Rudra Roy

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SUMMARY

Electrical and Electronic Engineering student from BUET. Specialized in deep learning, AI, computer vision, speech, and audio signal processing with a keen interest in robotics and automation. Trying to bridge theoretical concepts with practical applications. With a passion for advancing technology and a pragmatic approach to innovation, aiming to contribute significantly to projects that drive progress in robotics, AI, and beyond.

EDUCATION

M.Sc. in Electrical and Electronic Engineering   2024−*Ongoing*
Bangladesh University of Engineering and Technology   *Dhaka, Bangladesh*
Major: Communication and Signal Processing

CGPA: 3.83 out of 4.0{ (1st Semester)

B.Sc. in Electrical and Electronic Engineering   April 2019 − May 2024
Bangladesh University of Engineering and Technology   *Dhaka, Bangladesh*
Major: Communication and Signal Processing

CGPA: 3.38 out of 4.0

UNDERGRADUATE THESIS

• **CAPRes50-GAN: A Word-Level Sign Language Recognition Approach for Real-Life Scenarios Exploiting GAN-Based Classifier**
Developed a GAN-based deep learning model for word-level sign language recognition from video data. Built a real-time sign detection app, enabling seamless communication for the deaf community through innovative AI-driven solutions

PUBLICATIONS

Published

• A. Deb, R. Roy, A. Islam, I. Islam, A. Musabbir, M. S. S. Rian and C. Shahnaz, ”**Enhancing Communication for the Deaf and Hard-of-Hearing: A Custom Deep Learning Model-Based Approach for Real-Time Sign Language Recognition and Translation,**” 2024 IEEE 12th Region 10 Humanitarian Technology Conference (R10-HTC), Kuala Lumpur, Malaysia, 2024, pp. 1-6, doi: 10.1109/R10-HTC59322.2024.10778790.

• R. Roy, A. Deb , M. S. Sadik Rian, A. Islam, and C. Shahnaz, ” **Dpmas-net: A privacy-preserving deep learning model for emg-based hand gesture recognition with time-frequency domain features,**” in 2024 IEEE Region 10 Symposium (TENSYMP). IEEE, Sep. 2024, p. 1–6. [Online]. Available: http://dx.doi.org/10.1109/TENSYMP61132.2024.10752112

• R. Roy, A. Deb,I. Islam, A. Islam and C. Shahnaz, ”**Bio-Markers Presence Detection Using Transfer and Ensemble Learning on Optical Coherence Tomography of Retinal Imagery,**” 2024 6th International Conference on Electrical Engineering and Information & Communication Technology (ICEEICT), 2024, pp. 915-920, doi: 10.1109/ICEEICT62016.2024.10534519.

• A. Deb, Asaduzzaman NA, R. Roy, A. Islam and C. Shahnaz, ”**N2N2N: A Clean Data Independent Speech Enhancement Approach With Modified cGAN,**” IEEE TENCON 2024 : Article presented and to be published

• A. Deb,R. Roy, A. Islam, A. Nath, M. Haque, M. J. U. Islam and C. Shahnaz, ”**VOIS+: A Video Over Intercom Service with Home Automation Features for Advanced Security and Safety,**” 2024 IEEE International Conference on Robotics, Automation, Artificial-Intelligence and Internet-of-Things : Article presented and to be published

• A. Uzzaman, A. Deb, A. Biswas, R. Roy, A. Islam and C. Shahnaz, ”**WnD-UNET: A Waveform and Discrete Wavelet Coefficient-Based 1D Deep Learning Model for Single-Channel Noisy Speech Enhancement,**” 2024 International Conference on Computer and Information Technology (ICCIT): Article presented and to be published

Uneder Review -(Journal)

• **R Roy**, A. Deb, A. Islam, C. Shahnaz, and G. Sharma ”**CAPRes50-GAN: A Word-Level Sign Language Recognition Approach for Real-Life Scenarios Exploiting GAN-Based Classifier**”- IEEE Transactions on Multimedia

• A. Deb, R Roy, C. Shahnaz, W.P. Zhu, and M. O. Ahmed **"CAR-UNet: A ConvNeXT and Attention Aided Residual UNet-based Deep Learning Model for Monaural Speech Enhancement"**- IEEE Transactions on Audio, Speech and Language Processing

