YALDA SHABANZADEH

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EDUCATION

Sharif University of Technology (SUT) *Sep. 2019 - Jul. 2024*
B.Sc. in Computer Engineering
GPA: 19.13/20

National Organization for Development of Exceptional Talents (NODET) *2016 - 2019*
High School Diploma, Physics and Mathematics
GPA: 19.78/20

RESEARCH INTERESTS

. **Efficient Deep Learning**: LLM Training & Inference, Quantization, Sparsification

. **Optimizing Learning Systems**: Generalization, Robustness, & Transfer Learning

RESEARCH EXPERIENCES

Alistarh Group, ISTA Austria
Research Intern under the supervision of Prof. Dan Alistarh *Jul. 2024 - present*

· Improved an LLM compression algorithm (GPTQ) by optimizing its parameters via gradient descent
· Used FSDP to handle CUDA memory

Image and Visual Representation Lab, EPFL Lausanne, Switzerland
Research Intern under the supervision of Prof. Sabine Süsstrunk *Jul. 2023 - Sep. 2023*

· Performed data labeling for a comic dataset using Segment Anything (SAM).
· Used Mask2Former as the mask classification method and Deeplabv2 as the per-pixel classification method. Implemented dataset registration and fine-tuning by freezing different parts of the models in the Detectron2 framework.
· [GitHub]

Visual Intelligence for Transportation, EPFL Lausanne, Switzerland
Research Intern under the supervision of Prof. Alexandre Alahi *Jul. 2022 - Nov. 2022*

· Used optical flow methods to convert Video to 1-D signal for sudden movement detection in Videos to detect Rapid Eye Movement Behavior Disorder.
· Explored different anomaly detection methods and used Isolation Forest for detecting anomalies in converted signals.
· Explored domain adaptation methods & conducted fine-tuning unsupervised keypoint detection methods on an infrared dataset.
· [GitHub]

Robust/Interpretable ML Lab, SUT Tehran, Iran
Bachelor's thesis under the supervision of Prof. Mohammad Hossein Rohban *Oct. 2023 - Present*

· Trained the diffusion model (score-based SDE) to generate images on different domains and conduct domain generalization.
· Trained RetinaNet to detect mitotic cells on the generated images from the diffusion model.

Research Projects, SUT Tehran, Iran
Volunteer Research

Optimizing Adversarial Training through High-to-Low Resolution Mapping *June - Sep. 2023*
· Optimized a specific adversarial training setting by mapping high-res data to low-res equivalents with various low-rank decomposition techniques.

Generalized localized Anomaly Detection *Feb. - Jun. 2022*

· Explored state-of-the-art methods and addressed challenges in localized anomaly detection across CIFAR and MVTecAD datasets.

AWARDS AND SCHOLARSHIPS

ISTernship, Insititute of Science and Technology Austria *Mar. 2024*
Awarded ISTA Summer Internship Scholarship

Summer@EPFL Internship Program Admission *Dec. 2022*
Top 1.5% among applicants and awarded a fellowship

Summer@EPFL Internship Program Admission *Dec. 2021*
Top 2% among applicants and awarded a fellowship

Ranked top 10% among the 199 B.Sc students of the Computer Engineering Department at Sharif University

Ranked 106th out of +150,000 undergraduate applicants in the National University Entrance Exam.

WORK EXPERIENCES

Software Engineer at Yektanet - Part Time Tehran, Iran
Primer Online Advertising Platform in Iran *Jan. 2021 - Sep. 2021*

. Developed a versatile platform for email and SMS advertising, facilitating targeted outreach.
. Designed a Kafka-based solution for efficiently transferring user-based email events, enhancing data flow within the system.
. Conducted load balancing by modeling the system with graphs, reducing the server load with this proposed approach.

