KAZI ABRAR MAHMUD

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EDUCATION

- **Bangladesh University of Engineering and Technology** *February 2020 - February 2025*
  BSc. in Electrical and Electronic Engineering Dhaka, Bangladesh
  - **Major**: Communication and Signal Processing(CSP)
  - **CGPA**: 3.94/4.00
  - **Relevant Coursework**:
    - Random Signals and Processes
    - Robotics and Automation
    - Digital Image Processing
    - Microprocessor and Embedded Systems
    - Wireless Communication
    - Radar and Satellite Communication
    - Optical Communication
    - Control Systems
    - Digital Electronics
    - Communication Systems
    - Digital Signal Processing
    - Continuous Signals and Linear Systems
    - Computer Networks
- **Adamjee Cantonment College** *June 2019*
  HSC in Science Dhaka, Bangladesh
  - **GPA**: 5.00/5.00

RESEARCH INTERESTS

- LLM based Robotics
- Large Language Model
- Deep learning
- Audio Signal Processing
- Computer Vision
- Autonomous Navigation

RESEARCH EXPERIENCE

November 2023 – Present

- **Undergraduate Thesis: Towards Empathetic Voice Assistants- Enhancing Long-Term Conversations with Small Language Models, Semantic Routing, and Emotion-Aware Speech Recognition**
  Supervisor: Dr. Mohammad Ariful Haque
  - Utilized a fine-tuned Small Language Model (SLM) with semantic routing to enable long-term conversations while reducing inference time. Developed a custom Emotion-Aware Speech Recognition model to enhance the context of SLM.

November 2023 – March 2025

- **Funded Research: University Helping Robot .A LLM based multi-agent robotic system.**
  Supervisor: Dr. Mohammad Ariful Haque
  - Currently working as the ROS developer ,integrating LLM agents with robot's low level hardware, with the ultimate goal of giving full control to the LLM agent.

INTERNSHIP EXPERIENCE

- **Bangladesh Data Center Company Limited (BDCCL) [🌐]** *June 2024 - July 2024*
  Industrial Attachment Joydebpur , Bangladesh
  - Gained hands-on experience by touring a highly secure 4th-tier data center. Observed and learned about advanced data center infrastructure, security protocols, and operational standards.

HONORS AND AWARDS

- **University Merit Scholarship :** Academic Honour by BUET (5 out of 7 semesters so far) 2020–2025
- **Dean's List Award :** Academic Honour by BUET (every semester so far)for being in the top 10% at every level 2021–2025
- **Undergraduate CSP Major Merit Position:** 1st among 65 candidates of Communication and Signal Processing Major
- **Govt. Merit Scholarship:** Award by the Ministry of Education, Bangladesh in HSC Examination in Dhaka Board, Bangladesh 2019

TECHNICAL SKILLS

- **Programming Languages:** ROS, Python, C/C++, Verilog, MATLAB, Processing 3
- **Hardware Skill:** STM32 boards ,ESP & Arduino boards, FPGA
- **Circuit Simulation and Design:** PSpice, Keil uVision,Autodesk EaglePCB
- **Network Simulation and Design:** CISO packet tracer
- **Others:** Linux ,Autodesk Fusion 360,AutoCAD,Overleaf(LaTex)

PENDING PUBLICATIONS

IoT based Home Automation and Security System with Intruder Recognition feature, *2nd International Conference on Next-Generation Computing, IoT, and Machine Learning (NCIM 2025)*

Kazi Abrar Mahmud, Fahim Ahmed, Shadman Sobhan, Anik Biswas Submitted for Review

NOTABLE PROJECTS

- **AgroBot: An Intelligent Vision-Guided System for Sustainable Weed Detection & Elimination. Under The Supervison of:** Dr. Celia Shahnaz
  - This Project was developed using ROS running on Raspberry pi 5 and incorporates finetuned vision model with autonumos navigation system to traverse a crop field and eliminate weeds in the most optimized manner.
- **Analytical Solution generation of n-DOF manipulator and simulation of joint state output on processing 3 based visualizer.**
  - It focuses on generating The homogenous matrix combination from input DH-parameters, this is especially usfull for higher order Robotic arm manipulator.
- **FOMO-vision model based autonomous robot for fire detection and suppression.**
  - The key feature of this project was to implement the vision model in a memory-constrained environment (ESP-32 board) and integrate it with its differential drive-based platform.
- **Speaker identification using Machine learning.**
  - This project focues on extracting features from speech segment using MFCC filters and use KNN to identify the person using a pre-existing dataset.
- **Poisson's Equation of Gravitational Potential analyzer using numerical method for 2-dimensional space**
  - A notable feature of this Gravitational Potential Analyzer is its interactivity. It has the capability to visualize the gravitational fields of multi-body system.
- **Direct-conversion receiver(DCR) based AM radio station.**
  - Implemented DSB signal transmission and Direct Conversion Receiver (DCR) reception. Simulated in Eagle Schematics to optimize design. Finally developed hardware to establish the wireless communication.

REFERENCES

Dr. Mohammad Ariful Haque
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