Rashidul Islam

Curriculum Vitae

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Education

2016–2022 **Ph.D. Candidate**, *Department of Information Systems, University of Maryland, Baltimore County (UMBC), USA. CGPA 3.82/4.00.*

2018–2020 **Master of Science**, *Department of Information Systems, University of Maryland, Baltimore County (UMBC), USA. CGPA 3.82/4.00.*

2013-2014 **Master of Science**, *Electrical & Electronics Engineering, University of Dhaka, Bangladesh. CGPA 3.66/4.00.*

2009-2012 **Bachelor of Science**, *Applied Physics, Electronics & Communication Engineering, University of Dhaka, Bangladesh. CGPA 3.48/4.00.*

Research Statement

My research interests lie in the general area of artificial intelligence (AI) / machine learning (ML), particularly in the area of AI/ML Fairness and Ethics. It is now well understood that AI/ML systems, trained on data without due care, often exhibit unfair and discriminatory behavior against certain demographic groups. This phenomenon can have harmful consequences in a variety of AI-automated tasks including college admissions, financial and housing approvals, bail and sentencing decisions, job hiring, and the prioritization of healthcare services. My research is focused on building socially conscious statistical methods for modeling, measuring, and correcting unfairness or implicit bias in machine learning algorithms.

Work Experience

Jan'18 - Present **Research Assistant**, Information Systems Department, UMBC, MD
- Removing the barriers to deployment of fair AI technologies.
- Ensuring fairness in Bayesian inference for arbitrary probabilistic models.
- Stochastic learning of intersectional fair algorithms.
- Mitigating demographic biases in social media-based career recommendations.
- Differential fairness for artificial intelligence and machine learning systems.
- Developing statistically efficient Bayesian modeling for intersectional fairness.
- Developing a sparse stochastic collapsed inference algorithm to scale up the topic models.

May'19 - Aug'19 **Wavelet Development Intern**, The MathWorks Inc., Natick, MA
- Scattering transform has established itself as an effective feature extractor for machine learning workflows. This internship is mainly responsible to investigate proof of concepts: Gabor scattering transforms, mixed filters, pooling, and non-linearities.

Aug'16 - Dec'17 **Graduate Assistant**, CSEE Department, UMBC, MD
- Responsible for conducting discussion sessions, lab, grading, and proctoring exams for undergraduate courses.
- Artifact detection and removal system for brain signal in low power embedded processors.
- FPGA-based scalable accelerator for high-throughput MCMC algorithm.

Dec'14 - Jul'16 **Core Network Engineer**, Huawei Technologies Ltd., Bangladesh

- Operation and Maintenance of core network systems which include routine activities, troubleshooting, and resolving network issues and any other O&M related activities.
- Identify, modify, and upgrade core network equipment to enhance product services.

Publications

R. Islam*, K.N. Keya, S. Pan, A.D. Sarwate, and J.R. Foulds*. Differential fairness. *Under submission*, 2021.

R. Islam, S. Pan, and J.R. Foulds. Can we obtain fairness for free? In *Proceedings of AAAI/ACM Conference on Artificial Intelligence, Ethics and Society (AIES)*, 2021.

R. Islam, K. Keya, Z. Zeng, S. Pan, and J. R. Foulds. Debiasing career recommendations with neural fair collaborative filtering. In *Proceedings of The Web Conference (WWW)*, 2021.

K. Keya, **R. Islam**, S. Pan, I. Stockwell and J. R. Foulds. Equitable allocation of healthcare resources with fair survival models. *SIAM International Conference on Data Mining (SDM)*, 2021.

Z. Zeng, **R. Islam**, K. Keya, J. Foulds, Y. Song, and S. Pan. Fair heterogeneous network embeddings. In *Proceedings of the 15th International AAAI Conference on Web and Social Media (ICWSM)*, 2021.

K. Keya, **R. Islam**, S. Pan, I. Stockwell and J. R. Foulds. Equitable allocation of healthcare resources with fair Cox models. *AAAI Fall Symposium on AI in Government and Public Sector (AAAI FSS)*, 2020.

C. Wang, K. Wang, A. Bian, **R. Islam**, K. Keya, J. R. Foulds and S. Pan. A user study on a de-biased career recommender system. *Mid-Atlantic Student Colloquium on Speech, Language and Learning (MASC-SLL)*, 2020.

