Tianyue Zhou

tianyuez@mit.edu, zhoutianyue1@gmail.com | +86 13913830510, (617)4603149

Education

Massachusetts Institute of Technology (MIT) Sept 2025 - Present
*Ph.D. in Civil and Environmental Engineering; Advisor: Prof. Cathy Wu; GPA:**5.0/5.0*** *Cambridge, MA*

ShanghaiTech University Sept 2021 - June 2025
*B.Eng. in Computer Science; GPA: **3.75/4.0*** *Shanghai, China*

Massachusetts Institute of Technology (MIT) Sept 2023 - Dec 2023
*Undergraduate Exchange Student, Computer Science; GPA: **4.5/5.0*** *Cambridge, MA*

Research Interests

- **Machine Learning**: Reinforcement Learning, Multi-task Learning, Transfer Learning.

Publications

- **Expert with Clustering: Hierarchical Online Preference Learning Framework [paper]**
  ***Tianyue Zhou**, Jung-Hoon Cho, Babak Rahimi Ardabili, Hamed Tabkhi, Cathy Wu*
  Learning for Dynamics and Control Conference, 707–718
- **The Nah Bandit: Modeling User Non-compliance in Recommendation Systems [paper] [website] [code]**
  ***Tianyue Zhou**, Jung-Hoon Cho, Cathy Wu*
  IEEE Transactions on Control of Network Systems (Volume: 12, Issue: 4, Dec. 2025), 2919-2931
- **Structure Detection for Contextual Reinforcement Learning [paper] [website] [code]**
  ***Tianyue Zhou**, Jung-Hoon Cho, Cathy Wu*
  Proceedings of the AAAI Conference on Artificial Intelligence, 40(34), 29009–29016.

Research Experience

Massachusetts Institute of Technology *Cambridge, MA*
Undergraduate Research Assistant, Supervised by Prof. Cathy Wu, MIT LIDS

- **Online Preference Learning for Drivers** Sept 2023 - Jan 2024
  - **Objective**: Implement online learning algorithm in a travel route recommendation problem, aiming to rapidly capture user preferences and recommend personalized and eco-friendly travel routes.
  - Developed a novel contextual bandit framework, Expert with Clustering (EWC), leveraging hierarchical user information for rapid and accurate learning of user preferences, achieving a **27.57%** performance improvement over LinUCB baseline in experiments.
  - Proposed a distance metric, Loss-guided Distance, tailored for the online preference learning problem, which enhances the representativeness of centroids in clustering.
  - Established the regret bound of EWC, indicating superior theoretical performance compared to LinUCB.
- **Modeling User Non-compliance in Recommendation Systems** Jan 2024 - June 2025
  - **Objective**: Tackle a critical challenge often overlooked by traditional frameworks in physical-world recommendation problems: users can easily dismiss recommendations that do not appeal to them and revert to their baseline behavior.
  - Introduced a novel bandit problem–Nah Bandit–for modeling user non-compliance in recommendation systems. This framework offers the potential to accelerate preference learning compared to traditional frameworks.
  - Proposed a user non-compliance model to parameterize the anchoring effect in Nah Bandit, reducing the bias when learning user preference.
  - Combined the user non-compliance model with EWC, further efficiently utilizing non-compliance feedback and hierarchical information. Experimental results highlight that EWC achieves **at least 15.36%** performance improvement in multiple applications compared to both supervised learning and traditional bandits.
- **Structure Detection for Contextual Reinforcement Learning** Aug 2024 - Aug 2025
  - **Objective**: Extend model-based transfer learning approach to address multi-dimensional contextual reinforcement learning (cRL) problems.
  - Proposed SD-MBTL, a generic framework that detects underlying generalization structures and adapts task selection strategies accordingly.

- Developed M/GP-MBTL, an initialization of SD-MBTL that combines a clustering based approach and a Gaussian Process-based approach, tailored to different structural patterns in CMDPs.
- Validated on multi-dimensional real-world benchmarks, including robotics, eco-driving, and agriculture, showing significant gains in generalization and sample efficiency.

HONORS AND AWARDS

- ShanghaiTech **Outstanding Student** (2021-2022), Top $\mathbf{3}\% \sim \mathbf{7}\%$ *Dec 2022*
- ShanghaiTech **Outstanding Student Union Officer** (2021-2022) *Dec 2022*
- **Scholarship** for Undergraduate 3+1 Overseas Exchange Program, ∼$9,000 *June 2024*

MISCELLANEOUS

- **Programming Languages:** Python, C/C++, MATLAB
- **Tools:** PyTorch, Git, LaTeX, Markdown