Abhijit Paul

NLP Engineer | Formal Verification

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EDUCATION

University of Dhaka - Institute of Information Technology, Bachelors of Science in Software Engineering(BSSE)   **3.92/4.00**
Organizations: IITSEC, DU Research Society(DURS), DU Band Society(DUBS)

Notre Dame College, Dhaka - Higher Secondary School Certification Examination   **5.0/5/0**

Accomplishment: Secured the 70th position out of 86,000 students in the DU Admission Examination.

DEVELOPMENT SKILLSET

Languages:	Python, JavaScript, Solidity, E-Lisp, TypeScript,Java, C, C++, SQL, Bash, Php, Rust
Libraries and Frameworks:	Angular, NodeJS, OpenCV, Hardhat, Scikit-Learn, Actix Framework(Rust), BNLTK, Solana, Metaplex
Development Tools:	Git, Docker, Azure Cloud, Linux/UNIX, Emacs, Jupyter Notebook, Emacs
Others:	Software Requirements Specification, Database Administration, Linux System Administration

EXPERIENCE

Samsung R&D Institute, Bangladesh | Software Test Engineer   Jan 2024 - June 2024

Working on Samsung applications to improve quality and additionally, improve software testing process as a CMMI Level 5 company. So far, I have submitted 2 SBPA papers and 1 Advanced Research Fund (ARF) proposal. From them, the ARF was approved and we received a grant of 3MM/1yr.

IIT, University of Dhaka | NLP Research under Dr. Ahmedul Kabir   May 2021 – Dec 2023

- o Researched NLP from scratch level bayesian language model - normalization to word embedding, LLMs, Bangla Sign Language, Spelling Correction, Topic Modeling, Information Retrieval, stemmers, parts-of-speech tagging, and many more.
- o As a research project lead, starting from reaching out to external organizations for resources, collaborations to recruiting new members, training and guiding them, leading the team towards the goal of the group and managing international relationships.

KolpoKoushol, Workshop by Universal Machine Inc, Silicon Valley, California.   Oct 10 – Oct 15, 2023
An open platform for talented individuals to work together and develop new ideas. I worked on an AI driven distributed Food Crowdfunding Solution for 4 days with food business owners and chefs. It felt similar to workin on HCI discipline where you just use any tool to solve a problem.

Softanbees Technologies Limited, Kolkata, India | Data science Intern   Nov 2021 – Dec 2021
- o Creating models like Early Prediction of Birth Weight Based on Maternal Factors.
- o Constructing documentation for research and technical content.

PUBLICATIONS

Stemming - The Evolution and Current State with a Focus on Bangla - On Review, EACL Conference   September, 2023
With the advent of LLM and generative agents, the need for a good stemmer is at an all time high. Bangla, being a low-resource high-inflectional language, has a natural need for good stemmers. In this research, we look at existing progress and provide future directions.

Exploring Diverse Coping Mechanisms in 2023: A Comprehensive Survey Across Backgrounds and Cultures. Arxiv   June, 2023
The work on coping mechanisms has been going on for decades. However, a critical problem with the existing literature is an intense use of small-scale surveys. This does not allow us to explore diverse coping mechanisms across cultures. In this work, we collect coping mechanisms from social media and classify them into existing taxonomy of coping mechanisms and emphasize the emergence of interesting coping mechanisms.

GRANTS

Advanced Research Fund, Samsung R&D Institute, Bangladesh   Jan 2025-Jan 2026
I secured a grant of 3 Man-Month for 1 year for a classified research task. It will start from January 2025 and last for 1 year. The grant was secured after 5 layers of verification and defense from Samsung R&D Institute, Bangladesh before being approved by Headquarter.

National Science Foundation (NSF), United States   Jan 2024-Present
I work on this NSF funded project under the supervision of Dr. Shebuti Rayana, Old Westbury SUNY.

