

Vanshaj Khattar

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Research Interests

My research interests lie at the intersection of **machine learning**, **reinforcement learning**, **optimization**, and **control**. I am interested in how we can achieve trustworthy reinforcement learning algorithms that are **safe**, **explainable**, and can continually adapt to non-stationarity in the real world.

Education

Virginia Polytechnic Institute and State University (Virginia Tech)

PH.D. ELECTRICAL ENGINEERING

- Advisor: Dr. Ming Jin

Blacksburg, VA

August 2021 - May 2026

Virginia Polytechnic Institute and State University (Virginia Tech)

MS ELECTRICAL ENGINEERING

- Advisor: Dr. Azim Eskandarian

Blacksburg, VA

August 2019 - May 2021

Delhi Technological University

B.TECH ELECTRICAL AND ELECTRONICS ENGINEERING

- CGPA: 8.09/10.0

New Delhi, India

August 2014 - May 2018

Publications

CONFERENCE PUBLICATIONS

Khattar, V., Ding, Y., Sel, B., Lavaei, J. and Jin, M., “A CMDP-within-online framework for Meta-Safe Reinforcement Learning”. In The Eleventh International Conference on Learning Representations (ICLR 2023 Spotlight)

Khattar, V. and Jin, M., “Winning the CityLearn challenge: adaptive optimization with evolutionary search under trajectory-based guidance”. In Proceedings of the (AAAI 2023 — AI for Social Impact track).

Jin, M., **Khattar, V.**, Kaushik, H., Sel, B. and Jia, R., “On solution functions of optimization: universal approximation and covering number bounds”. In Proceedings of the (AAAI 2023).

Meimand, M., **Khattar, V.**, Yazdani, Z., Jazizadeh, F., Jin, M., “TUNEOPT: An Evolutionary Reinforcement Learning HVAC System Controller For Tuning Energy-Comfort Optimization Formulations”. (BuildSys 2023).

Khattar, V. and Eskandarian, A., “Stochastic predictive control for crash avoidance in autonomous vehicles based on stochastic reachable set threat assessment”. In ASME (IMECE 2021).

Khattar, V. and Eskandarian, A., “Reactive online motion re-planning for crash mitigation in autonomous vehicles using bezier curve optimization”. In ASME (IMECE 2020).

Valluru, S.K., Singh, M., Singh, M. and **Khattar, V.**, “Experimental validation of PID and LQR control techniques for stabilization of cart inverted pendulum system”. In IEEE International Conference on (RTEICT 2018).

IN REVIEW

Sel, B., Al-Tawaha, A., **Khattar, V.**, Wang, L., Jia, R. and Jin, M., Algorithm of thoughts: Enhancing exploration of ideas in large language models. arXiv preprint arXiv:2308.10379.

Khattar, V. and Jin, M., “Optimization Solution Functions as Deterministic Policies for Offline Reinforcement Learning”. (Under review. [Link](#))

JOURNAL PUBLICATIONS

Khattar, V. and Eskandarian, A., “Stochastic reachable set threat assessment for autonomous vehicles using trust-based driver behavior prediction”. SAE International Journal of Connected and Automated Vehicles.

Awards & Scholarships

2023	AAAI 2023 travel scholarship., AAAI	\$ 750
2022	Member of the winning team ROLEVT at CityLearn challenge 2021.(ROLEVT team),	\$ 1500
2021	Second position in 2021 Torgersen Graduate Student Research Excellence Award for MS Oral presentation. (Link), Virginia Tech	\$ 500

Presentations

Spring, 2023. *Offline Actor-Critic with Optimization Policies for Demand Response and Urban Energy Management*. PEC Conference at Virginia Tech.

Spring, 2022. *Winning the CityLearn Challenge with Optimization as RL Policies*. PEC Conference at Virginia Tech.

Spring, 2023. *Trustworthy Reinforcement Learning*. Presented to 150+ undergraduates in the undergraduate engineering research seminar, Fall 2022

Technical Skills

Programming languages. Python, C, MATLAB, HTML

Frameworks. PyTorch, Tensorflow, cvxpy, NumPy, Pandas

Peer-Review

Conference reviewer. AISTATS 2022, 2023, 2024