Yuankun Jiao

Ph.D. student in Computer Science
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Education

University of Minnesota, Twin Cities — Aug. 2022 – Present
M.S./Ph.D. student, Computer Science, GPA: 3.90/4.00, Advisor: Prof. Yao-Yi Chiang — *Minneapolis, MN, USA*

Huazhong Agricultural University — Sep. 2018 – Jun. 2022
B.S. with Honors, Geographic Information Science, GPA: 3.89/4.00 — *Wuhan, Hubei, China*

Publications

- Pyo, J.*, **Jiao, Y.***, Chiang, Y. & Corey, M. (2025). Augmenting Human-Centered Racial Covenant Detection and Georeferencing with Plug-and-Play NLP Pipeline. *(In Preparation)*
- Grossman, M., **Jiao, Y.**, Hu, H., Hourdos, J., & Chiang, Y. Y. (2024). Performance Evaluation of Different Detection Technologies for Signalized Intersections in Minnesota (No. MN 2024-10). Minnesota. Department of Transportation.
- Zhang, W., Li, S., Gao, Y., Liu, W., **Jiao, Y.**, Zeng, C., Gao, L., & Wang, T. (2022). Travel changes and equitable access to urban parks in the post COVID-19 pandemic period: Evidence from Wuhan, China. *Journal of Environmental Management*, 304: 114217.
- **Jiao, Y.** and Chiang, Y.-Y. (2021). Incorporating Geographic Information for Building a Location-based Recommendation System. In *Proceedings of the 29th International Conference on Advances in Geographic Information Systems (SIGSPATIAL '21)*. Association for Computing Machinery, New York, NY, USA, 680–681.

Presentations

- **Jiao, Y.**, Kim, J., Namgung, M., Uhl, J.H., Burghardt, K., Chiang, Y.-Y., Leyk, S., Lerman, K. (March 2023) Assessing Spatio-Temporal Street Name Evolution Using Natural Language Processing and Geospatial Analysis. American Association of Geographers, Denver, USA
- **Jiao, Y.**, Chiang, Y.-Y. (November 2021) Presented the research of Incorporating Geographic Information for Building a Location-based Recommendation System. The 29th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, Beijing, P.R.China (Presentation Link)

Conferences

American Association of Geographers 2023 Annual Meeting (AAG 2023) — Mar. 23-27, 2023

- Presented the research of Assessing Spatio-Temporal Street Name Evolution Using Natural Language Processing and Geospatial Analysis

The 29th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL 2021) — Nov. 2-5, 2021

- Presented the research of Incorporating Geographic Information for Building a Location-based Recommendation System
- First Place Winner: Student Research Competition

Research Experience

Map Reasoning Benchmark with Vision Language Models (VLM) Aug. 2025 - Present
University of Minnesota, Twin Cities, USA, Mentor: Prof. Yao-Yi Chiang

Abstract: While VLMs show strong performance in image and chart understanding, their human-like interpretation of cartographic maps remains underexplored. This project aims to design chain-of-thought prompts grounded in cartography and VLM knowledge, establishing a benchmark for future research in map-based AI reasoning.

Mapping Prejudice Jan. - Jul. 2025
University of Minnesota, Twin Cities, USA, Mentor: Prof. Yao-Yi Chiang

Abstract: Researched the legacy of racially restrictive covenants in historical property deeds. Enhanced crowdsourced transcription workflows by developing natural language processing pipelines: a context-aware text labeling model (reduced false positives by 25.96% at 91.73% recall) and a georeferencing module (achieved 85.6% location accuracy within 1×1 square-mile). Improved scalability and crowdsourcing efficiency while enriching spatial annotations for public engagement.

Detection Technologies Performance Evaluation for Signalized Intersections Jan. 2023 - Apr. 2024
University of Minnesota, Twin Cities, USA, Mentor: Prof. Yao-Yi Chiang

Abstract: This research evaluates the performance of non-intrusive detection technologies (NITs) for traffic signals in Minnesota. The goal is to find which NIT devices perform better in local conditions and provide maintenance recommendations. Our research includes synthesizing national and local experiences about NITs and evaluating real-world NIT deployments in Minnesota across different weather conditions. Results shows that no single NIT performs best, but Autoscope Vision is less prone to lens blockages requiring on-site service. Our analysis also finds some intersections have more failures, indicating location and geometry impact performance. We recommend using central monitoring systems, installing heat shields to prevent snow/rain accumulation, and routine annual checks and checks after major storms.

Identifying Street Name Evolution in Semantic & Spatio-Temporal Spaces Aug. 2022 - Dec. 2023
University of Minnesota, Twin Cities, USA, Mentor: Prof. Yao-Yi Chiang

Abstract: This study proposes an automated pipeline to capture the semantics and origins of street names in over 2,600 counties in the US and analyze their spatiotemporal development. We use pretrained BERT to extract all potential semantic meanings of individual street names into contextualized embeddings. Then we identify the shared semantic meanings that co-occur among nearby street names and quantify the semantic changes across periods by Average Mutual Information index. In this way, we identify relationships between socio-cultural factors and semantic meanings of streets among regions over time.

