Francis Fan

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EDUCATION

Yale College — New Haven, CT
Bachelor of Science: Cumulative GPA: 4.0 — Expected May 2026
Expected Major: CS and Math
Relevant Coursework: Discrete Math, Linear Algebra, Data Structures

WORK & VOLUNTEER EXPERIENCE

Apollo Lab, Yale University — New Haven, CT
Undergraduate Researcher — Sept 2023 – present

- Developed the implementation of diffusion policy and reinforcement learning on an ensemble of robotic manipulators to direct optimal viewpoints using ROS2 Humble and PyTorch
- Implemented behavioral cloning on models trained by Generative Adversarial Networks and Reinforcement Learning
- Developed the implementation of a transformer based approach to reinforcement learning

Center for Functional Neuroimaging, University of Pennsylvania — Philadelphia, PA
Intern Researcher — Jun 2022 – Aug 2023

- First author on paper using machine learning analysis to uncover the relationship between risk tolerance and brain gray matter volume under Professor Hengyi Rao, presented at Organization for Human Brain Mapping Conference August 2023
- Implemented SHAP, a game theory based model, to confirm a previous paper's finding of the cerebellum's importance in predicting risk tolerance

PROJECTS

Stock Analysis Model — April 2023

- Designed and implemented Pytorch and Scikit-Learn based analytical model for the stock market in Python
- Implemented a tweet sentiment classification model with BERT to link stock performance to overall sentiment trends on Twitter

Robotics Physics Environment — June 2024

- Created a robotics physics simulator with MuJoCo and OpenAI Gymnasium to train a policy using diffusion policy for opening a microwave with two arms.
- Introduced a novel moving viewpoint on one arm while the other manipulated the task

fitness_log — July 2024
Technologies: MERN Stack, bcryptjs, cloudinary, express, mongoose, recharts, groq-sdk, jsonwebtoken

- Developed a full-stack fitness tracking app with user authentication and profile management.
- Implemented secure file uploads with Cloudinary and used MongoDB/Mongoose for data storage.
- Created dynamic progress charts using recharts and integrated AI insights with Groq.
- Built RESTful APIs with Express and validated inputs using express-validator

Stable Diffusion from Scratch — August 2024
Technologies: Pytorch, vite, react, tokenizer

- Developed a Stable Diffusion model from scratch that can be finetuned on user data
- Implementing a framework to host the model and to allow users to input images to finetune the model on and train the model

ACTIVITIES

Yale Undergraduate Capital Partners — New Haven, CT
Analyst — Sept 2023 - May 2024

- Worked under Kleida Martiro at Glasswing, a venture capital firm
- Developing deliverables and theses to provide clients with a better understanding of the gen AI market space
- Arranged calls with software engineers to assess pain points in their work

ADDITIONAL

Technical Skills: Proficient in Python (PyTorch, Scikit-learn), C++, Java, Javascript
Languages: Fluent in Chinese, English; Intermediate Latin Comprehension
Certifications & Training: Online Course in Game Theory (Coursera), TD Securities Virtual Experience Program - August 2023
Awards: National Merit Finalist, AP Scholar with Distinction, Science Olympiad Nationals Silver Medalist