Mazdak Teymourian

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Summary

Recently graduated Computer Engineering student from Sharif University of Technology, Physics Olympiad silver medalist, and machine learning researcher. Co-first author of two papers, including ICML 2026 and a manuscript under review at AAAI 2027. Research spans adversarial robustness, interpretability, model representations, and generalization, with additional work on NTK-based approaches to characterizing learned concepts in neural networks. Extensive coursework and teaching experience in DL, RL, learning theory, and optimization.

Education

Sharif University of Technology, Tehran, Iran *2022–2026*
B.Sc. in Computer Engineering **GPA:** 19.25/20 | **Major GPA:** 19.34/20
Selected Coursework: Machine Learning (20/20), Artificial Intelligence (20/20), Linear Algebra (20/20), Probability & Statistics (20/20), Numerical Computation (20/20), Stochastic Processes (20/20), Algorithm Design (20/20), Deep Reinforcement Learning (19.9/20), Machine Learning Theory (18.9/20), Convex Optimization (18.3/20; class avg. 15.4/20).

Allameh Helli School, Tehran, Iran *2016–2022*
National Organization for Development of Exceptional Talents (NODET)
Diploma in Mathematics and Sciences **GPA:** 19.61/20

Research Interests

- Trustworthy Machine Learning
- Interpretability of Machine Learning
- Reinforcement Learning
- Theory of Machine Learning

Selected Publications & Research

SORA: Free Second-Order Attacks in Fast Adversarial Training
Mazdak Teymourian*, Ramtin Moslemi*, Farzan Rahmani, Mohammad Hossein Rohban
ICML 2026 — Accepted | Paper | Code
Co-first author. Developed SORA, a second-order approach to fast adversarial training that achieved state-of-the-art performance in robust and clean accuracy, efficiency, and generalization.

Understanding Decision-Making Mechanisms in Neural Routing Solvers
Fatemeh Askari*, **Mazdak Teymourian***, Mohammad Izadi, Mahdieh Soleymani Baghshah
AAAI 2027 — Under Review
Co-first author. Mechanistic interpretability study of transformer-based neural combinatorial optimization (NCO) solvers using behavioral analysis, probing, geometric analysis, and activation patching on TSP and CVRP.

Research Experience

Research Assistant *2026–Present*
Machine Learning Lab (MLL), Sharif University of Technology — Supervised by Dr. Mahdieh Soleymani
- Investigated decision-making mechanisms in transformer-based neural routing solvers, including LEHD and POMO, on TSP and CVRP using attention analysis, probing, behavioral experiments, trajectory analysis, and activation patching.
- Developed hypotheses from attention, representation, and geometric analyses, including lookahead-based decision making in LEHD, a shared representation of node embeddings across decision steps and instances, and a systematic clockwise tour-construction tendency in POMO.
- Designed activation-patching experiments using mean ablation of current- and start-node embeddings and controlled replacement of start-node embeddings with nodes at specified angular offsets; co-wrote the resulting AAAI 2027 manuscript and designed the main and supporting figures.

Research Collaborator *2025–Present*
Remote collaboration with Dr. Seyed-Mohsen Moosavi-Dezfooli (Apple), Dr. Mahed Abroshan (Alan Turing Institute), and Dr. Mohammad Sabokrou (OIST)
- Proposed using Neural Tangent Kernels (NTK) as an interpretability tool to characterize hidden model invariances and sensitivities and identify associated eigenfunctions, investigating the intersection of interpretability, robustness, and generalization.
- Implemented experiments on orthogonal adversarial directions, data memorization, and spurious correlations across vision and language datasets; preliminary results show that the approach can identify model invariances, sensitivities, and associated eigenfunctions.

Research Assistant *2024–2026*
Robust and Interpretable Machine Learning Lab (RIML), Sharif University of Technology — Supervised by Dr. Mohammad Hossein Rohban

- Analyzed catastrophic overfitting in fast adversarial training and identified its strong dependence on perturbation step size, motivating a second-order approach to fast adversarial training.
- Conceived SORA and developed its efficient second-order step-size estimation by using gradients evaluated at nearby input points to approximate input-space curvature via a Taylor expansion; derived the optimal step-size approximation and theoretical connection between PertAlign and loss-landscape curvature.
- Implemented SORA and the majority of competing methods (~13 baselines), evaluating them across 6 datasets and 4 architectures and empirically identifying a configuration-independent set of SORA hyperparameters.

Honors & Achievements

34th National Physics Olympiad — Silver Medalist *2021*
Among approximately 10,000 participants; only 40 students received medals. The competition covered university-level mathematics and physics, including calculus, differential equations, data analysis, mechanics, electromagnetism, optics, special relativity, modern physics, thermodynamics, and statistical mechanics.

Top 0.2% — National University Entrance Examination (Konkour) *2022*
Placed in the top 0.2% nationwide in Iran's highly competitive university entrance examination.

Teaching & Mentoring

Teaching Assistant, Sharif University of Technology *2023–2026*

- Served as a TA for 10 courses spanning artificial intelligence, machine learning, deep learning, reinforcement learning, optimization, mathematics, game theory, computer simulation, and computer engineering.
- Designed and graded both theoretical and programming assignments and conducted TA classes covering course material and solving practice problems.

Courses: Artificial Intelligence, Machine Learning, Deep Learning, Deep Reinforcement Learning, Convex Optimization, Linear Algebra, Probability & Statistics, Game Theory, Computer Simulation, Logical Circuit Design.

Physics Olympiad Instructor, Allameh Helli School *2022*
Designed and graded Physics Olympiad problems in mechanics and electrostatics and conducted laboratory sessions covering physics experiments.

Selected Academic Projects

Non-Stationarity in Reinforcement Learning *2026*
Deep Reinforcement Learning — Course Project / Course

- Surveyed research on RL under evolving dynamics, including non-stationary MDPs, dynamic regret, and adaptation methods.
- Synthesized and presented the literature through a research poster, slide presentation, and video; developed a companion technical blog and poster.

MIPS Processor Design and Implementation *2024*
Computer Architecture — Course Project [Code]

- Designed and implemented a MIPS processor architecture in Quartus, including registers, RAM/ROM memories, an ALU, and support for a range of instructions from basic arithmetic to more advanced operations.
- Implemented single-cycle, multi-cycle, and pipelined processor structures and executed machine-code programs stored in ROM, including a Fibonacci-sequence program.

Stronghold Crusader 2 Game Design and Implementation *2023*
Advanced Programming — Course Project [Code]

- Developed a Java-based recreation of Stronghold Crusader 2 with a graphical interface and multiplayer functionality as a team project using Git.
- Architected the system using the Model–View–Controller (MVC) pattern and clean-code principles, including single-responsibility design; implemented A* shortest-path search for troop movement.

Technical Skills

Programming: Python, C++, C, Java
ML / Scientific Computing: PyTorch, TensorFlow, NumPy, scikit-learn
Tools: Linux, Git, LaTeX
Languages: Farsi (Native), English (Professional)