

Zhiyu Zhang

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RESEARCH INTEREST

Theoretical aspects of machine learning and optimization. Specifically, I work on adaptive online learning, i.e., designing sequential decision making algorithms that optimally exploit problem structures.

EDUCATION

Boston University

PhD, Systems Engineering, advised by Ioannis Paschalidis and Ashok Cutkosky

2018 – 2023 (Expected)

Tsinghua University

BEng, Mechanical Engineering

2014 – 2018

Delft University of Technology

Undergraduate exchange student

Fall 2016

RESEARCH

Unconstrained Dynamic Regret via Sparse Coding

Zhiyu Zhang, Ashok Cutkosky, Ioannis Paschalidis

Preprint

- Generalizes static unconstrained OLO algorithms to the dynamic setting, by incorporating a dictionary prior.
- Improves our ICML 2022 paper to further achieve gradient adaptivity, through a new discretization argument.

Optimal Comparator Adaptive Online Learning with Switching Cost

Zhiyu Zhang, Ashok Cutkosky, Ioannis Paschalidis

NeurIPS 2022

- Also presented at ICML 2022 Workshop “Complex Feedback in Online Learning”.
- Improves the regret bound from our AISTATS 2022 paper to the optimal rate.
- Shows that the continuous-time framework from our ICML 2022 paper can reveal generalizable knowledge across different online learning settings.

PDE-Based Optimal Strategy for Unconstrained Online Learning

Zhiyu Zhang, Ashok Cutkosky, Ioannis Paschalidis

ICML 2022

- An unconstrained online learning algorithm with the optimal loss-regret tradeoff and leading constant optimality.
- Designed through a continuous-time framework, which requires less guessing than existing approaches.

Adversarial Tracking Control via Strongly Adaptive Online Learning with Memory

Zhiyu Zhang, Ashok Cutkosky, Ioannis Paschalidis

AISTATS 2022

- A new linear system controller that can provably track an adversarially generated target sequence.
- The key component is the first comparator adaptive online learning algorithm with switching costs.

Provable Hierarchical Imitation Learning via EM

Zhiyu Zhang, Ioannis Paschalidis

AISTATS 2021

- Also presented at ICML 2020 Workshop “Theoretical Foundations of Reinforcement Learning”.
- Under certain conditions, the Expectation-Maximization algorithm for Hierarchical Imitation Learning converges to a norm ball around the true model parameter.

AWARD

Top reviewer awards (~10%) at AISTATS 2022, ICML 2022, NeurIPS 2022

Dean’s Fellowship

College of Engineering, Boston University

2018 – 2019

Scholarship for Distinction in Academics

Tsinghua University

2014 – 2017

Scholarship for Outstanding Exchange Students

China Scholarship Council

2016

SERVICE

Conference reviewer: AISTATS 2021-2023, ICML 2022-2023, NeurIPS 2022, ALT 2023.

Subreviewer: NeurIPS 2020, L4DC 2020.

Journal reviewer: IEEE Transactions on Robotics (1 time), Journal of Machine Learning Research (1 time)

TEACHING AND MENTORING

Teaching Assistant

Boston University

2020 – 2021

- EK 381: Probability, Statistics, and Data Science for Engineers
- ME 366: Probability and Statistics for Mechanical Engineers
- ME 404: Dynamics and Control of Mechanical Systems

BU RISE program mentor

Boston University

Summer 2019

- Summer research program for high school students.