résumé of **Sadia Afrose**

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EDUCATION

Bangladesh University of Engineering & Technology (BUET)
Bachelor of Science(B.Sc.) in Electrical & Electronic Engineering (EEE) (March 2018 - May 2023)
Major: Communication & Signal Processing (CSP)
CGPA: 3.79/4.00(last 4 Semester CGPA 3.93/4.00)

RESEARCH INTEREST

Wireless Communication | Next-generation Wireless Networks | Massive MIMO | Wireless Security | mm-Wave | Open RAN | 5G/6G Cellular Systems | Localization | Applied Machine Learning/Deep Learning | Signal Processing

RELEVANT COURSEWORK

Wireless Communications | Telecommunication Engineering | Communication Systems I & II | Computer Networks | Radar & Satellite Communication | Continuous Signals & Linear Systems | Digital Signal Processing I | Random Signals & Processes | Optical Communications | Control System I | Microprocessors & Embedded System | Probability & Statistics

RESEARCH & PUBLICATIONS

B.Sc. Thesis: Efficient Defense Against First Order Adversarial Attacks on Convolutional Neural Networks - *Signal, Image and Video Processing* Journal by Springer. (*Under Review*) [Link]
Supervisor: *Dr. Hafiz Imtiaz, Professor, BUET*

- Proposed a computational-efficient approach to enhance the robustness of machine learning models against adversarial attacks, where inputs are purposefully altered to induce incorrect predictions. To achieve this, we focused on identifying the parts of the model that are most vulnerable to adversarial attacks and selectively trained only these sensitive components. This approach enabled us to achieve equivalent results comparable to conventional full-model adversarial training while using fewer resources, which ensures significant computational load savings.

Control Systems Project: Aquatic Robot for Trash Removal and Water Quality Monitoring Built from Recycled Materials - *13th International Conference on Electrical and Computer Engineering* (ICECE 2024). (*Accepted*) [Link]

PROFESSIONAL EXPERIENCE

Robi Axiata PLC
Senior Associate, Radio Access Network (RAN) Operations (August 2023 - Present)

- Implementing preventive and corrective measures to ensure service quality, resource availability, and optimal performance in the radio network, while overseeing smooth execution of network changes and integration of new technologies. Deploying advanced wireless technologies, such as Massive MIMO Systems and Antenna Integrated Radios, to improve network capacity and throughput, while utilizing coding and automation to enhance operational efficiency and optimize network performance. Collaborating with vendors and engineers to resolve complex network issues, supporting business projects, and working with cross-functional teams to develop and maintain operational processes and procedures. Actively engaging with current and emerging wireless network technologies to drive innovation and ensure seamless adoption of advancements.

AWARDS/HONORS

- **Ranked-**1^{st} in Level-3, Term-I & Level-4, Term-II of Undergraduate study **2021 & 2023**
  Secured **GPAs 4.0/4.0**
- Recipient,**Dean's List Scholarship** **2021-2023**
  Academic Honor by BUET for attaining CGPA of 3.75 for two consecutive terms
- Recipient,**University Merit Scholarship** **2021-2023**
  Academic Honor by BUET to the top 10% students of a department in a semester
- **Ranked-**3^{rd}**, Humanitarian Project Design Idea Contest** [Certificate] **2022**
  International Symposium on Social Implications of Sustainable Technology of IEEE Bangladesh Section Co-located Conferences

- Recipient, **Govt. Scholarship in Secondary & Higher Secondary School Certificate Examination 2015&2017**
  Awarded by Ministry of Education, Bangladesh

STANDARDIZED TESTS

GRE General: 310/340 (Q:165)
TOEFL iBT: 92/120 (R:25, L:24, S:22, W:21)

TECHNICAL SKILLS

Programming Languages: Python | C/C++ | MATLAB | Assembly Language | Verilog HDL | Embedded C | Shell Scripting
Deep Learning Framework & Libraries: TensorFlow | PyTorch | Pandas | Numpy
Simulation & Development Environments: Linux | Virtual Machine | Proteus | Arduino IDE | OpenStack
Network & Radio Tools: ENM (Ericsson Network Manager) | WinFOIL | Wireshark
Documentation and Illustration: LaTeX | MS Office | AutoCAD

HIGHLIGHTED PROJECTS

- **Open RAN-Based 5G Network Simulation** [Repository]
  Simulated virtualized 5G network environments using ZeroMQ, srsUE, gNB, Open5GS Core, O-RAN Near-RT RIC, KPI-MON xApp, and CU-DU split configurations. Explored Open RAN, RAN deployment, UE/base station interactions, and data flow in controlled environments.
- **Covid-19 Prediction in Bangladesh Using Deep Learning Algorithm** [Repository]
  Forecasted the number of daily COVID-19 cases occurring in Bangladesh using various machine learning models like Fbprophet, LSTM, and MLP, and comparing their performances.
- **IoT Based Remote Heart Rate Monitoring System** [Repository]
  Developed an ECG monitoring system using IoT, where heart rate data was processed via Arduino and MATLAB, then transmitted to the IoT cloud and notified to the concerned person via email.
- **Gas Leak Detection and Explosion Prevention with Air Quality Monitoring System** [Repository]
  Designed an ultimate engineering solution against gas leak explosions by detecting gas leaks and taking preventive measures such as limiting them and alerting the user via a mobile phone call. Air quality measurements were also taken.
- **Intelligent Gesture Based Security System** [Repository]
  Designed a contactless security system that is unlocked by means of a stored hand gesture pattern. The simulation was performed using MATLAB, VSPE, Arduino, and Proteus.
- **4-bit Calculator** [Video Demonstration]
  Designed separate circuit blocks in both hardware and Proteus for performing operations: encoding, enabling, addition, subtraction, multiplication, division, and decoding. These blocks were integrated to obtain a fully functional calculator.
- **Stepper Motor Control using MATLAB, SIMULINK, PROTEUS, and ARDUINO** [Video Demonstration]
  It involves selecting a suitable motor driver and linking it to the microcontroller. A control program is then created and the motor is fine-tuned. The final step is to execute the program to operate the motor.

RELEVANT MOOCKS

- **5G Network Fundamentals** (Issuing Organization: Institut Mines-Télécom via Coursera)
- **5G for Everyone** (Issuing Organization: Qualcomm Academy via Coursera)
- **Learn 4G (LTE) like Pro-The Fundamental Way (65+ Hours)** (Issuing Organization: GotechnicalNow (GTN) via Udemy)
- **Machine Learning and Deep Learning Specialization** (Instructor: Andrew Ng via Coursera)

VOLUNTEER ACTIVITIES

Treasurer, IEEE Signal Processing Society BUET Student Branch Chapter *2021 – 2023*
Founding Member, Pabna Science Club *2017 – Present*
Community Tutor, Ummesh Floating Children School *2015 – 2023*
Class Representative, BUET *2018 – 2023*