

# YALDA SHABANZADEH

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## EDUCATION

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### 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

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- Deep Learning
- Generalization & Robustness
- Computer Vision
- Reinforcement Learning
- Artificial Intelligence
- Federated Learning

## RESEARCH EXPERIENCES

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### 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

- Involved in a project that uses diffusion models to solve domain shift issues in a medical dataset (MIDOG).
- 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.

**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**

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**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**

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**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**

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**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 ( $\times 3$ ):** Designing & grading assignments and final project
- Linear Algebra:** Designing & grading assignments and final project
- Probability and Statistics:** Designing & grading assignments

**SELECTED PROJECTS**

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**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.
- $\epsilon$ -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

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### Sharif University of Technology, Selected, \* Graduate Course

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

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**Programming** Python, R, Java, C, C++, SQL, Bash,  $\text{\LaTeX}$ , Racket, Verilog

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

**Languages** Persian, English, Spanish

## EXTRACURRICULAR ACTIVITIES

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**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.

## REFERENCES

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| . <b>Prof. Alexandre Alahi</b> , <i>EPFL</i><br><a href="mailto:alexandre.alahi@epfl.ch">alexandre.alahi@epfl.ch</a>    | . <b>Prof. MohammadHossein Rohban</b> , <i>SUT</i><br><a href="mailto:rohban@sharif.edu">rohban@sharif.edu</a> |
| . <b>Prof. Sabine Ssstrunk</b> , <i>EPFL</i><br><a href="mailto:sabine.susstrunk@epfl.ch">sabine.susstrunk@epfl.ch</a> | . <b>Prof. GholamReza GhassemSani</b> , <i>SUT</i><br><a href="mailto:sani@sharif.edu">sani@sharif.edu</a>     |