Shangjie Du

(209)-355-4704 ● sdu14@ucmerced.edu ● linkedin/Shangjie Du ● github/aJay0422 ● ajay0422.github.io

EDUCATION

University of California Merced | *Merced, CA*   08/2023 - Present

M.S., Electrical Engineering and Computer Science (GPA: 4/4, top 1%)

    Area of Study: Computer Vision, Multimodal Large Language Model, Generative Model

    Advisor: Meng Tang

    Courses of Study: Large Language Model, Deep Learning, Digital Image Processing

Columbia University | *New York, NY*   09/2021 - 12/2022

M.A., Statistics (GPA: 4.14/4.33, top 5%)

    Area of Study: Statistical Machine Learning, Human Activity Classification

    Courses of Study: Probability and Statistical Inference, Stochastic Process, Bayesian Statistics, Nonparametric Statistics, Advanced Machine Learning, Machine Learning Image Analysis, Database System

Nanjing University | *Nanjing, China*   09/2017 - 06/2021

B.S., Mathematics (GPA: 4.27 / 5, top 20%)

    Courses of Study: Probability, Numerical Analysis, Stochastic Process, Convex Optimization, Real and Functional Analysis, Information Theory, Statistical Machine Learning, Artificial Intelligence, Data Mining

SELECTED PROJECTS

VisLoc-MLLM: Semantic Reasoning in Multimodal Large Language Model for Relative Camera Pose Estimation | *UC Merced*   01/2025 - Present

- Design and customize Qwen2/LLaVA-OneVision for camera pose estimation through numerical output. Prepare vision datasets for vision-language fine-tuning.
- Build an MLLM parallel training and evaluation pipeline with PyTorch and DeepSpeed.
- Train MLLM on 8xH100 GPUs with QLoRA and monitor training with wandb. The model achieves comparable performance to SOTA method on relative camera pose estimation.
- (Ongoing) Deploy Qwen2.5-VL-72B locally and annotate semantic camera pose description on multiple vision datasets. Train MLLM for reasoning capability on vision tasks.

GraPhy: Graph-Based Physics-Guided Urban Air Quality Modeling for Monitoring-Constrained Regions | *UC Merced*
08/2023 - 07/2024

- Design graph neural networks that mimic the diffusion and convection processes of air pollutants' physical fluid dynamics to compensate for data spatial sparsity.
- Relax the requirement for fine-grained meteorology data in most related works and design specialized message-passing mechanisms to accommodate extremely sparse meteorology data.
- Leveraging the flexibility of graph neural networks, we combine the temporal learning on nodes with the spatial learning from the message-passing mechanism and achieve the spatial-temporal modeling of air pollution.

General Variational Autoencoder for Imbalanced Dataset | *UC Merced*   01/2024 - 05/2024

- Develop a general variational autoencoder (VAE) that leverages contrastive loss (InfoNCE) in the latent space to create robust and separable representations of the minority classes from an imbalanced image dataset.
- Introduce the orthogonal latent spaces into the VQ-VAE framework to separate the label-relevant (e.g, dog and cat) representations and label-irrelevant (e.g., background) representations in the latent space. Enhancing image content representation efficiency.

Transformer-Based Model for Activity Classification | *Columbia University*   12/2021 - 10/2022

- Conduct video downsampling and human pose extraction using OpenCV and detectron2

- Data augmentation by rotation using 3D human pose generated from VideoPose3D.
- Feature selection and dimensionality reduction using PCA and Slice Inverse Regression(SIR).
- Developed Transformer-Based algorithms to model the feature series for activity classification.

PUBLICATIONS

Shangjie Du, ZhiZhang Hu, and Shijia Pan. GraPhy: Graph-Based Physics-Guided Urban Air Quality Modeling for Monitoring-Constrained Regions. Proceedings of the 11th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation. 2024 (Best Paper Runner-Up)

Yue Zhang*, **Shangjie Du***, Jiqing Wen, Robert Likamwa, Shiwei Fang, Shijia Pan. "PrivaSee: Augmented Reality-Enabled Privacy Perception Visualization for Internet of Things" Proceedings of the 22nd Annual International Conference on Mobile Systems, Applications and Services

ZhiZhang Hu*, **Shangjie Du***, Yuning Chen, Xuan Zhang, Wan Du, Asa Bradman, Shijia Pan. "Enhancing Fault Resilience of Air Quality Monitoring in San Joaquin Valley: A Data Equity Analysis" *Proceedings of the 21st ACM Conference on Embedded Networked Sensor Systems.* 2023.

TECHNICAL SKILLS

- Languages: Python, Matlab, R, LaTex
- Tools: Pytorch, Huggingface-transformers, Deepspeed, OpenCV-Python, Sci-Kit Learn, pandas, Scipy, NumPy

HONORS AND REWARDS

- BuildSys 2024: Best Paper Runner-Up Award   2024
- MobiSys 2024: Best Poster Runner-Up Award   2024
- Columbia University Chair's List of Academic Achievements   2023
- Nanjing University People's Scholarship First Prize   2020
- Nanjing University People's Scholarship Third Prize   2019