J. R. Foulds*, **R. Islam***, K. Keya*, S. Pan. Bayesian modeling of intersectional fairness: The variance of bias. *SIAM International Conference on Data Mining (SDM)*, 2020.

J. R. Foulds, **R. Islam**, K. Keya, and S. Pan. An intersectional definition of fairness. *36th IEEE International Conference on Data Engineering (ICDE)*, 2020.

J. R. Foulds, **R. Islam**, K. Keya, and S. Pan. Differential fairness. *NeurIPS 2019 Workshop on Machine Learning with Guarantees*, 2019.

R. Islam, K. Keya, S. Pan, and J. R. Foulds. Mitigating demographic biases in social media-based recommender systems. *The 25th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) Social Impact Track (extended abstract)*, 2019.

R. Islam and J. R. Foulds. Scalable collapsed inference for high-dimensional topic models. In *Proceedings of the 2019 Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*, 2019.

R. Islam and J. R. Foulds. Towards a highly efficient online inference algorithm for latent Dirichlet allocation. In *Mid-Atlantic Student Colloquium on Speech, Language and Learning (MASC-SLL)*, 2018.

M. Hosseini,**R. Islam**, L. Marni, and T. Mohsenin. MPT: Multiple parallel tempering for high-throughput MCMC samplers. In *31st IEEE International System-on-Chip Conference (SOCC) (pp. 244-249)*, 2018.

R. Islam, W. D. Hairston, T. Oates and T. Mohsenin. An online EEG artifact detection and removal system for embedded processors. In *Signal Processing in Medicine and Biology Symposium (SPMB)*, 2017.

M. Hosseini, **R. Islam**, A. Kulkarni and T. Mohsenin. A scalable FPGA-based accelerator for high-throughput MCMC algorithms. In *Proceedings of the 25th Annual IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM)*, 2017.

* Equal contribution.

Technical Skills

Research	AI Fairness and Ethics, Machine Learning, Deep Learning, Natural Language Processing
Programming Language	Python, PyTorch, Keras, Pyro, PyMC3, Gensim, Scikit-learn MATLAB, GNU Octave, Julia, R Verilog
Applications	Latex, SQL, MS Word, PowerPoint, Excel

Academic Services

Reviewer NeurIPS 2021, ICML 2020, ICTAI 2020.

Honors and Awards

PhD Student Research Award (1st Place) from the Department of IS, UMBC, 2021

Best Poster Award in PHD Completed Research category at IS Poster Day, UMBC, 2021

Student Scholarship Award to attend The Web Conference (WWW), 2021

GSA Professional Development and *IS Dept. Travel Grant* to attend in NAACL, 2019

NST Fellowship for M.S. Thesis from Ministry of Science & Technology, Bangladesh, 2014

Course Projects

Spring'20 **AE-NCF: An Autoencoder-informed Neural Collaborative Filtering Model**
Develop a joint model of multiple deep learning-based collaborative filtering approaches for the rating prediction task in recommender systems.

Spring'19 **Mitigating Demographic Biases in Social Media-based recommender systems**
Develop linear projection-based simple technique to mitigate demographic bias from user embeddings without losing much accuracy of collaborative filtering.

Fall'18 **Disaster Event Detection from Tweets**
Developed a framework for disaster event detection from tweets based on auto-annotation by latent Dirichlet allocation instead of any manual annotation.

Spring'18 **Named Entity Recognition System**
Developed a ML-based named entity recognition system for Cyber security domain.

Spring'18 **Statistical Learning**
Apply a vast set of tools of statistical learning using R to organize, understand and explore the complex data.

Fall'17 **Human Physical Activity Detection**
Developed a high-performance human activity recognition technique based on several machine learning classifiers in ensemble method.

Fall'17 **Handwritten Digits Detection**
Implemented machine learning techniques (e.g. KNN, Perception, SVM, NN, PCA etc.) on the MNIST database for digit detection.

Spring'17 **Pattern Detection**
FPGA implementation of low power convolutional neural network to detect a known pattern from a given image.

Coursework

Core Courses Introduction to Machine Learning, Probabilistic Machine Learning, Deep Learning, Probability and Random Processes, Statistical Learning, Computational Methods for IS Research, Information Extraction, Social Media Analytics.