

Mingzhou Yang

CONTACT INFORMATION	Computer Science Department 200 Union St SE Minneapolis, MN 55455	Phone: 6124332118 Linkedin: https://www.linkedin.com/in/mingzhou-yang/ Email: yang7492@umn.edu
RESEARCH INTEREST	Spatiotemporal Data Mining, Physics-guided Machine Learning, Reinforcement Learning, Urban Intelligence, Optimization Algorithms, Database Systems	
EDUCATION	University of Minnesota , Twin Cities <i>Ph.D. Student in Computer Science</i> <i>Advised by Prof. Shashi Shekhar</i>	September 2021 - May 2025
	Xi'an Jiaotong University , Xi'an, China <i>M.S. in Control Science and Engineering</i>	September 2017 - May 2020
	Xi'an Jiaotong University , Xi'an, China <i>B.Eng. in Automation</i>	September 2013 - May 2017
APPOINTMENTS	University of Minnesota Twin Cities, MN <i>Graduate Research Assistant</i>	May 2022 - Present
	University of Minnesota Twin Cities, MN <i>Graduate Teaching Assistant</i>	September 2021 - May 2022
TECHNICAL SKILLS	• Languages: Python, C++, Java, R, SQL, Scala, Android • Machine Learning: PyTorch, Keras, TensorFlow, OpenCV • Big Data: Apache Spark, Hadoop, Hive, PySpark • DevOps: Jira, Git, Agile Methodologies, Scrum and Sprint planning, Docker, Tableau	
EXPERIENCE	Graduate Research Assistant, UMN, Twin Cities <i>Advised by Prof. Shashi Shekhar</i> Project: Vehicle-Physics-Informed AI for Transportation Science Affiliation: <i>NSF, USDOE</i> • Proposed an eco-toll estimation physics-informed neural network (Eco-PiNN) framework to quantify the environmental cost of vehicles (e.g., energy consumption) for selecting energy-efficient paths. • Proposed an attention-based contextual information encoder to capture a path's contextual information, including the influence of adjacent segments on the path. • Proposed a physics-informed decoder that integrates physical laws governing vehicle dynamics into Eco-PiNN using vehicle-physics equations derived from the forces acting on the vehicle. • Proposed a physics-informed regularization to regularize the training stage of Eco-PiNN to reduce overfitting. It minimizes vehicle acceleration changes as abrupt acceleration shifts are unrealistic since it is uncomfortable for vehicle occupants. • Conducted extensive experiments on real-world heavy-duty truck datasets, showing that Eco-PiNN outperforms the state-of-the-art models. Project: Reducing Transportation Emissions to Achieve Net Zero Affiliation: <i>NSF, USDOE</i> • Described existing gaps in transportation decarbonization research where data mining can help address problems related to medium/heavy vehicle electrification, electric micromobility safety, and analysis of alternative fuel-powered and plug-in hybrid electric vehicles. • Encompassed open research problems, opportunities for data mining applications, and examples of areas where advancements in data mining techniques are needed.	May 2022 - Present

Visiting Student, Worcester Polytechnic Institute

July 2019 - October 2019

*Advised by Prof. Yanhua Li***Project: Inferring Passengers' Interactive Choices on Public Transits**

- Designed Markov Game models to model the interaction of the urban passengers' trips.
- Proposed a multi-agent inverse reinforcement learning (MA-IRL) algorithm to recover the reward functions of agents from deterministic Nash equilibrium policies in Markov Games.
- Proposed a multi-agent apprenticeship learning (MA-AL) algorithm to deal with the case where the equilibrium joint policy are known only through a set of observed expert trajectories.
- Validated the proposed methods using synthetic data and real-world trip data in Shenzhen, China.

SELECTED
PUBLICATIONS**[1] Eco-PiNN: A Physics-informed Neural Network for Eco-toll Estimation***Proceedings of the 2023 SIAM International Conference on Data Mining (SDM '23)*Yan Li*, **Mingzhou Yang***, Matthew Eagon, Majid Farhadloo, Yiqun Xie, William F. Northrop, and Shashi Shekhar (* co-first author)**[2] Data Mining Challenges and Opportunities to Achieve Net Zero Carbon Emissions: Focus on Electrified Vehicles** *Best Vision Paper Award (runner-up)**Proceedings of the 2023 SIAM International Conference on Data Mining (SDM '23)***Mingzhou Yang**, Bharat Jayaprakash, Matthew Eagon, Hyeonjung Jung, William F Northrop, Shashi Shekhar**[3] Revolutionizing Electric Vehicle Management: Spatial Computing Challenges and Opportunities***Proceedings of the 15th ACM SIGSPATIAL International Workshop on Computational Transportation Science, 2022*Hyeonjung Jung, **Mingzhou Yang**, Matthew Eagon, William Northrop**[4] Inferring Passengers' Interactive Choices on Public Transits via MA-AL: Multi-agent Apprenticeship Learning***Proceedings of The Web Conference 2020 (WWW '20)***Mingzhou Yang**, Yanhua Li, Xun Zhou, Hui Lu, Zhihong Tian, Jun Luo**[4] A Hierarchical Algorithm for Bi-Objective Routing: A Summary of Results (under review)***40th IEEE International Conference on Data Engineering (ICDE ' 24)***Mingzhou Yang**, Ruolei Zeng, Shunichi Sawamura, Arun Sharma, William F. Northrop, Shashi ShekharHONORS AND
ACHIEVEMENTS**Best Vision Paper Award (runner-up)****2023***SIAM International Conference on Data Mining (SDM'23).***Student Travel Award****2023***SIAM International Conference on Data Mining (SDM'23).*TEACHING
EXPERIENCE**CSCI 4041 Data Structures and Algorithms****Spring 2022***Graduate Teaching Assistant*

- Student rating: 5.425 out of 6
- Led the weekly discussion section for 30+ students

CSCI 1113 Introduction to Computing and Programming Concepts **Fall 2021***Graduate Teaching Assistant*

- Student rating: 5.32 out of 6
- Involved in grading of 200+ students and testing weekly assignments and labs