Haotian Xiang

hx2341@columbia.edu | https://haotianxiangsti.github.io/haotianxiang.github.io

Education

Columbia University in the City of New York — *New York City, NY*

M.S. in Electrical Engineering, Specialization in Data-Driven Analysis and Embedded System — Sep. 2022 - Dec. 2023 (Expected)

Supervised by Dr. Liam Paninski, in the Statistics and Neuroscience departments, Paninski'lab

Supervised by Dr. Sharon Di, in Civil Engineering and Engineering Mechanics, Smart Cities Section, Ditectlab

This semester's GPA: 3.91/4.00

University of Electronic Science and Technology of China — *Chengdu, China*

B.S. in Electrical Engineering — Sep. 2018 - Jun. 2022

UESTC Merits Student Scholarship(2019, 2020), Graduate with First Class Honor

GPA: 3.67/4.00, Core GPA 4.0/4.0

Papers

[1] **Haotian Xiang**†, Lyndong Liu†, Zhaobin Mo†, Sharon Di*, "DiffIRM: A Diffusion-Augmented Invariant Risk Minimization Framework for Spatiotemporal Prediction over Graphs"
Aiming AIStat 2024. see abstract here

[2] Zhaobin Mo, **Haotian Xiang**, Sharon Di*, Eric Chang, "Cross- and Context-Aware Attention Based Spatial-Temporal Graph Convolutional Networks for Human Mobility Prediction"
Submitted to ACM Transactions on Spatial Algorithms and Systems workshps 2023. see draft paper here
†: Equal Contribution, * : Corresponding Author

Research Projects

Active Learning Pipeline for Animal Behaviour Videos — *New York City, NY*

Built an Active Learning Pipeline with several unsupervised learning methods and Ensemble Methods to help Neuroscience researchers to select frames in their animal behavior videos which their Object Tracking models may fail to precisely track key-points and need they to add extra annotations. We aim to design a pipeline with better frame selecting efficiency and less computation resources required.

Jul. 2023 - Now

DiffIRM: A Diffusion-Augmented Invariant Risk Minimization Framework for Spatiotemporal Prediction over Graphs — *New York City, NY*

Built a novel system, diffIRM, that integrates the diffusion model into the Invariant Risk Minimization (IRM) framework which provides a pipeline for training more robust and more general forecasting model. Specifically, diffIRM significantly outperforming the state-of-the-arts accuracy of 20% and showing strong robustness when encountering with cities under different traffic patterns.

May. 2023 - Sep. 2023

Cross- and Context-Aware Attention Based Spatial-Temporal Graph Convolutional Networks for Human Mobility Prediction — *New York City, NY*

Predicted Covid-19 Case Rate in New York City with an Multiple Attention Mechanisms Based Spatial-Temporal Graph Convolutional Networks. A Cross-Modal Transformer to align similarity between dynamic features and a Transformer encoder to extract context (POI) features. Then, a Spatial-Temporal Transformer to fuse all extracted features with a Graph Convolutional Network to estimate the Spatial-Temporal pattern of human mobility during in the COVID-19. Our model outperforms the state-of-the-arts Mean Square Error (MAE) by 4% less.

Feb. 2023 - May. 2023

A Multimodal Chemical Material Classification Model for X-ray Diffraction Spectrum — *Rochester, NY*

Avoided heavily time consuming manual classification and avoid repeated slicing on expensive materials to get more experiment samples. Constructed a Stable-Diffusion liked Generative Model to produce experiment data with a Align-before Fuse (ALBEF) liked Multi-modal Model as a Classifier to distinguish elements in four different kinds of materials. Our proposed framework tackled the label imbalance dilemma in X-ray Diffraction Spectrum based elements classification tasks.

Feb. 2023 - Jul. 2023