Md Abul Hayat

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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.
- Implemented U-Net and DenseNet based image segmentation models on OCT images.
- Applied classical dimension reduction techniques like PCA, Kernel-PCA; regression techniques like GLM, Elastic net and classification algorithms like k-means, KNN, DBSCAN, OPTICS, SVM in MATLAB and Python.

Lawrence Berkeley National Laboratory, Berkeley, CA
Research Affiliate August 2020 - Present
Summer Intern – Computing Sciences, National Energy Research Scientific Computing Center 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, Human Augmented Sensing Group

- Applied deep learning segmentation techniques on Optical Coherence Tomography (OCT) images of skin.
- 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 possible issues of MPD degradation and TCH congestion.
- Implemented different radio aggregation techniques on wireless backhaul devices like NEC iPasolink, Huawei OptiX RTN900 and SIAE ALCplus2. Analyzed and solved performance issues like IPPM loss and Ping Packet loss.

Publications

[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.