Arshia Soltani Moakhar

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Education

Sharif University of Technology **September 2019 – Present**

Bachelor of Science in Computer Engineering *Tehran, Iran*

- Overall GPA: 18.42/20.00
  Last two years: 19.51/20.00
- Major GPA: 18.96/20.00
  Last two years: 19.89/20.00

Publications and Preprints

- **A. Soltani Moakhar**, M. Azizmalayeri, H. Mirzaei, M.T. Manzuri, M.H. Rohban, "Seeking Next Layer Neurons' Attention for Error-Backpropagation-Like Training in a Multi-Agent Network Framework," *Submitted to ICML 2024 Conference*, 2024, (arXiv).
- H. Mirzaei, M. Jafari, H.R. Dehbashi, A. Ansari, S. Ghobadi, M. Hadi, **A. Soltani Moakhar**, M. Soleymani Baghshah, M.H. Rohban, "RODEO: Robust Out-of-Distribution Detection Via Exposing Adaptive Outliers," *Submitted to ICML 2024 Conference*, 2024, (OpenReview).
- **A. Soltani Moakhar***, E. Iofinova*, D. Alistarh, "SPADE: Sparsity-Guided Debugging for Deep Neural Networks," *NeurIPS ATTRIB Workshop, Submitted to ICML 2024 Conference*, 2024, (arXiv)(OpenReview).
- M. Azizmalayeri, **A. Soltani Moakhar**, A. Zarei, R. Zohrabi, M.T. Manzuri, M.H. Rohban, "Your Out-of-Distribution Detection Method is Not Robust!," *Advances in Neural Information Processing Systems 36*, 2022, (NeurIPS 2022).
- M. Jabbarishiviari, **A. Soltani Moakhar**, "Software 1.0 Strengths for Interpretability and Data Efficiency," *ICLR, Tiny Papers*, 2024, .

Research Interests

- Deep Learning
- Adversarial Robustness
- Interpretability in Deep Learning
- Sparse Neural Networks
- Out-of-Distribution Detection
- Game Theory

Research Experience

Internship in Interpretability and Sparsity in Deep Neural Networks **Feb 2023 - Sep 2023**

Institute of Science and Technology Austria (IST Austria)

Supervised by: Prof. Dan Alistarh

- **Sparsity-Guided Debugging for Deep Neural Networks (arXiv)**

  I enhanced the performance of various interpretability methods by sparsifying the network on a selected sample, before applying the interpretability method. This approach increases the performance of saliency maps and feature visualizations. I wrote all the codes, designed and conducted a human experiment, and discovered the theory behind the interpretability enhancement.

Research Assistant in Robust and Interpretable Machine Learning Lab **Aug 2021 - Present**

Sharif University of Technology

Supervised by: Prof. Mohammad Hossein Rohban

- **Robust Out-of-Distribution (OOD) Detection Using GAN Architecture (NeurIPS 2022)**

  Initially, I identified vulnerabilities in existing Robust OOD detection methods to end-to-end adversarial attacks. Subsequently, we proposed an OOD detection algorithm inspired by Generative Adversarial Network (GAN) architecture and adversarial training.

- **Aligning Self-Interested Neurons in Deep Neural Networks (arXiv)**

  I studied neurons as self-interested agents, which makes the neural network a multi-agent system. I introduce a neural objective function that incentivizes neurons to behave similarly to error-backpropagation while the network shows the benefits of multi-agent systems.

Honors and Awards

2022 International Collegiate Programming Contest **(ICPC)** World Final participation

2020 **First Place** in Sharif CodeJam

2019 **Silver Medal** in International Olympiad of Informatics (IOI)

2019 **Bronze Medal** in International junior competitive programming competition, infO(1)CUP

2019 **First Team** in the 7^{th} Ferdowsi Collegiate Programming Contest

2018 **First Place** in Iranian National Olympiad of Informatics

2017 **Silver Medal** in Iranian National Olympiad of Informatics

Teaching Experience

Teaching Assistant — **Spring 2023**

Sharif University of Technology

Teaching Assistant for Machine Learning course lectured by Prof. Abolfazl Motahari.
Taught Jupyter, NumPy, Matplotlib, and PyTorch to the course students.
Designed and graded four course assignments.

National Committee Member — **Aug 2020 - Present**

Iranian National Olympiad in Informatics

Proposed and selected algorithmic problems for Iran's National Olympiad in Informatics, specifically for summer camp exams and IOI team selection tests.
Proposed and selected combinatorial problems for Iran's National Olympiad in Informatics.
Instructed and consulted Iranian gold medalists and IOI team members in competitive programming.
Graph theory lecturer in Olympiad of Informatics national summer camp.

Scientific Committee Member — **Feb 2021 - Sep 2021**

Rasta NGO

Designed online workshops in Game Theory for high school students.
Taught the optimal kidney exchange problem and fair profit distribution in a workshop.

Related Coursework

Sharif University

Artificial Intelligence	20.0/20.0
Machine Learning	20.0/20.0
Adv Information Retrieval(NLP)	19.9/20.0
Introduction to Bio informatics	20.0/20.0
Medical Image Processing	18.9/20.0
Discrete Structures	20.0/20.0
Design of Algorithms	20.0/20.0
Game Theory	20.0/20.0
Linear Algebra	18.8/20.0
Eng Probability & Statistic	18.2/20.0

Online Courses

Deep Learning Specialization	DeepLearning.AI
Practical Reinforcement Learning	HSE university
Generative Adversarial Networks	DeepLearning.AI
Introduction to Deep Learning 11-785	CMU University
Game Theory I, II	Stanford University

Skills

Programming	Python | R | Java | C | C++ | SQL | Bash | LaTeX| Racket | CUDA
Frameworks	PyTorch | Tensorflow, Keras | NumPy | Pandas | Scikit-Learn | Matplotlib | Jupyter | Django
Languages	Persian: Native | English: TOEFL iBT Score 106