PROJECTS

Assembly Line Management System | Versatile Garments Ltd | NodeJS, TypeScript, Angular, FastAPI, MySQL   **Machine Learning**
- o Conducting experimentation to find a NMF-based approach at detecting congestion in the assembly line.

o   Performing Software Requirements Specification after communicating with Versatile Garments Ltd to design our system.

Video Feature Based Sign Mimicking Evaluation System | Python, Angular, TypeScript, FastAPI, Keras   **Machine Learning**
   o   A platform where teachers can upload their videos in sign language, students can view them and take quizzes.
   o   Multiple experimentation starting from data creation to testing. Additionally, deployment in AWS Cloud Server.

Automated-Static-Control-Flow-Testing | React, TypeScript, FastAPI, Python   **Testing**
   o   Parsing C code to generate static control flow graphs from scratch and then hoisting variables to test using heuristics.
   o   Identifying independent paths and generating test cases for each of the independent paths discovered.

Representation Discrimination of Ethnic People in Bangladesh | Python   **Machine Learning**
   o   Performing topic modeling to identify the representation discrimination of ethnic people in Bangladesh.
   o   An ongoing effort of sentiment analysis to identify the general notion towards how people perceive the idea of ethnicity.

BNLP Knowledge Graph | Org Mode, Emacs Lisp, Firebase   **Research Artifact**
   o   The project is aimed at creating a hierarchical graph for BNLP, with subject nodes representing key topics and paper nodes representing papers related to those topics. We used tools readily available to use for nothing to fast-prototype it.

DAOist | Solidity, Hardhat, Design Patterns, IPFS   **Blockchain**
   o   A decentralized platform for DAO entities to communicate, vote NFTs and auction them using native DAO currency.
   o   A liquidity pool to automatically adjust exchange rates between DAO currencies based on liquidity availability.
   o   For each NFT exchange, Royalty is automatically transferred to the original owner of the NFT. Weighted voting scheme to select NFT.
   o   Creational pattern to simplify the process of creating DAO currency with the Royalty system, along with the DAO community.

Bangla Sign Language Learning Platform | Collaborative Project | Angular, TypeScript, FastAPI, MySQL   **Collaborative Project**
   o   A platform where teachers can upload their videos in sign language, students can view them and take quizzes.
   o   Multiple experimentation starting from data creation to testing. Additionally, deployment in AWS Cloud Server.

Dhaka University Bus Tracking System | Collaborative Project | Azure, React, JavaScript,LeafletJS, MySQL   **Deployed**
   o   Under the guidance of Dr. Naushin Nowar, leading a team of six towards creating a fast and scalable bus tracking system.
   o   Designed a distributed, anonymous implementation of Bus Tracking System. along with their business model.

NLP Library | C++, Gprof, gdb, Cmake   **SPL1**
   o   Implemented language model and a wide variety of smoothing and segmentation techniques to preprocess and post-process the data.
   o   Showed an application of the NLP library with a noisy channel model for spelling correction tasks and optimized existing research work.

More on Github: abj-paul

Awards

2023   **1st Runners-Up in Blockchain Segment, ITVerse, University of Dhaka, Bangladesh**
2023   **2nd Runners-Up in Notre Dame Inter-University Ideathon Contest, Bangladesh**
2023   **Finalist of National Blockchain Olympiad, Bangladesh**
2023   **1st Runners-up in Deep Learning Sprint, BUET, Bangladesh**
2023   **2nd-Runners up of IEEE BUP Project Showcasing, Bangladesh**
2020   **Champion of Datathon, Coding Objects Private Limited, India**

CERTIFICATES

2020   **"Industrial Data Science in Python", Coding Objects Private Limited, Kolkata, India.**

REFERENCE

Dr. Naushin Nower   **Dr. Ahmedul Kabir**   **Tahlil**
Professor   Associate Professor   Web3 Engineer
Institute of Information Technology,   Institute of Information Technology,   Tero Labs LLC
University of Dhaka   University of Dhaka   California, USA