

Haotian Xiang

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Education

Columbia University in the City of New York

New York City, NY

MS in EE, Specialization in Data-Driven Analysis and Computation and Embedded System

Sep. 2022 - Jun. 2024 (Expected)

Supervised by Professor Liam Paninski, in the Statistics and Neuroscience departments, Paninski's lab

Supervised by Professor Sharon Di, in Civil Engineering and Engineering Mechanics, Smart Cities Section in the Data Science Institute, focusing on Travel Behavior and Transportation Systems, Ditectlab

Off-campus Research: Professor Tong (Tony) Geng, in Electrical and Computer Engineering and Computer Science, Rochester University, Tonytgeng's team.

This semester's GPA: 3.91/4.00

University of Electronic Science and Technology of China

Chengdu, China

BS in EE

Sep. 2018 - Jun. 2022

First Class Honor

GPA: 3.67/4.00, Core GPA 4.0/4.0

Supervised by Professor Li Liang, Natural Language Processing Lab, in School of Mathematical Sciences

Ongoing 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 workshops 2023. see draft paper here
[†]: Equal Contribution, * : Corresponding Author

Research Projects

Active Learning Pipeline for Animal Behaviour Videos

New York City, NY

Project Aim: To Build an Active Learning Pipeline with several unsupervised learning methods and Ensemble Methods to select frames which Users' Object Tracking models may fail to precisely track key-points.

Jul. 2023 - Now

Thus, with the pipeline, users can annotate mainly these frames to reduce labor resources.

DiffIRM: A Diffusion-Augmented Invariant Risk Minimization Framework for Spatiotemporal Prediction over Graphs

New York City, NY

Project Aim: To build 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 augments the spatiotemporal graph data (such as human mobility) using a conditional diffusion model, which takes in conditions (such as COVID-19 case rates and demographic features) and generates diverse training environments. Then the augmented spatiotemporal graph data is used to train Graph Neural Networks with the penalty of IRM.

May. 2023 - Aug. 2023

Cross- and Context-Aware Attention Based Spatial-Temporal Graph Convolutional Networks for Human Mobility Prediction

New York City, NY

project Aim: To predict Covid-19 Case Rate in New York City based on Human Mobility Dataset of New York.

A Spatial-Temporal Attention Graphic Convolutional Network is used to predict case rate considering number of visit and other three features together inside a Spatial-Temporal Dataset from New York City. Besides, a Cross-Modal Attention Module is used to focus on dynamic features (i.e. Number of Visits) in the Dataset, while a Contextual Tri-Attention Module is applied to pay attention to situational features (i.e. Medium Income).

Feb. 2023 - May. 2023

A Multimodal Chemical Material Classification Model based on X-ray Diffraction Spectrum

Rochester, NY

Project Aim: To avoid heavily time consuming manual classification and to avoid repeated slicing on expensive materials in order to get more experiment samples.

Using a Align-before Fuse (ALBEF) liked Multi-modal Model as a Classifier and a Stable-Diffusion Model to Generate XRD Sample for Expensive Materials

Feb. 2023 - Jul. 2023

SAM Based Blood Cell Classification Model

New York City, NY

project Aim: To fine-tune the versatile Segment Anything Model (SAM) into a Medical Image Segmented specific Model.

Segment Anything Model is a strong and versatile image segment model. But it is trained barely on medical images.

Thus, SAM performs poor in medical images. However, SAM has ample intuition in image segmentation as it is trained on a gigantic image dataset. So, the weights from image encoder and prompt encode is inherited and freeze while the mask decoder is fine-tune based on the medical image dataset specifically Blood Cell Images. As a result, the fine-tune Medical specified SAM with classification module reaches almost SOTA results and has better efficiency.

Feb. 2023 - May. 2023

Awards and Honors

June. 2022

First Class Honor: “First Class Honor ”

Chengdu, China

Sep. 2020

Scholarship : First Standard Scholarship”

Chengdu, China

Sep. 2019

Scholarship : First Standard Scholarship”

Chengdu, China