

Bowen Fang

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EDUCATION

Ph.D. Student, School of Engineering and Applied Science, **Columbia University**, New York, NY 2024-present

- Focus: Reinforcement Learning and Autonomous Driving
- Advisor: Sharon Di
- Relevant courses: Diffusion Models AI & RL, Quantum Computing and Communication

M.S. in Operations Research, **Columbia University**, New York, NY Feb 2024

- GPA: 4.13
- Relevant courses: Advanced Big Data and AI, ML and High-dimensional Analysis, Robot Learning, Optimization, Stochastic Models

B.Mgt in Big Data Management and Application, **Peking University**, Beijing China Sep 2018 - Jul 2022

- GPA: 3.5
- Relevant courses: Algorithms and Data Structure, Database

PUBLICATIONS AND PREPRINTS

SLAMuZero: Plan and learn to Map for Joint SLAM and Navigation

Bowen Fang, Xu Chen, Zhengkun Pan, Xuan Di *Proceedings of the International Conference on Automated Planning and Scheduling, ICAPS 2024*

[\[Paper\]](#), [\[Code\]](#)

Learn to Tour: Operator Design for Solution Feasibility Mapping in Pickup-and-delivery Traveling Salesman Problem

Bowen Fang, Xu Chen, and Xuan Di (*submitted to Transportation Research Part B, under review*) 2024

[\[arxiv\]](#)

TravelLLM: Could you plan my new public transit route in face of a network disruption

Bowen Fang, Yang Zixiao, Wang Shukai, and Xuan Di 2024

[\[arxiv\]](#)

INDUSTRY EXPERIENCE

Part-time Data Scientist, **MathWorks**, New York, NY Aug 2022 - Dec 2022

- Reproduced **Dynamic Programming** for Goal-based Wealth Management, developed 4 reward signals, devised experiments with 6 model-free agents to discover the best algorithm
- Achieved an increase of success rate from 41% to 61%, compared to **Q-Learning** baseline, the success rate is -0.07 from theoretical best probability. A blog with code was published officially and **added into MATLAB toolbox** [\[blog\]](#)

Machine Learning Research Engineer Intern, **AI TOPIA**, Beijing, China Sep 2021 - Jun 2022

- Proposed learning algorithms to optimize execution cost for intraday order placement optimization. Implemented 5 **model-free algorithms** and a **high frequency trading** environment
- Utilized advanced models including **DeepLOB** and **XGBoost** to improve the short-term prediction. Realized on average 2-ticks better price for tick-level order placement

Quant Analyst Intern, **Nomura Orient International Securities**, Shanghai, China Jul 2021 - Sep 2021

- Perfected our **FOF website platform**. Built **dashboard and SQL database** for metrics include style and systematic risk
- Realized a new feature in **MongoDB** and a **web crawler**, which has been **added to the department's core codebase**

Data Scientist, Intern, **Deloitte**, Beijing, China Aug 2020 - Oct 2020

- Completed a **web crawler** project and automatically produced formatted excel spreadsheet weekly
- Collaborated with data scientists on the **interactive data visualization**, preprocessed fundamental data for **business intelligence dashboard** products

PROJECT EXPERIENCE

Python Open-source Library Muax[\[code\]](#)

NY, United States

- Implemented variants of **MuZero** with **JAX/TensorFlow**, supported **distributed RL** and **distributed training**
- Integrated with DeepMind's **Acme** framework, compared **MCTS** search policies on **Open Spiel** multi-agent games (e.g., Go)

SLAMuZero[\[code\]](#)

NY, United States

- Enhanced **MuZero** perception with **SLAM** for **embodied AI**, experiment on Meta's **Habitat simulator**
- Realized comparable performance for indoor **exploration** tasks on Gibson dataset, with better sample efficiency

LLM Agent Navigation in VR Unity

NY, United States

TravelLLM

NY, United States

- Implemented website frontend with **open route service** instance running on server, realized completion and dropdown options features with **Google Maps API**
- Implemented LLM agent using **OpenAI's ChatGPT API** with **function calling** and **structured output** to add or remove waypoints

PRESENTATIONS

- Learn to Tour: Operator Design for Solution Feasibility Mapping, INFORMS, Phoenix, United States, 2023
- SLAMuZero: Plan and learn to Map for Joint SLAM and Navigation, ICAPS, Banff, Canada, 2024

HONORS AND AWARDS

Calatrava Family Fellowship

2024

PROFESSIONAL SERVICE

Reviewer

- Transportation Research Board
- Transportation Research Part C: Emerging Technologies

Workshop Organization

- Student Assistant, Urban Mobility AI Workshop, Columbia University, 2024
 - Developed and maintained workshop website with **HTML/CSS/JS**, Assisted in organization and coordination
 - Workshop URL: [\[Homepage\]](#)

TEACHING EXPERIENCE

Teaching Assistant, IEOR department, **Columbia University**, New York, NY

2023

- Graduate Optimization Models and Methods (IEOR E4004) instructed by Cedric Jozs
- Self-motivated to enhance final project on **Moving Object Detection**, created sample videos and code templates for quick start[\[summary\]](#)

TECHNICAL SKILLS

- Programming: Python, SQL, C++, C#, Java, MATLAB
- Development: HTML/CSS, JavaScript, Unity, XCode
- Machine Learning: JAX, PyTorch, TensorFlow, MuZero, Acme, OpenCV, LLM
- Data Science: Apache Spark, Docker, Airflow, MongoDB, Pandas, NumPy, SciPy
- Cloud Computing: AWS, GCP
- Others: Git, LaTeX, Linux, iOS