Arya Aftab

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EDUCATION

Sharif University of Technology **Sep. 2018 – Jul. 2021**
Master of Science, *Department of Electrical Engineering (Communication Systems)* *Tehran, Iran*
Thesis: "Speech Emotion Recognition with Deep Learning and Frequency Features"
Supervisor: Prof. Shahrokh Ghaemmaghami
GPA : 3.3 (15.80 / 20)

Amirkabir University of Technology (Tehran Polytechnic) **Sep. 2013 – Aug. 2018**
Bachelor of Science, *Department of Biomedical Engineering (Bioelectric)* *Tehran, Iran*
Thesis: "Investigating Effect of Drop-out Regularizer on Deep Neural Network"
Supervisor: Dr. Seyyed Ali Seyyedsalehi

RESEARCH INTERESTS

- Deep Learning
- Machine Learning
- Meta Learning
- Artificial Intelligence
- Speech Processing
- Tiny Machine Learning

RELEVANT COURSEWORK

- Deep Learning
- Information Hiding
- Speech Processing
- Random Processes
- Advanced Communication
- Source Localization
- Radar Systems
- Artificial Intelligence
- Chaos Theory
- Optimization
- Linear Algebra

HONORS

- Ranked $\mathbf{9}^{th}$ among more than 3,500 students in nation-wide university entrance exam (Konkoor) for M.Sc. degree in Electrical Engineering [Spring 2018].
- Ranked within top **0.5%** among more than 260,000 students in nation-wide university entrance exam (Konkoor) for B.Sc. degree. [Summer 2013].
- Acceptance in the first stage of Iran's nation-wide astronomy Olympiad (among top 2000 of 100,000 participants) [Winter 2011].

PUBLICATIONS

- **Arya Aftab**, Alireza Morsali, Shahrokh Ghaemmaghami, Benoit Champagne. "**Light-SERNet: A Lightweight Fully Convolutional Neural Network for Speech Emotion Recognition**". Accepted in ICASSP 2022. Arxiv
- **Arya Aftab**, Alireza Morsali, Shahrokh Ghaemmaghami. "**Multi-Head ReLU Implicit Neural Representation Networks**". Accepted in ICASSP 2022. Arxiv
- Fatemeh Kashani, **Arya Aftab**, Shahrokh Ghaemmaghami. "**A Machine Learning Framework for Predicting Entrapment Efficiency in Niosomal Particles**". Under submission.
- **Arya Aftab**, Fatemeh Kashani, Alireza Morsali, Shahrokh Ghaemmaghami. "**An End to End Method for Predicting pK_a of Small Molecules**". Under preparation.

PROJECTS

Extract information from ID cards with Raspberry Pi | Python, TensorFlow Lite, ONNX **Present**

- Using deep learning models and Raspberry Pi 4B, we extracted identity information from identification cards such as passports and national cards in a real-time manner.

Different Models for Word Spotting | Python, TensorFlow, PyTorch **Jun. 2022**

- For an industrial project at Electronic Research Institute (ERI), we examine several different models in terms of efficiency, accuracy, ability to implementation, and so on.

SVM in TensorFlow | Python, TensorFlow **Jun. 2022**

- We implemented support vector machine (SVM) in form of a Python library. You can use this library to attach an SVM classifier on top of every model or embedder.

A ML Framework for Predicting EE in Niosomal Particles | Python, TensorFlow **Apr. 2022**

- Several machine learning models were implemented in the form of a TensorFlow-based framework to predict drug entrapment efficiency (EE) in niosomal particles.

Multi-Head ReLU for Implicit Neural Representation | Python, TensorFlow **Sep. 2021**

- A novel multi-head multi-layer perceptron (MLP) structure is presented for implicit neural representation.

Speech Emotion Recognition (My Master's Thesis) | Python, TensorFlow, Linux **Jul. 2021**

- We propose an efficient and lightweight fully convolutional neural network(FCNN) for speech emotion recognition in systems with limited hardware resources.

Drop-Connect in TensorFlow | Python, TensorFlow **Jul. 2021**

- We implemented drop-connect in form of a Python library.

SincNet in TensorFlow | Python, TensorFlow **Jun. 2021**

- We implemented SincNet in form of a Python library.

Rotary Embeddings in TensorFlow | Python, TensorFlow **May. 2021**

- A standalone library for adding rotary embeddings to transformers in TensorFlow was implemented.

Sparse Layer in TensorFlow | Python, TensorFlow **Apr. 2021**

- We implemented two layers(Convolution and Dense) as sparse layers in form of a Python library.