• A. Deb, R Roy, A. Islam and C. Shahnaz **"pFLOCT: A Personalized Federated Learning Framework for Heterogeneous OCT Data Classification Using Adaptive Clustering and Weight Optimization"** - IEEE Access

TECHNICAL SKILLS

Programming Languages: Python, C, C++, MATLAB

Deep Learning & AI: TensorFlow, PyTorch, Federated Learning, Differential Privacy, Transformers, RNNs, CV, GANs

Libraries & Tools: NumPy, Pandas, Scikit-learn, OpenCV, Git, Docker, Librosa, Torch-Audio

Robotics & Automation: ROS2, ROS- Noetic, DroneKit, Arduino, Raspberry PI (Linux)

Software: AutoCAD, Spice, Simulink, Microsoft Office Suite

Web Development: HTML, CSS, JavaScript,React, Tailwind

Hardware Proficiency: Embedded System, Embedded System Programming

EXPERIENCE

R&D Engineer — Jan,2025 – present
Cybernetics Hi-Tech Solutions — *Dhaka, Bangladesh*
- Contributing to research and development in IoT and robotics-based systems
- Successfully Deployed a GreenHouse Automation Project to BWMRI

Asia Pacific Internet Engineer 2025 — 9 Feb 2025 – 15 Feb 2025
Universitas Brawijaya (UB) — *Malang, Indonesia*
- Learn about network design and deployment, virtualization technologies, and web server security.
- Gained hands-on experience in DNS configuration and protection
- Explored IoT system design and cloud computing integration

Assistant Technical Secretary — 2024 – 2024
ICCIT 2024 — *Cox's Bazar, Bangladesh*
- Aided in the coding of programs necessary to automate the conference submissions and final checks
- Directed hybrid technical sessions arranged by ICCIT

Academic Advisor — 2021 – Present
Udvash — *Dhaka, Bangladesh*
- Provided academic guidance and support to students
- Assisted in curriculum development and student assessment

Intern — November, 2023 - December, 2023
Nagad — *Dhaka, Bangladesh*

AWARDS

IEEE WIE Big Idea Pitch Competition — 2024
Champion — *IEEE Global*
- Pitched an idea that won the title of "Best Innovation Pitch"
- Idea is related to combating climate change

HTC Silver Award — 2024
Silver Award — *IEEE R10 HTC*
- Awarded for innovation entitled CHINHO: An AI based Smart Wearable Sign Language Interpreter for People with Hearing and Speech Disability

VIP CUP 2023 (ICIP) Finalist — 2023
Finalist — *IEEE Global*

Bangladesh Math Olympiad	2017

Finalist *Regional*

Bangladesh Science Olympiad	2015, 2018

Finalist *Regional*

Bangladesh Physics Olympiad	2015, 2016

Finalist *Regional*

Board Scholarship	2014, 2016, 2018

JSC, SSC, HSC

CERTIFICATIONS

• Crash Course on Python-2024

• Understanding the internet

• Operating the internet

PROJECTS

IoT Based Gas Burner Monitoring System	2024
	Robotics & Automation Lab

Smart sensors track gas levels, temperature, and flame status in real-time, transmitting data wirelessly for remote monitoring.Detects real-life scenarios promptly, ensuring quick intervention to prevent accidents.Users can remotely control burner settings and receive alerts on mobile devices.

Electrical Service Design of a Multi-storied Building	2024
	Electrical Services Design Lab

Designed a 2500 sq. ft floor plan with two apartments, including ground floor, basement, and roof plans.Integrated necessary fittings, fixtures, and electrical equipment with calculated conduit designs.

Audio Steganography for Secure Data Transmission	2022

Implemented LSB coding for secure data transmission by embedding information within audio signals.

Wind Power Plant Simulation Using Simulink

Simulated a wind power plant using Simulink, focusing on energy generation and efficiency analysis.

Smart Solar Panel Monitoring and Solar Tracker

Developed a real-time solar panel monitoring system and designed an automated solar tracker for optimal energy generation.

REFERENCES

Dr. Celia Shahnaz	
Professor, Department of EEE, BUET, Bangladesh	*celia.shahnaz@gmail.com*

Dr. Shaikh Anowarul Fattah	
Professor, Department of EEE, BUET, Bangladesh	*fattah@eee.buet.ac.bd*