AMIRHOSSEIN DABIRI AGHDAM

Department of Electrical and Computer Engineering, Faculty of Engineering, University of Tehran, Iran

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EDUCATION

University Of Tehran *Sep. 2018 - Present*

- B.Sc. in Electrical Engineering (Control Engineering specialization) *Cumulative GPA:* **19.24/20**
  Thesis: "An Analysis of Forgettable Examples Extracted During Multilingual Models Training" *Last Two Years GPA:* **19.48/20**
- Minor in Computer Engineering *Cumulative GPA: 18.75/20*

Allameh Helli Tehran High School *Sep. 2014 - Jun. 2018*

- Diploma in Mathematics and Physics' Discipline *Cumulative GPA: 19.95/20*

Affiliated with the National Organization for the Development of Exceptional Talents (NODET)

RESEARCH INTERESTS

- Machine Learning & Deep Learning
- Natural Language Processing
- Reinforcement Learning
- Computer Vision

HONORS & AWARDS

- Ranked 2nd among 120 B.Sc. students in Electrical Engineering, University of Tehran. *2022*
- Ranked 1st among Control Engineering B.Sc. Students, University of Tehran. *2022*
- Ranked 537th among about 150,000 participants in Nationwide University Entrance Exam. *2018*
- Winner of FOE Award (Faculty of Engineering Award for top students). *2019*
- Recognized as a talented student in the entrance exam of NODET for high school. *2014 - 2018*
- Kyokushin Karate Black Belt holder and member of IKO Kyokushinkaikan. *2008 - Present*

PUBLICATION

- TARGETED ADVERSARIAL ATTACKS AGAINST NEURAL MACHINE TRANSLATION
  Sahar Sadrizadeh, **AmirHossein Dabiri Aghdam***, Ljiljana Dolamic, Pascal Frossard*
  Accepted for publication, IEEE ICASSP, Rhodes Island, Greece, June 2023.

RESEARCH EXPERIENCE

Research Internship - EPFL Excellence in Engineering (E3) *Jul. 2022 - Sep. 2022*

Signal Processing Laboratory (LTS4), EPFL *Lausanne, Switzerland*

- Worked on the targeted adversarial attacks against transformer-based neural machine translation models.
- Under the supervision of Prof. Pascal Frossard and Dr. Sahar Sadrizadeh

Research Assistantship *Sep. 2022 - Present*

NLP Lab, ECE department, University of Tehran *Tehran, Iran*

- Working on analyzing the effect of forgettable examples training on the out-of-distribution generalization of multilingual models in single- and multi-source training. (bachelor's thesis)
- Under the supervision of Dr. Yadollah Yaghoobzadeh

Summer Internship *Jul. 2021 - Sep. 2021*

HARA.ai Co *Tehran, Iran*

- Worked on developing Chatbot NLU, for which I trained two of the state-of-the-art models (BERT & Bi-LSTM) implemented with PyTorch for Intent Detection & Slot Filling on the ATIS dataset after applying various data augmentation and balancing methods. (GitHub)
- Under the supervision of Dr. Reshad Hosseini

TEACHING EXPERIENCE

Teaching assistant *, University of Tehran, ECE department*

- **Engineering Probability & Statistics**
  Instructor: Dr. B. Bahrak *Fall 2022*
- **Introduction to Computing Systems & Programming**
  Instructor: Dr. M. R. Hashemi *Spring 2020*
- **Modern Control Systems**
  Instructor: Dr. H. Kebriaei *Fall 2022*
- **Signals and Systems**
  Instructor: Dr. S. Akhavan Behabadi *Spring 2022*

- **Introduction to Computing Systems & Programming**
  Instructor: Dr. M. Moradisabzevar *Fall 2019*
- **Linear Control Systems**
  Instructor: Dr. A. Adhami-Mirhosseini *Fall 2021*
- **Electronics I**
  Instructor: Dr. Z. Sanaee *Spring 2021*
- **Engineering Mathematics**
  Instructor: Dr. M. Mohammad Taheri *Fall 2020*

RELEVANT COURSES (Graduate courses are indicated by †)

- **Interactive Learning† (TBA)**
  Instructor: Dr. M. Nili Ahmad Abadi
- **Machine Learning† (18.9/20)**
  Instructors: Dr. B. N. Araabi & Dr. M. A. Dehaqani
- **Linear Algebra (20/20)**
  Instructor: Dr. M. J. Yazdanpanah
- **Digital Control Systems (20/20)**
  Instructor: Dr. A. Yaghmaei
- **Operational Research (19.3/20)**
  Instructors: Dr. A. Ramezani & Dr. M. Shokri
- **Computer Architecture (19.3/20)**
  Instructor: Dr. S. Safari
- **Data Structures (19.69/20)**
  Instructor: Dr. R. Shojaee
- **Advanced Programming (20/20)**
  Instructor: Dr. R. Khosravi
- **Natural Language Processing† (20/20)**
  Instructors: Dr. Y. Yaghoobzadeh & Dr. H. Faili
- **Artificial Intelligence (20/20)**
  Instructors: Dr. H. Fadaei & Dr. M. Moradi
- **Engineering Probability & Statistics (19.5/20)**
  Instructor: Dr. A. M. Rabiei
- **Modern Control Systems (19.1/20)**
  Instructor: Dr. H. Kebriaei
- **Mechatronics Engineering (20/20)**
  Instructor: Dr. M. Tale Masouleh
- **Logic Circuits (20/20)**
  Instructor: Dr. Z. Navabi
- **Algorithm Design (current semester)**
  Instructor: Dr. M. J. Dousti
- **Computer Networks (20/20)**
  Instructor: Dr. V. Shah-Mansouri

