

Intro

I'm a Research Scientist with a strong technical background in HW/SW co-design and Edge AI. In summary I have:

- 5+ years experience as AI Research Scientist
- 1 years experience as Data Scientist
- 2+ years experience as FPGA Engineer/RTL Designer

Experience

Research & Industry

Research Scientist, **Rain**

August 2023–present, Montreal, Canada

- Design and emulation of digital hardware units to work in the next generation of Rain's Compute-In-Memory (CIM) technology (optimized for LLMs, Convs, etc.).
- Research and development of novel machine learning algorithms for edge devices including Rain's current and future CIM products.
- Principal inventor of two patents, one on softmax HW and another on CIM architecture (in provisioning state, confidential for now)

Research Scientist, **Imagia**

May 2018–March 2022 (internship period included), Montreal, Canada

- Research on *Federated Learning* optimization led to SoTA performance via drift elimination
- Research on Transfer Learning led to a filed patent
- Research on multiple Meta Learning and Few-shot Learning projects
- Research on Multi-hypothesis Transfer Learning and out of distribution generalization
- Collaborated with R&D team in designing an AI library for Imagia research
- Collaborated with IT in porting Polyaxon on a cluster of NVIDIA DGX systems

Research Assistant, **Institute for Big Data Analytics**

May 2017–May 2018, Halifax, Canada

- Research on predicting human behaviour from *fMRI* data
- Developing a *CNN* framework for detecting corrosion in aircrafts using *D-Sight* technology (*DAIS*)
- Optimizing calculation of minimum distance to shore from *AIS-GIS* streaming data using *CUDA* and *OpenMP*
- Research on sparsity, activation functions and normalization

Data Scientist (part-time), Cognitive Health and Recovery Research Lab

Mar 2020–Jun 2020, Halifax, Canada

- Clinical data integration and visualization
- Investigating post-operative cognitive dysfunction in elderly patients
- Analyzing surgical time series data (anesthesia depth, patients' vitals, ...)

FPGA Engineer, Kara Telephone Co.

Jun 2013–Jun 2014, Tehran, Iran

- Design & Imp. of TDM switches on FPGAs supporting up to 16k x 16k channels (in VHDL)
- Multi-channel I2C master controller supporting 16 modules with error checking & correction
- SPI & USART Peripheral interfaces
- Embedded Processors, RTOS
- Focus on speed optimization on Altera Cyclone series

RTL Designer Intern, SarvNet Telecommunication Inc.

Jul 2012–Sep 2012, Isfahan, Iran

- Design & Imp. of lightweight AES modules used in STM4 lines
- Multi-channel I2C master controller supporting 16 modules with error checking & correction.
- SPI & USART Peripheral interfaces.
- Focus on area optimization on Xilinx Virtex 4, 6 series

Teaching

- Co-instructor, ML for Big Data, CSCI-6515, Dalhousie University, Fall 2020
- Teacher Assistant, ML for Big Data, CSCI-6515, Dalhousie University, Fall 2018
- Teacher Assistant, Digital Circuits, ECED-2200, Dalhousie University, Winter 2016
- Teacher Assistant, System Analysis, ECED-3401, Dalhousie University, Fall 2016
- Instructor, Computer Architecture, Chehelsotoon Inst. for Higher Edu, Fall 2015
- Instructor, System Programming, Chehelsotoon Inst. for Higher Edu, Fall 2015
- Teacher Assistant, Java Programming, University of Guilan, Winter 2009
- Teacher Assistant, Algorithms, University of Guilan, Winter 2010

Background

Education

- Ph.D., Computer Science. Dalhousie University. 2017–2023, CGPA: 4.19
- M.Sc., Computer Architecture. University of Isfahan. 2012–2015, CGPA: 4.02
- B.Sc., Computer Engineering, Guilan University. 2008–2012.

