Md Abul Hayat

Mailing Address: 3217 Bell Engineering Center, University of Arkansas, Fayetteville, AR 72701, USA
Email: mahayat@uark.edu **Website:** https://mahayat.github.io/

Education

PhD student of Electrical Engineering Expected: May 2022
University of Arkansas, Fayetteville, AR
Relevant Courses: Deep Learning, Machine Learning, Information Theory, Stochastic Processes, Detection & Estimation

Master of Science in Statistics Expected: May 2021
University of Arkansas, Fayetteville, AR
Relevant Courses: Statistical Inference, Computational Statistics, Multivariate Analysis, Time Series Analysis

Bachelor of Science in Electrical & Electronic Engineering September 2015
Bangladesh University of Engineering & Technology (BUET), Dhaka, Bangladesh
Relevant Courses: Digital Signal Processing I & II, Microwave Engineering, Digital Communication, Power System Analysis

Technical Skills

Programming Languages:	Python, R, MATLAB, C++, C, SQL, AMPL
Machine Learning Modules:	PyTorch, Keras, TensorFlow, NumPy, scikit-learn, Jupyter
Engineering Applications:	Simulink, PSpice, PowerWorld, Tableau
Other Skills:	Git, Bash, LaTeX, Linux, High Performance Computing

Work Experience

University of Arkansas, Fayetteville, AR August 2017 - Present
Graduate Assistant, Electrical Engineering

- Analysis of peripheral venous pressure (PVP) signals under different clinical conditions using deep and statistical learning.
- Developed a Kalman filter and hidden Markov model based unsupervised anomaly detection algorithm for PVP signals.
- Applied deep learning techniques like CNN, Grad-CAM and Guided Backpropagation on PVP signals.
- Developed a Gaussian mixture model (GMM) based Bayesian unsupervised algorithm for rice panicle detection.
- Implementing time-frequency based cyclostationary and synchrosqueezing statistical models on PVP signals.
- Applied classical dimension reduction techniques like PCA, Kernel-PCA; regression techniques like GLM, Elastic net and classification algorithms like k-means, KNN, DBSCAN, SVM in MATLAB and Python.

Lawrence Berkeley National Laboratory, Berkeley, CA
Research Affiliate August 2020 - Present
Summer Intern – Computing Sciences May 2020 - August 2020

- Exploring self-supervised representation learning for photometric redshift prediction (ongoing).
- Trained and validated cosmological image dataset of ~100GB using distributed training on supercomputer Cori.
- Mentor: Mustafa Mustafa

Nokia Bell Labs, Murray Hill, NJ June 2019 - August 2019
Summer Intern – Math & Algorithms

- Implemented U-Net and DenseNet based deep learning segmentation algorithms on OCT images.
- Mentors: Atefeh Mohajeri, William Sean Kennedy

Grameenphone, Dhaka, Bangladesh October 2015 - August 2017
System Engineer, Regional Operations Department

- Grameenphone, part of the Norwegian Telenor Group, is the largest telecommunications operator in Bangladesh.
- Worked with more than 400 BTS/nodeBs of Huawei. Planned and implemented diversity techniques.
- Analyzed and solved performance issues like IPPM loss and Ping Packet loss, MPD degradation and TCH congestion.
- Implemented different radio aggregation techniques on wireless backhaul devices.

Publications

[C3] M. A. Hayat, Peter Harrington, et.al., "Estimating Galactic Distances From Images Using Self-supervised Representation Learning," Machine Learning and the Physical Sciences Workshop, 34th Conference on Neural Information Processing Systems (NeurIPS), December 2020. **[Submitted]**

[J4] M. A. Hayat, Jingxian Wu, et.al., "Unsupervised Anomaly Detection in Peripheral Venous Pressure Signals with Hidden Markov Models," Biomedical Signal Processing & Control, September 2020. **[IF: 3.321]**

[J3] M. A. Hayat, Jingxian Wu, et.al., "Unsupervised Bayesian Learning for Rice Panicle Segmentation with UAV Images," Plant Methods, February 2020. **[IF: 4.460]**

[J2] P. Bonasso, K. Sexton, **M. A. Hayat**, et. al., "Venous Physiology Predicts Dehydration in the Pediatric Population," Journal of Surgical Research, March 2019.

[J1] P. Bonasso, K. Sexton, S. Mehl, M. Golinko, **M. A. Hayat**, et. al., "Lessons learned measuring peripheral venous pressure waveforms in an anesthetized pediatric population," Biomedical Physics & Engineering Express, February 2019.

[C2] S. M. Hasan, **M. A. Hayat** and M. F. Hossain, "On the downlink SINR and outage probability of stochastic geometry based LTE cellular networks with multi-class services," 18th International Conference on Computer and Information Technology (ICCIT), December 2015.

[C1] S. M. Hasan, M. B. Monjil, F. Mohsin, **M. A. Hayat** and A. B. M. H. Rashid, "Adaptive beamforming with a Microphone Array," 18th International Conference on Computer and Information Technology (ICCIT), December 2015.