

Kangrui Cen

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🌐 Homepage: Kr-Panghu.github.io 📄 <https://github.com/Kr-Panghu>

EDUCATION

- **Zhiyuan College, Shanghai Jiao Tong University** Shanghai, China
Bachelor of Computer Science *Sept 2021 - Present*
 - ▶ Member of John Hopcroft Honors Class, which is an elite CS program for top 5% talented students.
 - ▶ **Overall GPA: 86.39/100, Major GPA: 89.47/100.**
 - ▶ **Selected Courses:**
 - * **Computer Science:** Programming and data structure II (A+), Programming and data structure III (A+), Efficient Tools and Effective Operations in Computer Systems (A+), Data Mining (A+), Computer System Design and Implementation (A+), Cryptography in Blockchain (A+), Operating System (A)
 - * **Mathematics:** Optimization Methods (A+), Computational Complexity (A+), Information Theory (A), Topics in Modern Algorithms (A)

PAPER

- **LayerT2V: Customize Object Trajectory via Transparent Video Layering** (To be submitted)
Kangrui Cen, Kelvin C.K. Chan, Xiaohong Liu, Ming-Hsuan Yang [📄 Paper](#) *VL-Lab, UC Merced*

RESEARCH EXPERIENCE

- **Basic-Lab, SJTU** Shanghai, China
≡ *Optimization for Parallel Graph Algorithm based on Hierarchical Architecture* *June 2023 - Jan 2024*
 - Research Intern, supervised by Prof. Qiang Yin.
 - Performing hierarchical decomposition of a large-scale image followed by precomputation to enhance the overall performance of dynamic graph analysis.
 - Optimizing the graph partitioning algorithm to minimize the frequency of loading subgraphs onto the GPU, thereby achieving GPU acceleration.
 - Theoretical proof of the correctness of the hierarchical graph algorithm for the Single-Source Shortest Path problem.
- **MultiMedia-Lab, SJTU** Shanghai, China
≡ *Advanced Deep Learning Approaches for Image Quality Analysis and Enhancement* *Feb 2024 - Present*
 - Research Intern, supervised by Prof. Xiaohong Liu.
 - Local quality reduction of high-quality images from AIGI using a diffusion model with masks to construct the corresponding dataset.
 - Regression prediction of the argument of the diffusion model and the degree of localized quality reduction using neural network.
 - Design a CNN-based network that can predict the localized quality scores of AIGI.
- **Vision and Learning Lab, University of California Merced** Merced, America
≡ *LayerT2V: Customize Object Trajectory via Transparent Video Layering* *June 2024 - Present*
 - Exchange Scholar, supervised by Prof. Ming-Hsuan Yang, advised by Dr. Kelvin C.K. Chan in Google DeepMind.
 - Put forward a novel pipeline that generates videos step-by-step by layering backgrounds and foreground objects separately.
 - These transparent video layers allow for the flexible compositing of multiple independent elements within a video, with each element positioned on a distinct *layer*, enabling complex visual effects and greater control over the generation process.
 - *LayerT2V* is capable of handling complex scenarios with multiple moving objects, and demonstrates the best results compared to state-of-the-art methods.

COURSE PROJECT

- **Bootstrapping Diffusion Model** Shanghai, China
CS3964 Image Processing and Computer Vision Course Project *Dec 2023*
 - Leverage synthetic data generated by the model training and train Diffusion/GAN model in a bootstrap manner.
 - Give an affirmative conclusion that generative model can boot-strap itself to deepen its understanding.
 - By recycling samples over successive generations, we continually expand the breadth and variety of our training data.[📄 GitHub](#) [📄 Project Paper](#)

- **Using information theoretic metrics to study the importance of individual neurons**

Shanghai, China

ICE2601 Information Theory Course Project

May 2023

- Use information theoretic metrics for node pruning to learn the importance of individual neurons at different levels in the whole deep neural network.
- Entropy, Mutual information and KL-Selectivity are used to determine the order of ablation.
- Figure it out that it is reasonable to use mutual information and KL-Selectivity as indicators of node pruning, indicating that they are strongly correlated with the classification results. [🔗 GitHub](#) [📄 Project Paper](#) [📄 Slides](#)

HONORS AND AWARDS

- Undergraduate Class B Scholarship *2022, 2023*
- Zhiyuan Honors Scholarship *2021, 2022, 2023*
- Meritorious Winner of Mathematical Contest In Modeling *2022*

OTHER EXPERIENCE

- Teaching Assistant *2023 Summer Semester*
Programming and data structure III
- Proficient with: C/C++/C#, Python (PyTorch, NumPy, etc.), Rust, Linux, L^AT_EX