Arman Zarei

azarei@umd.edu | LinkedIn | Github | Homepage | Scholar

Education

- **University of Maryland, College Park** — Maryland, USA
  Ph.D. in Computer Science - Advised by Prof. ***S. Feizi*** — *Aug. 2023 - Present*
  GPA: ***4.0/4.0***

- **Sharif University of Technology** — Tehran, Iran
  B.Sc. in Computer Engineering — *Sep. 2018 - Feb. 2023*
  GPA: ***19.29/20*** *(3.98/4.00) - ranked among the top ten*
  GPA of last four semesters: 19.87/20 (4.00/4.00)

- **Shahid Soltani High School** (NODET) — Karaj, Iran
  Diploma in Mathematics and Physics — *Sep. 2014 - June 2018*

Research Interests

Generative Models, Computer Vision, 3D Vision, Adversarial Robustness, Deep Learning

Publications

- **Understanding and Mitigating Compositional Issues in Text-to-Image Generative Models**
  A Zarei, K Rezaei, S Basu, M Saberi, M Moayeri, P Kattakinda, S Feizi — *Under Review - NeurIPS 2024*

- **Enhancing Epileptic Seizure Detection with EEG Feature Embeddings**
  A Zarei, B Zhu, M Shoaran — *IEEE BioCAS 2023 (Oral)*

- **Improving Adversarial Training Through the Lens of Out-of-Distribution Detection**
  M Azizmalayeri, A Zarei*, A Isavand, MH Rohban* — *CSICC 2023*

- **Your Out-of-Distribution Detection Method is not Robust!**
  M Azizmalayeri, A Soltani Moakar, A Zarei, R Zohrabi, MT Manzuri, MH Rohban — *NeurIPS 2022*

Please refer to Google Scholar for other publications.

Research Experience

University of Maryland, College Park — Maryland, United States

- *Research Assistant - Generative Models* — *Aug 2023 - Present*
  Supervisor: Prof. ***S Feizi***
  - Enhancing image editing capabilities in Text-to-Image Generative Models
  - Enhancing the compositional abilities of Text-to-Image Generative Models, specifically Diffusion Models
  - Exploring the interpretability of diffusion models and analysis of failure cases

École Polytechnique Fédérale de Lausanne (EPFL) — Lausanne, Switzerland

- *Research Assistant* ***(Summer Internship)*** *- Machine Learning and Signal Processing* — *July 2022 - June 2023*
  Supervisor: Prof. ***M Shoaran***
  - Seizure detection using EEG recordings of brain activity and domain adaptation

Sharif University of Technology — Tehran, Iran

- *Research Assistant - Robustness in Deep Learning* — *Apr. 2021 - Jan. 2023*
  Supervisor: Prof. ***MH Rohban***
  - Robust out-of-distribution detection
  - Improving adversarial training using data-centric approaches

University of Arizona — Arizona, United States

- *Research Assistant* ***(Summer Internship)*** *- 3D Vision* — *July 2021 - Sep. 2021*
  Supervisors: Prof. ***TL Swetnam****, Prof.* ***E Lyons***
  - Lettuce soil point cloud segmentation

Academic Services

- **Conference Reviewer**, ICLR 2024 - ICML 2024
- **Backend Lead**, Sharif AI Challenge, Iran's Largest AI Competition — *2021*
  - Managed the entire software development lifecycle, including architecture, solution design, and maintenance.

Selected Academic Projects

- **Image Generative Models - PyTorch Implementation from Scratch**: source-code
  A PyTorch implementation (from scratch) of various image generative models — Diffusion Models, GANs, VAEs, and Autoregressive Models — with detailed explanations, visualizations, and key mathematical formulas for deeper understanding of the models.
- **Improve Seizure Detection using Adaptive Learning**: source-code
  Designed and implemented pipelines for adaptive learning with tunable parameters concerning seizure detection using EEG signals (neural activities of brain) - Compared and analyzed the results of various models and methods - Developed tools to facilitate and accelerate the seizure detection procedure at different stages
- **3D Lettuce Soil Point Cloud Segmentation**: source-codes: 1 - 2 - 3
  Designed and implemented containerized (dockerized) pipelines for both annotating point clouds and training models for soil/lettuce point cloud segmentation - Developed tools to facilitate the aforementioned procedure at various stages
- **Selected Course Projects**:
  Image Processing: link | Machine Learning: link | Modern Information Retrieval: link | Compiler Design: link
- **Others**: Github

Work Experience

- **Sotoon**
  Software Engineer *Jan. 2022 - Apr. 2022*
  - A company providing Cloud and AI services
  - Project: Designed a Human Resource Management System
  - Technologies: Python, Django, Docker, HTML/CSS, Javascript, jQuery, Bootstrap
- **Snappfood**
  Software Engineer *Aug. 2020 - Feb. 2021*
  - Leading online food ordering company in Iran
  - Back-End Developer in Menu Squad - Maintained menu APIs and designed new features
  - Technologies: PHP, Symfony, MySQL, Redis, Elasticsearch, Docker, RabbitMQ, HTML/CSS/Bootstrap, JS/jQuery

Teaching Assistant Experience

- **Algorithms** *Fall 2023*
- **Machine Learning | Artificial Intelligence | Probability and Statistics** *Fall 2022*
- **Artificial Intelligence | Technical Presentation** *Spring 2022*
- **Artificial Intelligence | Design of Algorithms** *Fall 2021*
- **Design of Algorithms** *Spring 2021*
- **Compiler Design | Data Structures and Algorithms | Advanced Programming** *Fall / Spring 2020*

Relevant Coursework

- **Machine Learning**: 20/20
- **Artificial Intelligence**: 20/20
- **Advanced Information Retrieval**: 19.9/20
- **Advanced Computer Graphics**: 4.0/4.0 (A^+)
- **Foundations of Deep Learning**: 4.0/4.0 (A^+)
- **Calculus 2 (Vector Calculus)**: 19.9/20
- **Design of Algorithms**: 20/20
- **Image Processing**: 19.4/20
- **Visual Learning and Recognition**: 4.0/4.0 (A^+)
- **Advanced Numerical Optimization**: 4.0/4.0 (A^+)
- **Stanford CS229 - Machine Learning** (online, audited)
- **Stanford CS231n - Deep Learning for Computer Vision** (online, audited)
- **Generative Adversarial Networks (GANs) Specialization** (Coursera)

Technical Skills

- **Programming Languages**: Python, Java, C/C++, PHP, JavaScript, Golang
- **Machine Learning Libraries**: PyTorch, NumPy, Diffusers, Transformers, OpenCV, Scikit-Learn, Pandas, ...
- **Web Development & Database**: Laravel, Symfony, Django, NodeJS, ExpressJS, Wordpress, React, HTML/CSS, jQuery, Bootstrap, MySQL, Redis, MongoDB, Elasticsearch, RabbitMQ, ...
- **Hardware Design**: Quartus, Arduino, Proteus, ModelSim, Verilog, MIPS Assembly
- **Miscellaneous**: Docker, Git, Linux,

Honors and Awards

- Ranked **1st** in different Front & Back Development Contests (by SnappTrip, CodeCup, Edalat-Khaneh)
- Ranked **2nd** in the Provincial Chess Tournament
- Ranked among the top **1**% in the Nation-Wide University Entrance Exam

Languages

- **Persian**: native
- **English**: proficient (TOEFL 113: W30, S29, R27, L27)