

MD. SHARIAR KABIR

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Research Interests

NLP, Conversational AI, Data Science, Distributed Computing, Human-Computer Interaction

Publications

- EMNLP'23 BLP Workshop** Syed Mostofa Monsur, **Md Shariar Kabir** and Sakib Chowdhury. SynthNID: Synthetic Data to Improve End-to-end Bangla Document Key Information Extraction. [\[paper\]](#)
- Manuscript in progress** **Md Shariar Kabir** and Muhammad Abdullah Adnan. AgnoSVD: Dynamic Resource Allocation for Serverless Workloads Using Collaborative Filtering [\[paper\]](#)

Education

Bangladesh University of Engineering and Technology (BUET) 2019 - 2024

MSc in Computer Science & Engineering - Part time

CGPA: 3.75/4.00

Thesis: Dynamic Resource Allocation for Workloads in Serverless Architecture using Collaborative Filtering. Under the supervision of [Dr Muhammad Abdullah Adnan](#).

Coursework: Bioinformatics Algorithms, Distributed Computing Systems, Data Mining, Data Management in the Cloud, Advanced Database Systems, Advanced Artificial Intelligence.

Bangladesh University of Engineering and Technology (BUET) 2015 - 2019

BSc in Computer Science & Engineering

CGPA: 3.53/4.00

Thesis: Active Learning on Big Data; A research on how active learning can be applied to big data in a distributed cloud computing system. Under the supervision of [Dr Muhammad Abdullah Adnan](#). [\[report\]](#) [\[ppt\]](#)

Selected Coursework: Machine Learning, Pattern Recognition, Computer Graphics, Artificial Intelligence, Digital Image Processing, Data Structures, Database, Operating Systems.

Work Experience

Celloscope Limited September 2020 – Present

Senior AI Research Engineer

Dhaka, Bangladesh

Building AI-based solutions in local languages for broad user-centric intelligent applications that can save users' time and reduce complexity in daily banking-related tasks.

MedAIHealth Limited August 2021 – Present

NLP and Data Scientist - Part time

Remote

Extracting data-driven insights from multimodal raw medical data and enhancing the capabilities of large ASR models and LLMs to comprehend the nuances of medical symptoms better and develop a clinical decision support system.

GRP, ICT Division May 2019 – August 2020

DevOps

Dhaka, Bangladesh

Automating the deployment process and monitoring of numerous microservices.

Recent Industry Projects

Voice Banking Chatbot. January 2022 – March 2023

Bangladesh's pioneering Voice-based AI Chatbot using **RASA** for seamless banking activities, serving hundreds of thousands of real users. Agrani Bank is one of the largest state-owned banks in Bangladesh, with a huge number of customers who have very little access to information. Agrani Voice Banking makes banking services accessible to everyone. It is powered by Bengali ASR and a finetuned NLU engine for performing banking tasks in a natural language-driven way. It can behave *dynamically* based on the input messages by the user.

ASR System for Patient Symptoms. January 2022 – February 2023

ASR system for understanding medical symptoms spoken by patients in Bengali language. We trained the **DeepSpeech** model from scratch using audio data collected from consented users using our audio data collection portal. We finetuned the model for a noisy environment, using the 13 domain augmentations provided by Deepspeech. This model performed poorly when the user says any out-of-vocabulary words. Therefore we finetuned a **Whisper** (tiny) model which was trained using Bangla Mozilla Common Voice Dataset.

SynthCases Creator and Disease Recommendation System.

May 2023 – December 2023

A recommendation system using an ensemble of classifiers to predict diseases from patient symptoms. Trained on synthetic data mirroring real-world demographics, it considers risk factors, family, and medical history. The multi-layer pipeline predicts disease probabilities from symptoms, filters using a prevalence table by ethnicity, and then incorporates risk factors for final predictions.

End-to-end Bengali Document Key Information Extraction Using Synthetic Data.

September 2023

We propose a simple synthetic document image generation framework for Bengali documents. We finetune end-to-end models and report the key information extraction performances on real datasets. Short paper accepted in BLP Workshop at EMNLP'23.

Document AI.

September 2023 – October 2023

Finetuned large multimodal document key information extraction model with Bengali synthetic and real data. The model can perform key information extraction on various types of scanned/unstructured documents beating several benchmarks including commercially available OCR products.

Selected Academic Projects

wQFMSpark

September 2021 – November 2021

Performance Analysis of Species Tree Estimation Using wQFM in a Distributed System: Species tree estimation from Gene Trees is crucial in **Phylogeny**. Quartet-based estimation techniques like ASTRAL, QMC, and QFM are widely used, but some struggle with scalability. This project aims to redesign wQFM for scalability by distributing taxa and quartets across computational nodes exploring various clustering strategies. [\[report\]](#) [\[code\]](#)

3PC: Implementing the 3 Phase Commit.

March 2021

The goal of this project is to implement a consistent distributed music “playlist” using the three-phase commit protocol. A distributed playlist is an un-ordered list of song_name and URL pairs. The system can consist of two or many devices and ensures *consistency*, by satisfying the *ACID* property. [\[report\]](#) [\[code\]](#)

Solving The Hidato Puzzle Using CSP.

October 2020

Hidoku (or Hidato) puzzles, were invented by the mathematician Gyora Benedek. Surprisingly, these puzzles have turned out to be quite difficult for modern SAT solvers. Recently the inventor of this game proposed a more complex *Beehive Hidato*. The goal of this project was to explore ways to solve this puzzle using CSP. [\[report\]](#)

Modelling The Rehearsal Scheduling Problem.

October 2020

This problem originated at Lancaster University in the 1970s. It is reported to have been devised by a member of staff in the Management Science department, who was a member of an amateur orchestra and formalized the problem whilst waiting to play during a rehearsal. The goal of this project was to explore different ways to model this problem using CSP. [\[report\]](#)

Skills

Research:	Design Study, Technical Writing, System Design, Quick-Prototyping
Languages:	Python, Java, Shell, JavaScript, Scala, C, C++, \LaTeX , SQL, TypeQL, Assembly
Libraries:	Pandas, Datasets, ScikitLearn, OpenCV, Transformers, SpaCy, TensorFlow, PyTorch, SQLAlchemy, OpenGL, CTranslate2
Model Experience:	LLaMA, Falcon, Mixtral, Adapters, LoRA, QLoRA, DIET, BERT, DeepSpeech, Whisper, YOLOv5
Frameworks:	LangChain, RASA, Flask, FastAPI, Spark, PySpark, OpenWhisk, PyQT
Tools & Services:	Colab, Huggingface, Maven, NginX, Keycloak, Docker, Ansible, AWS EC2, AWS lambda, AWS Cognito, Grafana, PostgreSQL, TypeDB, Socket.IO

References

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Professor in CSE, Bangladesh University of Engineering and Technology (BUET)

Dr. Mamunur Rashid

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Assistant Professor in Bioinformatics, University of Birmingham

Dr. Shyama Shaha

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Chief Technical Officer, MedAI Health Limited