Physics-Based Neural Network | Python, TensorFlow, FEniCS **Feb. 2021**

- We used the sine activation function, which has recently been introduced as a solution for solving differential equations with neural networks.

Two Steps Gradient Vector Flow (GVF) Snake Model | MATLAB **Dec. 2020**

- We utilized the generalized gradient vector flow snake model using minimal surface and two steps converging using both vector based normalization and component-based normalization with distinct controlling parameters on active contour.

Stock Prediction | Python, TensorFlow, Web Crawling **Sep. 2020**

- We first extracted financial market data via web crawling and then modelled them for risk reduction and profit forecasting.

TEACHING EXPERIENCES

Teaching Assistant: Speech Processing **Sep. 2020 – Jan. 2021**

- For PhD and Master students of electrical engineering (communication systems) at Sharif University of Technology. Supervision: **Prof. Shahrokh Ghaemmaghami**.

Teaching Assistant: Fundamental of Electrical Engineering **Feb. 2020 – Jun 2020**

- For Bachelor students of electrical engineering at Sharif University of Technology. Supervision: **Dr. Leila Mahmodi**.

TECHNICAL SKILLS

Programming Languages:

- **Python**
  - **TensorFlow, Keras, AutoKeras**(Expert)
  - **PyTorch**(Intermediate)
  - **JAX**(Intermediate)
  - **Tkinter**(Intermediate)
  - **PyGame**(Elementary)
- **MATLAB**(Expert)
- **C++**(Elementary)
- **JavaScript**(Elementary)
- **HTML, CSS**(Elementary)
- **BashScript**(Intermediate)

Hardware:

- **Raspberry Pi**(Intermediate)
- **Arduino**(Elementary)

Technologies/Frameworks:

- **Linux**(Expert)
- **GitHub**(Expert)
- **Git**(Expert)
- **NodeJS**(Elementary)
- **Docker**(Elementary)
- **Flask**(Elementary)

Developer Tools:

- **VS Code**(Expert)
- **Jupyter Notebook**(Expert)
- **PyCharm**(Intermediate)
- **Sublime Text**(Intermediate)
- **Vim**(Elementary)

General Softwares:

- **LaTeX**(Intermediate)
- **GIMP**(Intermediate)
- **Inkscape**(Intermediate)
- **MeshLab**(Intermediate)
- **Mendeley**(Intermediate)
- **Microsoft Office**(Intermediate)

WORK EXPERIENCES

Electronic Research Institute (ERI) at Sharif University of Technology **Sep. 2021 – Present**
Research Assistant *Tehran, Iran*

- I am working as a researcher and developer to develop systems based on machine learning and speech processing. Major tasks include building a valid dataset and implementing the latest published models.

Orouna **Sep. 2020 – Present**
Head of AI *Tehran, Iran*

- At Orouna, I work as the head of its artificial intelligence department. My colleagues and I pay special attention to the implementation of deep learning algorithms on hardwares with limited computing resources such as Raspberry Pi and Arduino.

DG Sculptor **Jan. 2021 – Present**
Researcher *Montreal, Canada*

- My colleagues and I at this startup are trying to develop new methods for neural rendering. We reported the results of our research as open-source and authoritative articles.

Arya Teb Firouz **Mar. 2019 – Aug. 2019**
Researcher *Tehran, Iran*

- I worked as a researcher in the research and development (R&D) department of the company to solve problems with artificial intelligence.

INTERNSHIP

Emam Sajjad Hospital **Jun. 2017 – Aug. 2017**
Biomedical Intern *Yasuj, Iran*

- I classified documents related to medical devices in the hospital based on their performance.

INTERESTS

- Listening to Music
- Watching Movies
- Playing Computer Games
- Walking
- Climbing
- Reading Manga Comics

LANGUAGE PROFICIENCY

- **Persian:** Native
- **English:** Studying for IELTS or Duolingo

REFERENCES

- **Prof. Shahrokh Ghaemmaghami**: Full Professor
  Department of Electrical Engineering and Electronics Research Institute, Sharif University of Technology, Tehran, Iran.
  Email: ghaemmag@sharif.edu
- **Dr. Sajjad Amini**: Assistant Professor
  Department of Electrical Engineering and Electronics Research Institute, Sharif University of Technology, Tehran, Iran.
  Email: s_amini@sharif.edu
- **Dr. Alireza Morsali**: Associate Researcher
  Department of Electrical and Computer Engineering, McGill University, Montreal, Canada.
  Email: alireza.morsali@mail.mcgill.ca