TEACHING EXPERIENCES

Teaching Assistant, *Department of Computer Engineering, Sharif University of Technology*

. **Machine Learning:** Holding TA sessions for teaching course materials & grading assignments
. **Modern Information Retrieval:** Designing & grading assignments and final project
. **Artificial Intelligence (×3):** Designing & grading assignments and final project
. **Linear Algebra:** Designing & grading assignments and final project
. **Probability and Statistics:** Designing & grading assignments

SELECTED PROJECTS

Web Search Engine, GitHub *Numpy, Transformers, Django*
Created a system for crawling, searching, classifying, and clustering web pages with different NLP-based methods, query expansion, and analyzing search results.

Reinforcement Learning Course Projects, GitHub *PyTorch, Gym*

· PPO vs. DDPG training & comparison on the Pendulum environment.
· ϵ-Greedy, UCB, and Thompson Sampling algorithms for 2-armed bandit with gaussian distribution.
· Implemented a MCTS planning and used it to solve a Gym environment.
· Implemented Soft Actor Critic (SAC) on the CartPole environment in online and offline settings

Robust Cut-Paste, GitHub *PyTorch*
Implemented robust training of a Cut-Paste, which is a self-supervised learning method for anomaly detection and localization, on MVTecAD dataset.

Vision in Smart Home, GitHub *TensorFlow, OpenCV*
Use vision methods for hand gesture detection and created a real-time Raspberry Pi-based system and subsequent action execution.

Machine Learning Course Projects, GitHub *PyTorch, TensorFlow, Numpy*

. **Image Captioning**, Implement a RNN to caption Flickr images, using features extracted from ResNet50.
. **NN from Scrath**, Implemented Neural Networks & training pipelines from scratch.

SELECTED COURSES

Sharif University of Technology, Selected, * Graduate Course

* Machine Learning (20.0/20)
. Modern Information Retrieval (20.0/20)
. Signals and Systems (19.7/20)
. Probability & Statistics (20.0/20)
. Linear Algebra (20.0/20)
. Numerical Analysis (20.0/20)
* Reinforcement Learning (18.0/20)
. Artificial Intelligence (20.0/20)
. Data Structure & Algorithms (20.0/20)
. Discrete Mathematics (20.0/20)
. Game Theory (18.4/20)
. Automata & Machine Theory (20.0/20)

Online Courses from Other Universities, Audited

. Stanford CS330: Deep Multi-Task and Meta Learning (Chelsea Finn)
. Stanford CS234: Reinforcement Learning (Emma Brunskill)
. CS 285 at UC Berkeley: Deep Reinforcement Learning (Sergey Levine)
. Stanford CS231n: Deep Learning for Computer Vision (Fei-Fei Li)
. Stanford CS229: Machine Learning (Andrew NG)
. MIT 18.06: Linear Algebra (Gilbert Strang)

SKILLS

Programming Python, R, Java, C, C++, SQL, Bash, LaTeX, Racket, Verilog

Frameworks PyTorch, Keras, TensorFlow, Detectron2, OpenCV, Scikit-Learn, NumPy, Pandas

Languages Persian, English, Spanish

EXTRACURRICULAR ACTIVITIES

Sharif Datadays, *Data Science competition at Sharif* *Mar. 2021 - Jul. 2021*
Volunteered to help in website development.

Persian Wikipedia + ML *Fall 2022*
Contributed in the creation of Persian Wikipedia Pages for Key Machine Learning Concepts

Markov Decision Processes Lecture Note *Fall 2021*
Contributed in writing lecture notes for the AI Group's website at our university, a self-learning resource for students.

REFRENCES

. **Prof. Alexandre Alahi**, *EPFL*
alexandre.alahi@epfl.ch
. **Prof. Sabine Süsstrunk**, *EPFL*
sabine.susstrunk@epfl.ch
. **Prof. MohammadHossein Rohban**, *SUT*
rohban@sharif.edu
. **Prof. GholamReza GhassemSani**, *SUT*
sani@sharif.edu