Skills

- Programming languages: **Python**, Java, C/C++, Bash
- Deep learning frameworks: **PyTorch**, Keras, Tensorflow
- CI/CD platform: **Github Actions**
- MLOps, automation & AI scaling systems: **Polyaxon**, **MLflow**

- Target specific on-device training, Quantization & Compression
- Machine learning libraries: Pandas, Scikit-learn, Numpy, Scipy
- Digital Circuit Design and FPGA engineering: **VHDL**, **Verilog**
- Markup languages: ~~LaTeX~~, Markdown, RestructuredText, Mermaid
- Project Management: Agile, Scrum, Kanban, Jira, YouTrack

Publications

Papers

- Varno, Farshid, Marzie Saghai, Laya Rafiee, Sharut Gupta, Stan Matwin, and Mohammad Havaei. “Minimizing Client Drift in Federated Learning via Adaptive Bias Estimation.” *European Conference on Computer Vision*. – **ECCV** (2022).
- Varno, Farshid, Lucas May Petry, Lisa Di Jorio, and Stan Matwin. “Learn Faster and Forget Slower via Fast and Stable Task Adaptation.” *arXiv preprint arXiv:2007.01388* (2020).
- Varno, Farshid, Behrouz Haji Soleimani, Marzie Saghai, Lisa Di Jorio, and Stan Matwin. “Efficient neural task adaptation by maximum entropy initialization.” *arXiv preprint arXiv:1905.10698* (2019).
- Jiang, Xiang, Mohammad Havaei, Farshid Varno, Gabriel Chartrand, Nicolas Chapados, and Stan Matwin. “Learning to learn with conditional class dependencies.” In *international conference on learning representations*. – **ICLR** (2018).
- Saghai, Marzie, Jonathan Greenberg, Christopher O’Grady, Farshid Varno, Muhammad Ali Hashmi, Bethany Bracken, Stan Matwin, Sara W. Lazar, and Javeria Ali Hashmi. “Brain network topology predicts participant adherence to mental training programs.” *Network Neuroscience* 4, no. 3 (2020): 528-555.

Patent

- Varno, Farsheed, Behrouz Haji Soleimani, Marzie Saghai, Lisa Di Jorio, and Stan Matwin. Method and system for initializing a neural network. <https://patents.google.com/patent/WO2020225772A1>. _ EP WO CA CN_ (2020)

Honors

Leadership & Volunter Work

- Vice-president of Public Relations, Toastmasters International, Dal Toastmasters, 2020.
- Mentoring college students, **AI4ALL**, 2024.
- Experienced leading teams of 2-3 researchers during several projects.
- Mentored two masters students, currently one working as Senior Data Scientists in Canada and the other one as Data Scientist in Brazil.
- Reviewer at European Conference on Computer Vision (**ECCV 2024**, 6 papers).
- Reviewer at Computer Vision and Pattern Recognition (**CVPR 2024**, 2 papers).
- Reviewer at International Conference on Computer Vision (**ICCV 2023**, 3 papers).
- Reviewer at Computer Vision and Pattern Recognition (**CVPR 2023**, 5 papers).
- Reviewer at European Conference on Computer Vision (**ECCV 2022**, 2 papers).
- Reviewer at the 2nd FedVision Workshop (**FedVision 2023**, 2 papers).
- Selected conference program committee member & volunteering experience:
 - International Conference on Learning Representations (ICLR, Remote 2020)
 - SIGKDD Conference on Knowledge Discovery and Data Mining (KDD, Halifax 2017).
 - Confoo (Montreal, 2023).

Awards & Recognition

- Accelerate Award, 56k CAD, Mitacs, 2021-2022
- Scotia Scholar Award, 45k CAD, Research Nova Scotia, 2019-2021
- Best Graduate Student Research Award, Big Data Congress, Sep 2017
- Nova Scotia University Student Bursary, Government of Nova Scotia, 2020-2022
- FGS's alloc. for outstanding status, 2k CAD, Dalhousie University, Aug 2017
- 1st Rank Student Recognition, University of Isfahan, Mar 2015