

MM. Kamani

Ph.D. Candidate, Informatics



Education



- 2015–Present **PhD candidate (ABD) in Informatics**, *Pennsylvania State University*, State College, PA, USA, (GPA: 3.9).
- 2013 – 2015 **M.Sc. in Electrical Engineering, Communication Systems**, *Sharif University of Technology*, (GPA:3.85).
- 2008 – 2013 **B.Sc. in Electrical Engineering, Communications**, *Sharif University of Technology*, (GPA: 3.51).

Research Interests

- Machine Learning
- Bias Mitigation in ML
- Distributed Optimization
- Quantization of DNNs
- Computer Vision
- Fairness in ML
- Federated Learning
- Meta-Learning

Publications

- 2020 **MM. Kamani***, Md Fahim Faysal Khan*, Vijaykrishnan Narayanan, and Mehrdad Mahdavi. Learning to quantize deep neural networks: A competitive-collaborative approach. In *2020 57th ACM/IEEE Design Automation Conference*. **DAC**, 2020.
- MM. Kamani**, Rana Forsati, James Wang, and Mehrdad Mahdavi. Pareto efficient fairness in supervised learning. In *the review process*, 2020.
- Farzin Haddadpour, **MM. Kamani**, Mehrdad Mahdavi, and Viveck Cadambe. Breaking communication barrier in distributed optimization via local sgd with dynamic mini-batches. In *the review process*, 2020.
- Yuyang Deng, **MM. Kamani**, and Mehrdad Mahdavi. Adaptive personalized federated learning. *arXiv preprint arXiv:2003.13461*, 2020.
- 2019 **MM. Kamani**, Farzin Haddadpour, Rana Forsati, and Mehrdad Mahdavi. Efficient fair principal component analysis. *arXiv preprint arXiv:1911.04931*, 2019.
- MM. Kamani**, Sadegh Farhang, Mehrdad Mahdavi, and James Z Wang. Targeted meta-learning for critical incident detection in weather data. In *Climate Change Workshop at International Conference on Machine Learning*. **ICML**, 2019.
- MM. Kamani**, Sadegh Farhang, Mehrdad Mahdavi, and James Z. Wang. Targeted meta-learning: A bilevel programming framework for data-driven regularization. In *the review process*, 2019.
- Farzin Haddadpour, **MM. Kamani**, Mehrdad Mahdavi, and Viveck Cadambe. Trading redundancy for communication: Speeding up distributed sgd for non-convex optimization. In *International Conference on Machine Learning*, pages 2545–2554. **ICML**, 2019. [Code at](#)
- Farzin Haddadpour, **MM. Kamani**, Mehrdad Mahdavi, and Viveck Cadambe. Local sgd with periodic averaging: Tighter analysis and adaptive synchronization. In *Advances in Neural Information Processing Systems*. **NeurIPS**, 2019. [Code at](#)
- 2018 Farshid Farhat, **MM. Kamani**, and James Z Wang. Captain: Comprehensive composition assistance for photo taking. *arXiv preprint arXiv:1811.04184*, 2018.

- Sadegh Farhang, Jake Weidman, **MM. Kamani**, Jens Grossklags, and Peng Liu. Take it or leave it: A survey study on operating system upgrade practices. In *Proceedings of the Annual Computer Security Applications Conference*. **ACSAC**, 2018.
- 2017 **MM. Kamani**, Farshid Farhat, Stephen Wistar, and James Z Wang. Skeleton matching with applications in severe weather detection. *Applied Soft Computing*, 2017. [Code at](#) .
- Farshid Farhat, **MM. Kamani**, Sahil Mishra, and James Z. Wang. Intelligent portrait composition assistance - integrating deep-learned models and photography idea retrieval. In *2017 ACM Multimedia*. ACM, 2017.
- 2016 **MM. Kamani**, Farshid Farhat, Stephen Wistar, and James Z. Wang. Shape matching using skeleton context for automated bow echo detection. In *2016 IEEE International Conference on Big Data*. IEEE, 2016. [Code at](#) .
- 2015 **MM. Kamani**. Image processing in paintings using multispectral imaging. Master's thesis, Electrical Engineering Department, Sharif University of Technology, Iran, 2015.

