Xingjian (Jackson) Gao

2477 Virginia St., Apt. 306
Berkeley, CA 94709

Email: xgao@berkeley.edu
Website: xgao0613.github.io

Education

University of California, Berkeley August 2022 – May 2023
5th Year M.S. in EECS *Berkeley, CA*
Coursework: Computer Vision (A), Deep Neural Networks, Deep Reinforcement Learning (A)

University of California, Berkeley August 2018 – May 2022
B.A. in Computer Science and Applied Mathematics (GPA: 4.0) *Berkeley, CA*
Coursework: Machine Learning (A+), Computational Principles for High-dimensional Data Analysis (A+), Artificial Intelligence (A+), Optimization Models, Probability and Random Processes, Complex Analysis (A), Abstract Linear Algebra (A)

Research Experience

Digital-Twin Localization via Interpretable ViT | Dr. Allen Yang Fall 2023 – Present
UC Berkeley FHL Vive Center for Enhanced Reality – OpenARK *Berkeley, CA*
- Improving a transformer-based 6DoF (Six Degrees of Freedom) pose estimator to enable robust 3D object tracking in dynamic mobile AR (Augmented Reality) environments.
- Extending the CRATE (white-box transformer) architecture from processing image patches to processing point cloud representations for segmentation, thereby enhancing interpretability in depth information.
- Simplifying the heavily-engineered framework by using only two pretrained transformers to separately extract structured RGB and depth information, and fine-tuning them for the pose estimation task.

Sparse Coding in Deep Learning | Prof. Yi Ma Fall 2021 – Fall 2023
UC Berkeley Artificial Intelligence Research Lab (BAIR) *Berkeley, CA*
- Investigated sparse convolutional models that possess both strong theoretical interpretability and biological plausibility for image classification.
- Developed Convolutional Sparse Coding (CSC) layers with precise mathematical inverses, serving as drop-in replacements for standard convolutional layers in conventional deep neural networks.
- Bridged the gap between the strong empirical performance of deep learning and the high interpretability of sparse convolutional models in image classification and reconstruction tasks.
- Leveraged the stable recovery property of CSC layers to achieve enhanced robustness against input corruptions and adversarial perturbations.

Generative Models for Neural Data | Prof. Doris Tsao Spring 2022 – Spring 2023
UC Berkeley Neural Science Lab *Berkeley, CA*
- Built customized Generative Adversarial Networks (GANs) to generate realistic images, aiming to trigger the maximum firing rate of inferior temporal (IT) cortex cells in macaques.
- Employed Convolutional Sparse Coding (CSC) layers to learn a highly-structured representation of images presented to macaques, demonstrating a substantial correlation with neural data.
- Modified and fine-tuned variations of Stable Diffusion models to predict images seen by the brain using only neuronal responses.

Work Experience

Software Engineering Intern | IBM Inc. Summer 2019

Beijing, China

- Engineered efficient and robust machine learning algorithms, significantly boosting the effectiveness of banking product sales strategies.
- Successfully optimized existing code, achieving a 30% reduction in runtime without compromising result accuracy.
- Engaged in advanced research focusing on Multi-Label Classification and Automated Machine Learning techniques, contributing to innovative approaches in data analysis.

Research Publications

Revisiting Sparse Convolutional Model for Visual Recognition NeurIPS 2022

Xili Dai, Mingyang Li, Pengyuan Zhai, Shengbang Tong, Xingjian Gao, Shao-Lun Huang, Zhihui Zhu, Chong You, Yi Ma *Accepted*

Closed-Loop Transcription via Convolutional Sparse Coding CPAL 2024

Xili Dai, Ke Chen, Shengbang Tong, Jingyuan Zhang, Xingjian Gao, Yuexiang Zhai, Mingyang Li, Xiaojun Yuan, Heung-Yeung Shum, Lionel Ni, Yi Ma *Accepted*

Exploring the Encoding Scheme of the Brain by Generating Images on Axes in a Common Space Berkeley EECS Masters Report

Xingjian Gao

Awards & Honors

Highest Distinction in General Scholarship at Graduation

University of California, Berkeley *May 2022*

Specialized Skills

Programming Skills: Python, Java, C, Go, MATLAB, SQL, Bash, LaTeX

Machine Learning Tools: PyTorch, NumPy, scikit-learn, JAX