

RESEARCH INTERESTS

Machine Learning | Deep Learning | Computer Vision | AI Security | Natural Language Processing

EDUCATION

State University of New York (SUNY) Binghamton

PhD in Computer Science

CGPA: 4.0/4.0

Binghamton, New York

Jan 2023–Present

University of California Riverside (UCR)

MS in Electrical Engineering

CGPA: 3.96/4.0

Riverside, California

Sep 2021–Dec 2022

Bangladesh University of Engineering and Technology (BUET)

B.Sc. in Electrical and Electronic Engineering

Major: Communication and Signal Processing

Dhaka, Bangladesh

Feb 2015–Apr 2019

WORK EXPERIENCE

SUNY Binghamton

Graduate Research Assistant, ML Security Lab

Binghamton, New York

Jan 2023–Current

University of California Riverside

Graduate Research Assistant, Nozari Lab

Riverside, California

Sep 2021–Dec 2022

REVE Systems

Machine Learning Engineer

Dhaka, Bangladesh

Feb 2020–Aug 2021

Bangladesh University of Engineering and Technology

Research Assistant, DSP Research Lab

Dhaka, Bangladesh

May 2019–Jan 2020

RESEARCH EXPERIENCE

Improving Privacy and Security of Unsupervised Learning Algorithms

Jan 2023–Current

Supervisor: Dr. Adnan Siraj Rakin

- Investigated and improved security of unsupervised Source-Free Domain Adaptation Methods.
- Investigated and improved generalization of unsupervised Federated Learning techniques.

New Algorithm for Attacking DNNs

Jan 2023–Current

Supervisor: Dr. Adnan Siraj Rakin

- Proposed Deep-WRA, a novel weight replacement attack exploiting vulnerabilities in deep neural networks.
- Evaluated countermeasures and implications, offering insights into how to better secure DNNs against such vulnerabilities.

Linearizing Effect of Spatio-Temporal Averaging in Neural Networks

Sep 2021–Dec 2022

Supervisor: Dr. Erfan Nozari

- Validated the linearity of gradient descent dynamics in ANNs with nonlinear activations.
- Proved the linearity of aggregate activity in both static and dynamic (recurrent) neural networks.

Supervisor: Dr. Md. Kamrul Hasan

- Tackled performance decline of TSDR under real-world challenging weather conditions (CCs).
- Designed a modular framework achieving improved precision and recall for TSDR in CCs.

SIGNIFICANT PUBLICATIONS

1. **Sabbir Ahmed**, Ranyang Zhou, Shaahin Angizi, Adnan Siraj Rakin, “Deep-TROJ: An Inference Stage Trojan Insertion Algorithm through Efficient Weight Replacement Attack”, 2024 Computer Vision and Pattern Recognition (CVPR 2024). ([accepted, yet to appear](#))
2. **Sabbir Ahmed**, Abdullah Al Arafat, Mamshad Nayeem Rizvee, Rahim Hossain, Zishan Guo, Adnan Siraj Rakin, “SSDA: Secure Source-Free Domain Adaptation”, 2023 International Conference of Computer Vision (ICCV). ([Paper](#))
3. **Sabbir Ahmed**, Uday Kamal, Md. Kamrul Hasan, “DFR-TSD: A Deep Learning Based Framework for Robust Traffic Sign Detection Under Challenging Weather Conditions”, IEEE Transactions on Intelligent Transportation Systems. ([Paper](#))

SIGNIFICANT PROJECTS

- Explored signed Adversarial Attacks on Deep Networks
- Solved Atari Game (Ms. Pac-Man) using Reinforcement Learning
- Implemented Camera Model Identification using Deep Learning
- Implemented Image Captioning using Deep Learning
- Implemented CNC Plotter to generate Facial Images utilizing Generative Adversarial Networks
- Implemented Voice-Controlled Robot utilizing Speech Recognition technique

SKILLS

- **Programming Languages:** Python, MATLAB, C, C++, Intel-8086 Assembly
- **Simulation & Design Tools:** PSpice, Simulink, AutoCAD, Verilog
- **Machine Learning Libraries:** PyTorch, Tensorflow, Keras, Scikit-Learn

RELEVANT GRADUATE COURSE-WORKS

Machine Learning | Deep Learning | Reinforcement Learning | Design and Analysis of Algorithm

AWARDS AND HONORS

- **Ebay 2023 University ML Competition**, Team leader of team “*Bing NeuraNest*” that won 3rd place among teams participating from universities in USA.
- **Clog Loss: Advance Alzheimer’s Research with Stall Catchers**, Team leader of team “*acoustic_user*” that won 6th place among 922 teams from the whole world. ([link](#))
- **Bengali Handwritten Digit Recognition Competition**, Won 5th position among 57 teams from the whole country. ([link](#))
- **Kaggle APTOS 2019 Blindness Detection**, Team leader of team “*cholo model re shikhai*” that won 38th place among 2,943 teams from the whole world. ([link](#))
- **Kaggle Human Protein Atlas Image Classification**, Member of team “*The Unseens*” that won 98th place among 2,169 teams from the whole world. ([link](#))
- **IEEE Signal Processing Cup 2019**, Member of team “*Maverick*” that won 6th place among 24 teams from the whole world. ([certificate](#))
- **Received travel grant award** for attending the *ICCV 2023* conference to be held in Paris.