Yiru (Sylvia) Zhou

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EDUCATION

New York University Shanghai (NYUSH)   Sep. 2021- June. 2025
Double Major in Computer Science and Mathematics

- Cumulative GPA: **3.74**/4.0 (Major GPA: **3.82**/4.0)

- Research Interest：   NLP, LLM, Computational Biology

- Core Courses: Data structure, Algorithms, Computer Architecture, Creative Coding Lab；
                      Information Visualization, Game Theory, Discrete Math;

New York University, New York   Sep. 2023- May. 2024
Study Away Program

- Core Course: Operating System, Machine Learning, Deep Learning (grad-level)
                     Natural Language Processing (grad-level), Numerical Analysis

RESEARCH

Theoretical and Practical Development of Flow-Based Models   April. 2024-Present
Research Assistant, Supervised by Prof. Zhiyao Duan, University of Rochester

- Explored various flow-based models, including Continuous Normalizing Flows (CNF), Flow Matching, and Conditional Flow Matching, emphasizing their theoretical foundations and connections.

- Analyzed the connections between Flow Matching and Optimal Transport, documenting the latest developments and creating visualizations to illustrate complex theoretical concepts.

- Implemented and replicated toy models to validate theoretical insights and demonstrate practical applications in flow-based modeling.

- Authored comprehensive notes detailing advanced techniques like Rectified Flow and Diffusion Models, as well as the integration of Optimal Transport with flow matching to achieve state-of-the-art results.

Personalizing Large Language Models for Value Judgments Based on Cognitive Models   July. 2024-Present
Capstone Research Project, Supervised by Prof. Hongyi Wen, NYUSH

- Conducted an in-depth study on aligning large language models (LLMs) with human cognitive processes to generate more personalized value-based judgments.

- Designed personalized responses through prompt engineering and K-means clustering, tailoring outputs to unique respondent profiles.

- Fine-tuned LLaMA 3.1 using Low-Rank Adaptation (LoRA) to create cluster-specific models, enhancing cognitive alignment and model adaptability.

- Addressed challenges in adapting models for diverse question types (e.g., multiple-choice and sorting questions) through custom input and output modifications.

- Evaluated model performance through simulations, verifying its ability to generalize across various value-based topics within social science domains.

SELECTED PROJECT

Video Frame Prediction and Semantic Segmentation using SimVP and U-Net   April. 2024
Course Project in Deep Learning (Graduate School)

- Developed a combined framework integrating SimVP for video frame prediction and U-Net for semantic segmentation to generate object masks in predicted frames.

- Achieved an Intersection over Union (IoU) score of around 0.3 on a hidden dataset, demonstrating effective object segmentation and prediction accuracy, which reached the forefront of the class competition.

- Experimented with a synthetic 3D dataset, conducting training and evaluation using metrics such as MSE, IoU, and SSIM, optimizing the model for video dynamics and pixel-level segmentation.