SELECTED COURSE PROJECTS

Natural Language Processing [Grad. course]

- Implementing renowned text Tokenizers (such as BPE) from scratch.
- Spam detection by implementing Naïve Bayes from scratch.
- Part-of-Speech tagging and Name Entity Recognition using LSTM/GRU and Viterbi Algorithm.
- Textual Entailment task using Mono- and Multi-Lingual Transformers such as XLM-RoBERTa.
- Deploying a Neural Machine Translation System using tools such as OpenNMT and FairSeq.
- Question Answering task using Transformers such as PersianBERT on three Persian datasets.

Interactive Learning [Grad. course]

- Implementing Epsilon-Greedy, Upper-Confidence-Bound, and Gradient-Bandit algorithms for a Multi-armed Bandit problem.
- Implementing Policy and Value Iteration algorithms (for FrozenLake environment of gym library).
- Implementing Q-learning, SARSA, Tree Backup n-Step, On-policy Monte Carlo (for Taxi environment of gym library).
- Implementing Deep Q-learning from scratch using PyTorch (for Highway environment of gym library).
- Fine-tuning GPT2 language model for comment generation with positive/negative sentiment using Proximal Policy Optimization RL algorithm.

Machine Learning [Grad. course]

- Classification & Clustering of five different categories of Iranian local folklore music, which involved data gathering, data cleaning, pre-processing, and classification/clustering.
- Implementing the Expectation-Maximization algorithm from scratch for Gaussian Mixture Density Model.
- Implementing LDA and feature selection (forward & backward selection) algorithms from scratch.

Artificial Intelligence

- Detecting COVID-19 & PNEUMONIA in X-ray scans by training a Feed Forward Neural Network implemented using Keras.
- Implementing a Feed Forward Neural Network from scratch and training it on Fashion MNIST Dataset.
- Sentiment Analysis of Digikala Comments Dataset using Naïve Bayes Classifier implemented from scratch.
- Exploratory dataset analysis and implementation of some ML algorithms for Kaggle House Prices competition.
- Finding combinations of gates (AND/OR/XOR) to satisfy the truth table using genetic algorithm.
- Implementing the snake game using informed (A*) and uninformed (BFS, IDS) search algorithms.

Logic Circuits

- Designing and implementing a sequential circuit that computes an aproximation of tanh using its Taylor expansion (using Verilog, simulated in Altera Modelsim).

Computer Architecture

- Single-cycle, multi-cycle, and 5-stage pipeline implementation of MIPS processor using Verilog (simulated in Altera Modelsim).
- Implementing a 5-bit booth multiplier (using Verilog, simulated in Altera Modelsim).

Computer Architecture Lab

- Implementing a 5-stage pipeline ARM architecture (ARM968E-S Family) using Verilog, deployed on an Altera Cyclone II FPGA.

Computer Networks

- Implementing a chat room using C++ and socket programming.

Advanced Programming

- Implemented the Super Mario game with C++ (in object-oriented programming style).

Mechatronics Engineering

- Arranging colored blocks in the production line based on machine vision (OpenCV) using UR10 pick & place robot; simulated in CoppeliaSim and controlled by MATLAB robotics toolbox.
- A two-link robotic arm control via PID by calculating inverse kinematics (simulated in MATLAB Simulink).
- Face, eyes & mouth recognition with cascade classifier using OpenCV.

Operational Research

- Optimal Vehicle Routing (finding the best route with the min cost in terms of distance, etc.)

SKILLS

Programming	Python, C/C++, MATLAB, Verilog, Visual Basic ML/AI libraries: Huggingface Transformers, PyTorch, Tensorflow, Keras, NumPy, Pandas, scikit-learn, OpenCV Familiar with LaTeX, C#, JAVA, PHP, SQL, JS, Assembly
Engineering & Simulation Software	MATLAB Simulink®, ModelSim, Quartus, Proteus, Multisim, PSpice, CoppeliaSim, ROS, Gazebo, SolidWorks, AutoCAD
Technology	MQTT, Git, MakeFile Familiar with ARM(STM32), AVR, Arduino, ESP32
Operating Systems	Microsoft Windows, Linux(Ubuntu)

LANGUAGES

Persian	Native (Bilingual Proficiency)
Turkish (Azari)	Native (Bilingual Proficiency)
English	Proficient - **IELTS (10 Nov. 2022): Overall 8 (R:9, L:9, S:7, W:7)**

REFERENCES

Available upon request.