

# Ali Mortazavi

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## Summary

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PhD Candidate specializing in machine learning theory and game theory, with strong theoretical analysis skills and interest in applying theory to practical problems. My PhD focuses on incentive-compatible learning algorithms, robustness to data manipulation in classification, and sequential decision-making.

## Experience

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### PhD Research Assistant

Machine Learning Theory Group

Jan 2021 -

University of Victoria

- **Sequential Prediction with reputation maximizing expert advice** ([Event Lotteries Forecast](#), [FTPL](#), [Random Walk](#))

Co-designed a truthful algorithm for prediction with reputation maximizing experts with *arbitrary* preference for reputation over future rounds. This algorithm achieves  $\tilde{O}(\sqrt{TN})$  regret for full-information and  $\tilde{O}(T^{2/3}N^{1/3})$  for bandits feedback model for  $T$  rounds and  $N$  experts. This work has implications for designing online forecasting mechanisms in which experts gain no advantage by gaming the system.

- **Exploring the Price of Truthfulness in Bandits** ([Information Elicitation](#), [Incentives](#), [Multi-armed Bandits](#))

Proved a worst-case  $\Omega(T^{2/3})$  regret lower bound for one of the primary strategy-proof bandit algorithm. This implies the commonly used estimated losses for arms coupled with incentive-compatible weight updates could lead to sub-optimal regret bound. [Published in AISTATS 2024.](#) [🔗](#)

- **Adaptive decision making and group fairness** ([FTRL](#), [Anytime regret](#), [Fairness](#))

Characterized the loss pattern with minimum regret for the anytime version of the multiplicative weight algorithm (with no access to the time horizon.) Improved the understanding of how online algorithms can maintain fairness across groups in adaptive decision-making, even without access to the group sizes in advance. [Published in NeurIPS 2021.](#) [🔗](#)

### Amirkabir University of Technology

Bachelor's Project

Jan 2017 – September 2017

Tehran, Iran

- **Edge-Reusable Traveling Salesman Problem Optimization** ([Graph](#), [Genetic Algorithms](#), [Simulated Annealing](#))

Designed genetic and simulated annealing algorithms for a variant of the Traveling Salesman Problem (TSP) where edges can be reused at a reduced cost. Encoded traveling paths as ordered vertex sets and introduced operations for path conversion. Evaluated heuristic performance by comparing against optimal solutions obtained via Integer Linear Programming on small graphs. [\(Code and Report\)](#) [🔗](#)

## Applied Machine Learning Projects

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- **Image Denoising and Segmentation** ([report](#) [🔗](#)) ([Python](#), [Markov Random Fields](#), [Image Processing](#))

Optimized image denoising and segmentation with Simulated Annealing and Markov Random Fields. Compared performance across HSV, RGB, and Grayscale color spaces.

- **Text Summarization** ([report](#) [🔗](#)): ([Python](#), [TensorFlow](#), [NLP](#))

Developed a graph-based text summarization method using word2vec and PageRank. Evaluated the performance with word-level and sentence-level representations using ROUGE metrics.

## Internship

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### Shanghai University of Finance and Economics

Research Internship at Institute for Theoretical Computer Science

Shanghai, China

August 2019 – September 2019

- Hosted by [Prof. Nick Gravin](#) ([Online Stochastic Matching](#), [Competitive Ratio](#), [Primal-Dual](#))
- [Project](#) [🔗](#): Worked on Online Stochastic Matching for a general graph model under Bernoulli edge arrivals. Focused on developing and analyzing algorithms intended to exceed the traditional  $1/2$  competitive ratio, by using primal-dual framework.

## Publications

- Junpei Komiyama, Nishant Mehta, and Ali Mortazavi. “No-regret incentive-compatible online learning under exact truthfulness with non-myopic experts”
- Ali Mortazavi, Junhao Lin, and Nishant Mehta. “On the price of exact truthfulness in incentive-compatible online learning with bandit feedback: a regret lower bound for WSU-UX.” International Conference on Artificial Intelligence and Statistics. PMLR, 2024. (AISTATS 2024)
- Cristóbal Guzmán, Nishant Mehta, and Ali Mortazavi. “Best-case lower bounds in online learning” Advances in Neural Information Processing Systems 34 (2021). (NeurIPS 2021) (Link to the presentation)

## Education

<b>University of Victoria</b> <b>Ph.D.</b> Computer Science, <ul style="list-style-type: none"><li>• Research focus: Online Learning and Game Theory</li><li>• Supervised by Prof. Nishant Mehta</li><li>• Publications: NeurIPS and AISTATS</li><li>• Coursework: Online Learning, Collective Decision Making, Algorithms for Convex Optimization, Statistical Machine Learning Theory.</li></ul>	Victoria, BC, Canada Jan 2021 – Expected Aug 2026
<b>Amirkabir University of Technology</b> <b>M.Sc.</b> Artificial Intelligence, <ul style="list-style-type: none"><li>• Coursework: Statistical Natural Language Processing, Probabilistic Graphical Models, Big Data Analytics</li></ul>	Tehran, Iran Sept 2017 – Sept 2020
<b>Amirkabir University of Technology</b> <b>B.Sc.</b> Computer Software Engineering,	Tehran, Iran Sept 2013 – Sept 2017

## Service

Reviewer for ICML 2025, AISTATS 2025, NeurIPS 2024

## Technical Skills

**Languages:** Python, Java, C++  
**Frameworks:** NumPy, Pandas, Matplotlib, TensorFlow

## Teaching Experience

<b>Teaching Assistant</b> Computer Science Department	Jan 2021 - University of Victoria
<ul style="list-style-type: none"><li>• <b>Notable Responsibilities:</b> Designed and Taught labs and tutorials, helped prepare new TAs with teaching tasks</li><li>• <b>Courses:</b> Algorithms and Data Structure II, Theory of Computation, Data Mining, Collective Decision-Making, Advanced Data Structure and Optimization, Machine Learning Theory.</li></ul>	

## Awards

• University of Victoria Graduate Awards for Top-Performing Students	2021-2024
• University of Victoria Graduate TA Award	2021-2024
• Charles S. Humphrey Graduate Student Award	2022
• UVic PhD Fellowship Award	2021-2022
• Ranked 3rd (out of 100) in terms of Cumulative GPA among students of computer engineering, 2013 Entrance	2017
• Awarded direct admission to the M.Sc. program in Artificial Intelligence at Amirkabir University of Technology as a Talented Undergraduate Student	2017

## Research Interest

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|-------------------------|---------------------------|
| • Online Learning       | • Algorithmic Game Theory |
| • Randomized Algorithms | • Mechanism Design        |