner, ***Mathematical Contest in Modeling***, COMAP — May 2022
China National Scholarship, Top 0.2% Undergraduates Nationwide, Ministry of Education of China — Dec. 2020
First Prize, ***Mathematics Competition of Chinese College Students***, CMS — Dec. 2020