

Md Abul Hayat

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U.S. Permanent Resident

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TECHNICAL SKILLS

- **Languages:** Python, MATLAB, R, SQL, C++, C
- **ML Frameworks:** PyTorch, TensorFlow-Keras, Transformers, GluonTS, XGBoost, scikit-learn
- **Others:** Git, L^AT_EX, Jupyter, Bash, Slurm, High-Performance Computing

EXPERIENCE

- **JPMorgan Chase & Co.** Jersey City, NJ
Senior Associate - Model Risk Quant July 2023 - Present
 - Developing benchmarks, reviewing, and assessing the risk of anti-money laundering and fraud models.
 - Models: Gradient boosting (XGBoost, LightGBM, CatBoost), LLM/Generative AI (fine-tuning, zero-shot learning), Sampling/Ranking (false positive reduction, stratified random sampling, risk ranking).
- **Amazon** Seattle, WA
Applied Scientist Intern May 2021 - August 2021
 - Feasibility testing of MQ-RNN algorithm in anomaly detection for different types of univariate time-series.
 - Framework: GluonTS, Platform: AWS EC2, Service: Amazon Lookout for Metrics.
- **Lawrence Berkeley National Laboratory** Berkeley, CA
Summer Intern May 2020 - August 2020
 - Lead developer of contrastive self-supervised representation learning for galactic images. This approach outperformed the then state-of-the-art on several relevant tasks. [Journal][Github][Website][YouTube][Media]
 - Dataset size: 300 GB (1.3 million images), Model: Momentum Contrast for Unsupervised Visual Representation Learning (MoCo), Framework: PyTorch with “DistributedDataParallel”, Mentor: Mustafa Mustafa, Ph.D.
- **Nokia Bell Labs** Murray Hill, NJ
Summer Intern June 2019 - August 2019
 - Implemented U-Net and DenseNet-based deep learning segmentation algorithms for OCT images using Keras.
- **University of Arkansas** Fayetteville, AR
Graduate Assistant August 2017 - July 2023
 - Proposed a novel integral pulse frequency modulation-based modeling of peripheral arterial (PAP) and venous pressure (PVP) signals to extract respiratory rate and heart rate variability using MATLAB. [Journal][Github]
 - Developed first-ever Kalman filter and hidden Markov model-based unsupervised anomaly detection algorithm for PVP signals under Gaussian mixture assumption. Languages: R, MATLAB. [Journal][Github]
 - Proposed a Gaussian mixture model-based Bayesian unsupervised algorithm for rice panicle segmentation with Markov chain Monte Carlo techniques using drone images. This outperformed the then state-of-the-art algorithm. Language: MATLAB. [Journal][Github]
 - Successfully classified hydrated and dehydrated patients using PVP signals with GLM with LASSO (Sensitivity and Specificity greater than 90%). Language: MATLAB. [Journal]
- **Grameenphone** Dhaka, Bangladesh
System Engineer October 2015 - August 2017
 - Lead planning and operations engineer executing radio diversity and aggregation techniques for 400+ BTS/nodeBs.

EDUCATION

- **University of Arkansas** Fayetteville, AR
PhD, Electrical Engineering July 2023
- **University of Arkansas** Fayetteville, AR
MS, Statistics & Analytics May 2021
- **Bangladesh University of Engineering & Technology (BUET)** Dhaka, Bangladesh
BS, Electrical & Electronic Engineering September 2015

SELECTED PUBLICATIONS [GOOGLE SCHOLAR LINK]

- **M. A. Hayat**, Jingxian Wu, et.al., “Modeling Peripheral Arterial and Venous Pressure Signals with Integral Pulse Frequency Modulation,” Biomedical Signal Processing & Control, September 2023. [Journal][Github]
- **M. A. Hayat***, George Stein*, et. al., “Self-Supervised Representation Learning for Astronomical Images,” The Astrophysical Journal Letters, December 2020. [Journal][arXiv][Media][Github][Website][YouTube] {*Equal contributions}
- **M. A. Hayat**, 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. [Paper][arXiv][Poster]
- **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. [Journal][Github]
- **M. A. Hayat**, Jingxian Wu, et.al., “Unsupervised Bayesian Learning for Rice Panicle Segmentation with UAV Images,” Plant Methods, February 2020. [Journal][Github]

RESEARCH INTEREST

Deep Learning, Data Science, Bayesian Statistics, Mathematical Finance, Signal Processing, Time Series