Alireza Keshavarzian

University of Toronto - Department of Electrical and Computer Engineering

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Education

Ph.D.: *University of Toronto Department of Electrical and Computer Engineering* 2020–2024
M.Sc.: *Amirkabir University of Technology - Department of Electrical Engineering* 2016–2019
B.Sc.: *Amirkabir University of Technology - Computer Engineering and Information Tech.* 2014–2019
B.Sc.: *Amirkabir University of Technology - Department of Electrical Engineering* 2012–2016

Research Interest

- Computational Healthcare
- Time series Augmentation
- Random representation learning
- Signal Processing

Work and Teaching Experiences

Data Scientist at University Health Network (UHN) Dec 2020-Now
Devising models to grasp the mechanical behaviour of the respiratory system. Diagnosing the different types of respiratory disease via Oscillometry Data.

Data Scientist at Snappfood , May 2020-Oct 2020
Developing a recommendation system for food and restaurants. Analyzing the conversion rate of each page of the application. Developing a model to create meta-tag for foods and restaurants

Machine learning engineer at RISE Jan 2020-Aug 2020
Researching unified stream-processing and batch-processing frameworks.

Chief Technical Officer (CTO) at Atrovan Nov 2016-April 2020
Team leader and software architect of Smart Home Gateway based on Zigbee protocol. Software Engineer and Developer of Atrovan edge layer. Working on Modbus and MQTT Gateway, which is deployed on the fog layer of smart solutions. Team Lead and Software Engineer of Atrovan IoT Platform

Teacher Assistant at University of Toronto Jan 2021-March 2023
Probabilistic Machine Learning (CSC412), Computer Networks I (ECE361), Programming Fundamental (ECE244), Design and Analysis of Data Structure (CSCB63)

Publication

- A. Keshavarzian, S. Valaee. **"RASTER: Representation Learning for Time Series Classification using Scatter Score and Randomized Threshold Exceedance Rate"**. **Published** International Workshop on Machine Learning for Signal Processing (MLSP 2023).
  - https://doi.org/10.1109/MLSP55844.2023.10285973
- A. Keshavarzian, H. Salehinejad, S. Valaee. **"Representation Learning of Clinical Multivariate Time Series with Random Filter Banks"**. **Published** International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2023).
  - https://doi.org/10.1109/ICASSP49357.2023.10094305
- A. Keshavarzian, J. Wue, C. Chow, S. Valaee. **"Time series classification using convolutional kernel and adaptive dynamic thresholding"**. **Submitted** IEEE International Conference on Communication (ICC 2024).
- A. Keshavarzian, S. Sharifian, S. Seyedin. **"Modified deep residual network architecture deployed on serverless framework of IoT platform based on human activity recognition application"**. **Published** in Future Generation Computer Systems Journal.
  - https://doi.org/10.1016/j.future.2019.06.009

Skills and Expertise

- **Programming:** C/C++, Python, Golang, Matlab, Java
- **Framework:** Spark, PyTorch, Tensorflow, Keras, OpenCV, Numba
- **Data:** Pandas, Seaborn, Plotly, Power BI, pyspark
- **Hardware Expertise:** Xilinx, Verilog, VHDL, Microprocessors, Raspberry Pi Boards
- **Web**: HTML, CSS, JS, Bootstrap, React js, MongoDB, CassandraDB, RDMBS

Academic Projects

- **Ph.D. Thesis: Pulmonary ocillometry recognition using randomized kernel method**
  - Supervised by Dr. S. Valaee and Dr. CW Chow. Project: Devising a novel time series classification model based over-parametrized shallow network regime, using a random projection filter bank, randomzied sample, and novel temporal activation function to name but a few.
  - Python
- **M.Sc. Thesis: Human Action Recognition based on Movement Sensors using Parallel Deep learning method on Big Data platform**
  - Supervised by Dr. S. Sharifian and Dr. S. Seyedin. Project: aims to create a novel approach using raw smartphone accelerometer/gyro data for maximum accuracy, using minimum computational resources and deploying on Spark for faster training/inference.
  - Python, Keras, Tensorflow, Spark
- **B.Sc. Capstone: Implementation of Static Logo detection and impainting it on sports' footage using CUDA on GPU**
  - Supervised by Prof. S.A. Motamedi. Project: Devising wide range of methods to detect and impaint static advertisement logos on spots footage
  - C/C++, CUDA, Matlab 2017
- **B.Sc. Capstone:**
  - Supervised by Prof. S.A. Motamedi. Project: Devising wide range of methods to detect and impaint static advertisement logos on spots footage
  - C/C++, CUDA, Matlab 2017
- **IoT Platform: Designing and developing an IoT Platform to aggregate and analyze IoT data**
  - An enterprise project that aims to aggregate and analyze IoT data, visualize the data on a dashboard and analyze them. This project is devised and implemented in microservice architecture along with "function as a service" style for Rule engine, the part analysis the incoming data.
  - Golang, Openwhisk, Cassandra, Postgres 2019
- **Implementation of Feature Learning and Inpainting of damaged pictures**, Semi-Supervised Learning with context-conditional generative adversarial networks
  - Python, Keras, Computer Vision 2016

Honors and Awards

- **Ranked 6th**, in Department of the Electrical Engineering among 150 undergraduate students. 2016
- **Accepted** to Direct Admission to M.Sc. program in Electrical Engineering, under the "Exceptional Talents" category. 2016
- **Accepted** to Direct Admission to M.Sc. program in Computer Engineering, in Artificial Intelligence branch, under the "Exceptional Talents" category. 2016
- **Accepted** to a double-major program, Accepted to double-major program (Electrical Engineering and Computer Engineering) under the "Exceptional Talents" category. 2014
- **Top 0.1%** in nation-wide University Entrance Exam for Bachelor of Science. Among more than 350000 participants students. 2012