Sabbir Hossain Ujjal

Email: sabbirhossainujjal.buet@gmail.com
Phone: (+880) 1878110035
LinkedIn: Sabbir Hossain Ujjal **Github:** Sabbir Hossain Ujjal **Website:** Sabbir Hossain Ujjal

Education

- **Bachelor of Science in Electrical and Electronic Engineering (EEE)** *May 2023*
  Major in Communication & Signal Processing (CSP)
  Bangladesh University of Engineering and Technology (BUET)
  - **CGPA - 3.75/4.00**
- **Higher Secondary School Certificate (HSC)** *2017*
  Dhaka College. (**GPA:** 5.0/5.0)
- **Secondary School Certificate (SSC)** *2015*
  Shamsul Hoque Khan School & College (**GPA:** 5.0/5.0)

Research Interest

Natural Language Processing, Conversational AI, Large Language Model, Human Robot Interaction, Deep Learning, Machine Learning, Computer Vision

Work Experience

Machine Learning Engineer *Oct 2023 - Present*
ACI Limited

- **Virtual Assistant:** Developed a virtual assistant for farmers leveraging **ASR**, **LLM**, and **RAG** techniques, ensuring 24-hour customer service and providing essential farming information and solutions to their problems.
- **Voice Based Ordering System:** Developed an end-to-end **ASR** based system to help the sales representatives in accelerating the ordering process through voice commands.
- **Writing Assistant:** Developed an end-to-end **LLM** based system for crafting professional reports and emails ensuring report standard and proper articulated format which increases the employees productivity.
- **End-to-End ASR Service:** Developed an end-to-end system leveraging **ASR** technology to streamline various tasks within the company, including transcribing meetings, summarizing key points, and identifying important topics which enhanced efficiency across the board.

Machine Learning Engineer *Aug 2023 - Oct 2023*
AIEdgeInside - [AI Startup]

- **Computer Vision:** Developed system utilizing **computer vision** models for various applications.
- **Generative AI:** Researched and experimented with vision **generative models** for building applications.

Publications

- **mTOVA: A Multilingual Task Oriented Virtual Assistant for Human Computer Communication**
  - **Status:** Published
  - **Conference:** 5th IEEE International Conference on Telecommunications and Photonics (ICTP) 2023
  - **Authors:** Sabbir Hossain Ujjal, A F M Mahfuzul Kabir, Mohammad Ariful Haque

Research Experience

Undergraduate Thesis under supervision of Dr. Mohammad Ariful Haque.
Research Topic: Development of a multilingual conversational agent using deep learning and natural language processing.

- In our thesis work, we had developed a multilingual conversational agent (CA) which can understand voice command and generate response to help perform day-to-day tasks both in Bangla and English. We used **RASA** platform for deploying our CA and **ASR** and **NLU** models for understanding user voice command.

Competitions

- **Robi Datathon 3.0 [Champion]**
  - Robi Datathon is the biggest data analysis competition in Bangladesh where we have to solve business oriented problem leveraging ML algorithms. My team '**ACI_ServerDown**' has become the champion, outshining 1,000 teams formed by 3,500 talented individuals.

- **ভাষা-বিচিত্রা: ASR for Regional Dialects [First Runner-up]**
  - The objective of this challenge is to create a robust model which transcribe Bengali speech with various regional dialects following the orthography set by linguists. My team **(কাকাতুয়া)** became the **first runner up** and our model was the fastest model for competing the task among the solutions.

- **Bengali.AI Speech Recognition [Leaderboard: 59/744]**
  - The objective of this challenge is to create a robust model which could recognize Bengali speech from out-of-distribution audio recordings. I finished in the top **8%** of the 744 competing teams, at position 59.

Achievements

- Dean's List Award in multiple semesters.
- RISE Student Research Grant Award.
- President's Scout Award.
- Scholarship from Secondary Education Board.

Academic Projects

- **AI Generated Text Detection**
  - A deep learning based project to build a system which can detect whether a given text is AI generated or Human written . The project was focused to build a robust model which accurately detect AI generated text which can help on different evaluation process.
  - Language/Framework: Python, Pytorch
  - Link: AI Generated Text Detection
- **Resume Classification and Sorting**
  - Design an deep learning based end-to-end system that can classify a given resume and sort them in customized folders. This project was designed for seamless integration into any company's recruitment process, enhancing efficiency and effectiveness in candidate evaluation and selection.
  - Language/Framework: Python, Pytorch
  - Link: Resume-Classification
- **Bengali Name Extractor**
  - A deep learning based project to build a system which can extract person name from given text. The project was focused to build a robust model which can extract any person name which can be used in any call center and online voice based transaction systems.
  - Language/Framework: Python, Pytorch
  - Link: Bengali-Person-Name-Extractor
- **Real Time Object Detection for Blind People.**
  - A deep learning based project to developed and end-to-end system for detecting object from an image and audibly sending these detected object messages to the user.
  - Language/platform: Python, Colab
  - Link: Real-Time-Object-Detection-for-Blind-People
- **Drowsiness Detection by PPG signal Analysis.**
  - Proposed and implemented an wearable device for detecting drowsiness using PPG signal. Our designed device can detect drowsiness and send user an alarm to prevent drowsiness which can be very helpful in reducing road accidents.
  - Language/platform: Matlab, C++, Arduino

- **Real Time Covid Patient Monitoring.**
  - IOT based project where we proposed a monitoring system for covid patient and notify concern people in case of emergency. We used a deep learning based model for analysis and monitoring patient data.
  - Language/platform: Python, C++, Arduino
  - Link: Cough-Rate-estimation-for-Covid-Patient-monitoring-system-using-Deep-learning
- **Bangla Calendar Clock.**
  - A microprocessor based project where we developed a device which can show time, date, day of the week in Bangla and date not only in normal Gregorian calendar system but also Bengali date and Arabic date system. Our developed clock was later selected and hung on the microprocessor lab of BUET EEE department.
  - Language/platform: C++, Arduino
  - Link: Bangla Calendar Clock.

Relevant Coursework

- Deep Learning Specialization - [Course on Coursera offered by DeepLearning.AI]
- Machine Learning - [Course on Coursera offered by Stanford University]
- Python for Everyone - [Course on Coursera offered by University of Michigan]
- Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning -[Course on Coursera offered by DeepLearning.AI]
- Mathematics for Machine Learning Specialization - [Course on Coursera offered by Imperial College London]
- Signal and Linear Systems.
- Digital Signal Processing.
- Random Signal Processing.

Skills

- **Programming Languages:** Python, C, C++, MATLAB.
- **Frameworks & Libraries:** PyTorch, TensorFlow, Keras, RASA, Numpy, Pandas, Scikit-learn.
- **Circuit Simulation and Design:** Proteus, PSpice
- **Others Tools/Software:** Git, LaTex, PowerPoint, Excel

Reference

Dr. Mohammad Ariful Haque
Professor
Electrical & Electronic Engineering (EEE), BUET
Email: arifulhoque@eee.buet.ac.bd

Dr. Ahmed Zubair
Associate Professor
Electrical & Electronic Engineering (EEE), BUET
Email: ahmedzubair@eee.buet.ac.bd