Bo Yu

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EDUCATION:

Worcester Polytechnic Institute (WPI), Worcester, MA — Aug 2022 - Dec 2024
Master of Computer Science
GPA 3.5 / 4.0

Beijing Jiaotong University (BJTU), Beijing, China — Sep 2012 - Jun 2016
Bachelor of Traffic Engineering
GPA 85.5 / 100

RESEARCH EXPERIENCE:

Leverage Multi-modal Data from Social Media for Real-time Detection and Analysis of Vehicle Crash
Research Assistant — Sep 2024 - Present
Department of Civil & Environmental Engineering, The University of Utah, Salt Lake City, UT
Principle Investigator: Prof. Chenxi Liu, PhD

- Scraped multi-modal data of vehicle crashes from Twitter, including images and texts
- Cleaned and analyzed scraped data to investigate data bias
- Built multiple visual instruction-tuning datasets for a visual foundation model of multi-task vehicle crash detection and analysis

Diffusion-based Entropy Regularization in Reinforcement Learning
Research Assistant — Jan 2024 - May 2024
Department of Data Science, College of William & Mary, Williamsburg, VA
Principle Investigator: Prof. Haipeng Chen, PhD

- Utilized diffusion models to enhance maximum entropy algorithms in reinforcement learning
- Avoided high variance estimation errors in Soft Q-Learning (SQL) and the oversimplification of action distributions in Soft Actor-Critic (SAC)
- Enabled precise representation of complex, multimodal action distributions without reducing training and sampling efficiency
- Achieved comparable performance to other state-of-the-art algorithms on the MuJoCo and D4RL

An Optimized Automated Car-following Control Model of CACC System
Research Assistant — Nov 2015 - Jun 2016
School of Traffic and Transportation, Beijing Jiaotong University, Beijing
Principle Investigator: Prof. Danjue Chen, PhD

- Proposed a novel car-following control model featuring an adjustable headway strategy and a new braking strategy based on the CACC system
- Optimized the CACC car-following control model to reduce traffic oscillation
- Simulated the optimized car-following control model with MATLAB

A Rule-based Signal Compensation Strategy for the Non-bus-priority Approaches
Research Assistant — Aug 2014 - Jul 2015
School of Traffic and Transportation, Beijing Jiaotong University, Beijing
Principle Investigator: Prof. Wenxin Qiao, PhD

- Proposed an innovative signal compensation strategy for non-bus priority approaches at intersections
- Simulated the signal compensation strategy using VISSIM and analyzed the results
- Established a traffic evaluation platform with C# to reflect real-time traffic efficiency using radar maps

REFEREED PUBLICATIONS:

Refereed Conference Proceedings

- **B. Yu** and C. Liu*. "Harnessing Generative Models for Equity in Transportation: A Survey", Proceedings of the 104th Annual Meeting of Transportation Research Board, Washington D.C. USA, Jan. 2025.

REFREE FOR JOURNALS AND CONFERENCES:

Conferences

- The 25th COTA International Conference of Transportation Professionals (CICTP2025)

RESEARCH INTERESTS:

Intelligent Transportation System (ITS), Generative Models, Reinforcement learning

ACADEMIC PROJECTS:

NextGen Attendance, WPI, Worcester, MA Sep 2023 - Dec 2023

- Developed an innovative mobile app in Android Studio using Kotlin to track class attendance
- Integrated facial recognition, activity tracking, and geolocation to prevent attendance fraud using Machine Learning Kit and Google Maps
- Enabled automated attendance verification through dynamic QR code scanning, attendance reporting, and customized check-in requirements
- Enhanced the scalability and reliability of the attendance system using Firebase

Offline Reinforcement Learning for Basketball Tactic Strategies, WPI, Worcester, MA Sep 2023 - Dec 2023

- Applied Reinforcement Learning (RL) techniques to enhance decision-making processes in professional basketball games
- Trained an offline DQN on historical NBA games, integrating offline RL and multi-modal representation learning to devise effective tactical strategies in basketball
- Achieved promising outcomes, demonstrating that the RL agent proposed more effective tactical strategies, resulting in final game scores comparable to those of elite NBA teams

Depression Alarm, WPI, Worcester, MA Jun 2023 - Nov 2023

- Trained and fine-tuned machine learning models to diagnose depression using CDC NHANES data
- Assessed model performance using classification reports, confusion matrices, and ROC curves, focusing on maximizing recall with a weighted F-score to ensure accurate detection of depression cases
- Optimized Stochastic Gradient Descent (SGD) classifiers to predict depression, achieving an 81% recall rate, the highest among multiple models
- Analyzed the most impactful features of depression using the coefficients from the fine-tuned Stochastic Gradient Descent (SGD) classifier models

Book & Movie Recommender for Reddit, WPI, Worcester, MA Sep 2022 - Dec 2022

- Developed a book and movie recommendation system for Reddit users
- Employed JavaScript with React for the front-end and Node.js for the back end to create a responsive and interactive user-friendly interface
- Incorporated Neural Collaborative Filtering to generate personalized recommendations based on user behaviors
- Utilized external APIs, including Amazon Web Services, Amazon, and Rotten Tomatoes, to source and store a diverse range of books and movies for recommendations

WORK EXPERIENCE:

Tianan Taxi and Transportation Company, Gansu, China Aug 2021 - Jun 2022

Transportation Consultant

- Led the transformation of traditional vehicle rental operations to an internet-based business model within the company

Tianhe Engineering and Construction Company, Gansu, China

Project Manager — Jan 2020 - Jul 2021

- Managed over six million Yuan worth of infrastructure construction projects in rural areas
- Completed all projects on time and 12% under budget
- Led multiple rural poverty alleviation projects, including:
  - Road paving initiatives
  - Construction of rural health centers
  - Renovation of teaching facilities in rural primary schools
  - Fruit greenhouse construction projects

Senior Engineer — Feb 2018 - Jan 2020

- Managed roadway engineering design projects (supervised a team of four engineers)
- Led engineering visualization initiatives across the company

Engineer — Oct 2016 - Feb 2018

- Collaborated with engineers and local agencies to resolve construction issues in rural areas
- Managed roadway design projects in rural areas

SKILLS:

Computer Science & Data Science

- **Programming Language:** C, C#, Python, JavaScript, Kotlin, R, SQL, MATLAB
- **Tool and Framework:** Android Studio, Visual Studio Code, Google Colab, AWS, MySQL, Oracle, PyTorch, Scikit-learn, React, Node.js, Git
- **Machine Learning & AI:** Transformers, Diffusion Models, Reinforcement Learning

Other Knowledge Domains

- **Math & Statistics:** Probability Theory, Linear Algebra, Calculus, Discrete Mathematics, Operations Research
- **Software:** Traffic Simulation Software (VISSIM, Synchro etc.)
- **Traffic Engineering:** Traffic Design, Traffic Planning, Traffic Flow Theory