TANVIR AHMED

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tanvir9476.github.io

RESEARCH INTERESTS

AI for Healthcare & Medicine, Signal Processing, Computer Vision, Machine Learning, Quantum Computing

EDUCATION

Cornell University Aug *2023* - *Ongoing*
PhD in Information Science

- Advised by: Rajalakshmi Nandakumar (Wireless Sensing and Mobile Systems Lab @ Cornell Tech)

Bangladesh University of Engineering and Technology (BUET) Apr *2019* - Jul *2023*
M.Sc. in Electrical & Electronic Engineering *GPA: **3.83**/4.00*

- Thesis: **Image Super-Resolution Using Wavelet Residual Convolutional Neural Networks**
- Relevant coursework: Deep Learning, Digital Image Processing, Biomedical Signal Processing, Digital Speech Processing, Privacy-Preserving Machine Learning

Bangladesh University of Engineering and Technology (BUET) Feb *2015* - Apr *2019*
B.Sc. in Electrical & Electronic Engineering *(Degree awarded with Honours)* *GPA: **3.82**/4.00*

- Class position: ***21***/226 (**Top 9% in the graduating class**)
- Thesis: **Detection of Traffic Signs from Live-Stream Video Captured in Vehicles**
- Relevant coursework: Continuous Signals & Linear Systems, Digital Signal Processing I & II, Random Signal Processing, VLSI I & II, Control System, Single & Multi Variable Calculus, Probability & Statistics, Linear Algebra

WORK EXPERIENCE

Graduate Teaching Assistant, Cornell Tech Aug *2023* - *Ongoing*
Cornell Bowers CIS *2 West Loop Rd, New York, NY 10044, USA*

- Courses instructed: INFO 5600 AI for Healthcare (Fall 2023)

Lecturer, Brac University Jan *2020* - Aug *2023*
Department of Computer Science & Engineering *66 Mohakhali, Dhaka, Bangladesh*

- On PhD study leave (Aug *2023* - *Ongoing*)
- Courses instructed: CSE 428/EEE 476 Image Processing, CSE 460 VLSI Design, CSE 251 Electronic Devices & Circuits, CSE 250 Circuits & Electronics

RESEARCH EXPERIENCE

Image Super-Resolution Using Wavelet Residual CNN *Master's* thesis
Supervised by Dr. S. M. Mahbubur Rahman *Manuscript under preparation*

- Designed a novel CNN architecture for single image super-resolution (SISR) integrated with residual connections and the wavelet transform.

COVID-19 Identification From Lung CT Scans in a Low-Resource Setting Using a Regularized 3D CNN
Supervised by Dr. Mohammad Ariful Haque *ICECE 2022*

- **Ahmed T**, Nakib M, Haque MA, Miah MMM. Paper presented at: 12th International Conference On Electrical and Computer Engineering (ICECE); 2022 Dec 21-23; BUET, Dhaka, Bangladesh. [pre-print] | [IEEE Xplore]

· Developed a regularized 3D CNN architecture for small & imbalanced lung CT scan dataset that was able to classify with 87% accuracy into 3 classes: COVID-19, Community Acquired-Pneumonia, and Normal.

Biomimicry in Nanotechnology: A Comprehensive Review
Supervised by Dr. Sajid Muhaimin Choudhury *Nanoscale Advances, RSC*

· Himel MH, Sikder B, **Ahmed T**, Choudhury SM. Nanoscale Advances. 2023. [open access article]
· A comprehensive review article for biomimicry in nanotechnology.

Epileptic Seizure Prediction Using Band-Pass Filtering and Convolutional Neural Network
Co-supervised with Dr. Mohammad Zavid Parvez *MIET 2022*

· Mustaqeem N, Rahman T, Priyo JFBK, Parvez MZ, **Ahmed T**. Paper presented at: International Conference on Machine Intelligence and Emerging Technologies (MIET); 2022 Sep 23-25; NSTU, Noakhali, Bangladesh. [pre-print] | [Springer Link]
· Predicted seizure by detecting the pre-ictal state in the EEG signal using Butterworth band-pass filtering and a 2D CNN.

Recognition and Classification of Traffic Signs from Live Videos *Bachelor's* thesis
Supervised by Dr. S. M. Mahbubur Rahman

· Prepared Bangladeshi Traffic Sign Video Database, containing 7 classes of traffic signs. Recognition and detection were done using a CNN-based object detection model (YOLOv3). [slide]

SELECTED PROJECTS

· Performance analysis of privacy-preserving logistic regression classifiers on the MNIST dataset [report] [code]
· Segmentation of ground-glass opacity from COVID-19-infected lung CT scans using Multi-Res Unet [report] [code]
· Sign-language digit classification with explainable AI [report] [code]
· Bengali digit recognition from speech
· Stage spotlight automation using deep learning and micro-controllers [code]
· Design, implementation & verification of a 32-bit MIPS processor in Cadence [code]
· Design, implementation & verification of an 8×8 Booth-encoded multiplier in Cadence [report]
· Real-time ECG monitoring and disease detection using Arduino, ECG chip, and WiFi module [report]

ACHIEVEMENTS

· **Dean's List Award**, BUET *2015, 2016, 2018*
· **University Merit Award**, BUET *2015, 2016, 2017, 2018*
· **National Idea Competition**, 8^{th} position, Ministry of Power, Energy & Mineral Resources, Bangladesh *2017*
· **National Physics Olympiad**, 1^{st} position, St. Joseph Higher Secondary School, Dhaka, Bangladesh *2014*
· **Bangladesh Physics Olympiad**, 7^{th} position, Dhaka Divisional, Bangladesh *2014*

TECHNICAL SKILLS

Programming Languages	Python, C, C++, Assembly, Verilog
Libraries	TensorFlow, Keras, PyTorch, Numpy, OpenCV, Qiskit
Circuit Design & Simulation	PSpice, Proteus, Quartus
Numerical Analysis	MATLAB, Microsoft Excel, Google Sheets
VLSI	Cadence
Writing & Presentation	Microsoft Word, Microsoft PowerPoint, Google Docs, Google Slides, LaTeX

STANDARDIZED TESTS

IELTS	***8***/9	Speaking - ***7***/9, Listening - ***8***/9, Reading - ***9***/9, Writing - ***7***/9
GRE	***313***/340	Quantitative - ***167***/170 (87^{th} Percentile), Analytical Writing - ***4.0***/6.0 (54^{th} Percentile)