Work Experiences

- 2019 **Machine Learning Research Intern**, Twitter, Cortex.
Incorporating embeddings in different prediction platform used by Twitter services.
- 2018 **Machine Learning Research Intern**, Twitter, Cortex.
In this project, we focused on Dynamic Embeddings on different Embeddings such as NLP word embeddings like SVD and Word2Vec. Using CCA, we develop a generic distance measure for calculating semantic similarity between embeddings. Presented as a poster in **WeCNLP** 2018 summit in Facebook HQ.
- 2017 **Machine Learning Research Intern**, Honeywell International Inc.
In this project, we developed Deep Recurrent Neural Networks in order to estimate time to a failure or time to an event in Auxiliary Power Units of aircrafts. I was responsible for the complete process from ETL of the data from Hive tables, to developing and testing the deep learning models in Tensorflow.
- 2012 – 2015 **Business Intelligence**, *BI Manager*, Tadbir Pardaz Ltd.
Implementation of **Business Intelligence** based on SQL server services on Automation Reports in Total Broker Solution (TBS) and Mutual Funds. In this project I was responsible for ETL process, creating star schema databases, making data cubes, and visualizing data in different platforms.

Honors and Awards

- 2019 Awarded travel grant by Advances in Neural Information Processing **NeurIPS**
- 2019 Winner of the first and second round of **Nittany AI Challenge** 2019 at Penn State University for the idea of uApplication. Our team has received \$2000 to develop an MVP for the final round.
- 2019 Awarded travel grant by International Conference on Machine Learning , **ICML**
- 2018 Awarded **AI for Earth** grant, **Microsoft**. My project has been awarded 10,000 USD by AI for earth program in Microsoft to use on Azure systems.
- 2017 Awarded three-years **Academic Computing Fellowship**, Penn State University
- 2016 **NSF Travel Award**, International IEEE Big Data Conference
- 2013 Ranked **19th** in the Nationwide Electrical Engineering University Entrance Exam for post-graduates students (among 40,000 participants)
- 2008 Ranked **7th** in the Nationwide Mathematics and Physics University Entrance Exam (among 300,000 participants)
- 2008–Present Member of the National Organization of **Exceptional Talents** in Iran
- 2008–Present Member of the organization of **Exceptional Talents** at Sharif University of Technology
- 2006 Accepted in the first stage of **National Chemistry Olympiad** (Ranked 4th among 10,000 participants)

Projects

- 2019–present **Fairness in algorithmic decision making systems with the notion of Pareto optimality**, Advisor, Prof. Mehrdad Mahdavi.
- 2018–present **Speeding-up distributed SGD for learning Deep Neural Networks**, Advisors, Prof. Mehrdad Mahdavi & Prof. Viveck Cadambe.
- 2018–present **Bias mitigation from the lense of game theory**, Advisor, Prof. Mehrdad Mahdavi.
- 2018 **Dynamic Embeddings, consistency and stability**, *Twitter*, *Cortex*.
- 2018–present **Mental State Detection and Prediction using deep learning**, Advisor: Prof James Z. Wang.
- 2017 **Time to Failure analysis in time series using deep recurrent neural nets**, *Honeywell*.
- 2017 **Intelligent Photography Composition using Deep Learning**, Advisor: Prof James Z. Wang.
- 2016 **Emotion Recognition from Body Movement using Deep learning**, Advisor: Prof James Z. Wang.
- 2015–Present **Severe Weather Forecasting with Computer Vision and Machine Learning**, Advisor: Prof. James Z. Wang.
- 2013–2015 **Image Processing and Computer Vision in Cultural Heritage**, Advisors: Prof. Marvasti & Prof. Amini.
- 2011–2012 **Fuzzy Speech Recognition**, Advisor: Prof. Bagheri Shouraki.
- 2014 **Implementation of Asynchronous MAC Protocol on Opnet**, Prof. Pakravan.
- 2013 **implementation of Adaptive Noise Cancellation**, Prof. Babaizadeh.
- 2010 **Holding a workshop on Smart Grid conference**, Prof. Fotowat Ahmadi.
- 2010 **Summer Research internship**, Prof. Fotowat Ahmadi, KavoshCom Asia R&D Group.
- 2010 **Image processing for Chromosome Detection**, Prof. Khalaj.
- 2010 **Implementation of simplified Excel Software using C++**, Prof. Nazerfard.
- 2009 **Design and Implementation of Function Generator**, Prof. Fotowat Ahmadi.

Computer Skills

- Advanced **Python, TensorFlow, PyTorch, Shell Programming, Matlab, C/C++ , ImageJ, SQL Server (SSMS, SSIS, SSAS), Sharepoint, OpenCV, L^AT_EX**
- Intermediate **Scala, Scalding, Java, HTML & CSS, Spark, Apache Hadoop & Hive, Opnet & Network Simulator (NS2 and NS3), AWR Design environment & Microwave Office, PSpice & Orcad**
- Basic **ArcGIS**