AMIRHOSSEIN DABIRI AGHDAM

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

+98 9912035048 DabiriAghdam@gmail.com DabiriAghdam DabiriAghdam

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*
  Submitted to ICASSP 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† (current semester)**
  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 Naive Bayes from scratch.
- Part-of-Speech tagging and Name Entity Recognition using LSTM/GRU and Viterbi Algorithm.
- Textual Entailment task using Mono/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 Iteration 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).

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 for Gaussian Mixture Density Model.
- Implementing LDA and feature selection (forward & backward selection) algorithms.

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 - Advanced Regression Techniques" 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.)

Instrumentation

- A weather station based on ESP32 microcontroller and MQTT protocol with Android/Windows/Web client applications.

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	Git, Google Colab, Jupyter Notebook, MakeFile, MQTT Familiar with ARM(STM32), AVR, Arduino
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.