Incorporating Geo-Information to Build Location Recommendation System Jan. - Nov. 2021
University of Minnesota, Twin Cities, USA, Mentor: Prof. Yao-Yi Chiang

Abstract: This study proposes a novel approach for location recommendation based on content-based recommendation algorithms incorporated with geographic information. The study also analyzes the impact of various dimension reduction methods on the recommendation quality using various baseline approaches. The experiment demonstrates that the proposed approach to content-based location recommendations is feasible and valuable, with potentials for further research.

Travel Behavior, Accessibility, and Equitable Access to Urban Parks Sep. 2020 - Mar. 2022
Huazhong Agricultural University, China, Mentor: Prof. Wenting Zhang

Abstract: In this study, we took Wuhan city as a case study to analyze the changes in park visitors' travel behaviors under different COVID-19 risk levels, calculated the accessibility and equality of the urban parks. It is suggested that a higher risk level led to lower accessibility and greater inequitable access. The results should help the government guide residents' travel behaviors after COVID-19.

Teaching Experience

University of Minnesota, Twin Cities

- **Teaching Assistant**

CSCI 4707 : Practice of Database Systems	Fall 2024
CSCI 4511W : Introduction to Artificial Intelligence	Spring 2024
CSCI 1133 : Introduction to Computing and Programming Concepts	Spring 2023
CSCI 4707 : Practice of Database Systems	Fall 2022

Volunteer & Service

Computer Science Graduate Student Association (CSGSA) Aug. 2023 - May. 2024
GRaDs coordinator. *University of Minnesota, Twin Cities*
- Serve as a GRaDs coordinator;
- Organize and advertize the bi-weekly CSGSA GRaDs research symposium and networking event.

SIAM International Conference on Data Mining (SDM 23) Apr. 2023
Session Assistant Chair. *Minneapolis, USA*
- Serve as an Assistant Chair at the CP11 Spatial/Temporal Data III session;
- Assisted the Session Chair to organize the session and coordinate with attendees.

The 30th ACM SIGSPATIAL International Conference(ACM SIGSPATIAL 2022) Nov. 2022
Registration volunteer. *Seattle, USA*
- Volunteered at the registration desk and welcomed attendees.

Practical Experience

Wuhan Zondy Cyber Group Co. LTD Summer 2021
Trainee, Teamleader, WebGIS Development *Wuhan, Hubei, China*
- Developed the Intelligent Transportation WebGIS System of Wuhan Optical Valley with OpenLayers and MapGIS IGServer in cooperation with other seven team members;
- Developed the front-end static server and application services with HTML+CSS+JavaScript in Windows environment;
- Deployed the IGServer, a WebGIS server product of Wuhan Zondy Cyber Group, on the Windows server, which supports the management, analysis, and visualization of geospatial data.

Survey and Evaluation of Soil and Land Resources Nov. 2020
Trainee, Field Research *Xianning, Hubei, China*
- Investigated the distribution of soil and land-use types of Heshengqiao town;
- Processed geographic & attribute data from fieldwork by ArcGIS & MATLAB;
- Evaluated soil quality indicators with normalization and analytic hierarchy process (AHP);
- Constructed a geographic information database with 23 soil types and 31 land-use types discovered in the research;

Montana State University Summer 2019
Trainee, Field Research *Bozeman, MT, USA*

- Investigated the local soil by digging soil profiles based on American Soil Taxonomy, which is logically different from China Soil System Classification;
- Surveyed the phenomena from the geology aspect in Yellowstone National Park;
- Surveyed natural resources protection and utilization technologies surrounding Bozeman, including prevention of soil erosion and improvement of soil fertility.

Awards & Honors

The 18th "Top Ten College Students" Honorary Title
Awarded by Huazhong Agricultural University, China. Selected as one of 10 winners university-wide. *Apr. 2022*

First Place Winner: Student Research Competition @ ACM SIGSPATIAL 2021
Awarded by ACM SIGSPATIAL 2021 conference. Undergraduate Category. *Nov. 2021*

Special Award for Outstanding Academic Performance
Awarded by Huazhong Agricultural University, China. Selected as one of 2 winners school-wide. *Oct. 2021*

National-class Scholarship
Awarded by The Ministry of Education of China. *Dec. 2019*

Professional Skills

Programming: Python, SQL, HTML/CSS/JavaScript, C/C++, MATLAB, R
Libraries: PyTorch, PySpark, ArcPy, GeoPandas
GIS Softwares: QGIS, ArcGIS, ENVI, ERDAS, Google Earth Engine, Pix4D, 3DMAX
Languages: English (Advanced), Mandarin (Native)