SHADAB HAFIZ CHOUDHURY

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Education

University of Maryland, Baltimore County   **Maryland, United States**
MS in Computer Science   Fall 2023 – Present

North South University   **Dhaka, Bangladesh**
BS in Computer Science and Engineering   Fall 2016 – Fall 2020

Publications

Quantifying Nanoparticles and Monomer-Dimer Distribution in Optical Images using Deep Learning

S. H. Choudhury and A. S. M. Mohsin, *Currently Under Review.*

Label-Free Quantification of Gold Nanoparticles at the Single-Cell level using Multi-Column Convolutional Neural Network

S. H. Choudhury and A. S. M. Mohsin, *Analyst*, 2024.

COVID-19 and Pneumonia Detection and Web Deployment from CT scan and X-ray Images Using Deep Learning

N. Islam, A. S. M. Mohsin, **S. H. Choudhury**, T. P. Shaer, A. Islam, O. Sadat, and N. H. Taz, *PLoS ONE*, 2024

A Comparative Study on Approaches to Acoustic Scene Classification Using CNNs

I. J. Ananya, S. Suad, **S. H. Choudhury**, and M. A. Khan, *MICAI 2021. Lecture Notes in Computer Science.*

Predicting the Possibility of COVID-19 Infection Using Fuzzy Logic System

S. H. Choudhury, A. J. Aurin, T. A. Mitaly, and R. M. Rahman, *Int'l Journal of Intelligent Information and Database Systems*, 2021.

Research

Graduate Independent Research   **January 2024 – May 2024**

LARA Lab   *University of Maryland, Baltimore County*   *Baltimore, United States*

- Fine-tuned and trained from scratch emotion-conditioned text-generation language models. Analysed available affective text datasets and designed user interfaces for AAC applications.

Research Assistant   **September 2021 – August 2023**

IoT, Applied Machine Learning & Nanotechnology Research Group   *Brac University*   *Dhaka, Bangladesh*

- Fine-tuned YOLO models and built custom density mapping CNNs for nanoparticle detection, measurement, and analysis in live cells. Achieved test accuracies ranging from 78% to 93% depending on the task.
- Labelled and pre-processed novel datasets consisting of over 400 images for counting and 30 images for object detection.
- Built two front-end websites and dashboards for displaying live water quality info and predictions and for displaying emergencies in real time. Used React, ChartJS and integrated Google Maps API and Firestore database.
- Designed MySQL database and built REST APIs to ingest data from hardware sensors and output to web.
- Improved predictions by 38% for a water quality forecasting problem. Applied time-series forecasting algorithms (ARIMA, Regressive models) on a custom dataset collected from scratch. implemented a Flask API to serve machine learning model predictions in real-time.
- Trained gradient boosted tree model to predict severity of trauma from sensor data for emergency response prioritization.
- Presented research projects and outcomes at poster sessions and other events.

Undergraduate Directed Research   **October 2020 – February 2021**

Department of Electrical and Computer Engineering   *North South University*   *Dhaka, Bangladesh*

- Analysed audio preprocessing techniques for feature extraction based on images and embeddings, then tested multiple neural network-based approaches for classifying environmental audio.
- Achieved 93% accuracy from spectrogram representations and 81% accuracy with very lightweight embeddings-based models.

Teaching

Graduate Teaching Assistant   **August 2023 – Ongoing**

University of Maryland, Baltimore County,   *Baltimore, Maryland, United States*

- TA for CMSC 341 – Data Structures. Proctored exams, and held office hours, both in-person and virtually, for questions related to course lectures, projects, and grading.

Marker   **February 2020 – June 2020**

Department of English and Modern Languages, North South University,   *Dhaka, Bangladesh*

- Marker for 4 sections of ENG102 (Introduction to Composition) and ENG105 (Advanced Composition). Proctored exams and quizzes, and graded exams, quiz papers and assignments with feedback.

Industry

Python Developer   **February 2023 – June 2023**

Dviz Technologies   *Dhaka, Bangladesh (Remote)*

- Prompt engineered inputs for a GPT 4.0 chatbot for recommending construction products. Also prompt engineered an automatic categorization pipeline to separate product categories into diverse subcategories.
- Designed ML algorithms to categorize and recommend online products based on their descriptions only. Used natural text embeddings by leveraging OpenAI's GPT 3.5 API and XGBoost classifiers. Achieved 90% accuracy.
- Developed endpoints for REST API using Django for data visualization and analytics dashboards for an environmental regulation platform.

Data Scientist and Machine Learning Engineer   **May 2022 – February 2023**

Neovotech   *Dhaka, Bangladesh (Remote)*

- Built English and Swedish multi-speaker text-to-speech models used for automatic video content creation product. Deployed it using FastAPI.
- Developed pipeline for image retrieval on outfits. Takes image of outfit as user input, embeds it using a CNN, and then uses FAISS vector search to fetch most similar outfit in database.
- Prototyped virtual outfit try-on. Tested multiple 2D image generation models and 3D object generation models.
- Built pipeline & selected model for outfit-generation StyleGAN model. Won Storm AI Hackathon, H&M Retail Category with Team Styler.

Data Scientist and Machine Learning Intern   **February 2022 – May 2022**

Eucaps AB | Neovotech   *Stockholm, Sweden (Remote)*

- Built automated data scrapers for data mining financial news and stocks websites using Selenium and BeautifulSoup. Developed and tested 8+ crawlers, increasing volume of data collected by 27%.
- Automated data cleaning and Swedish-to-English neural machine translation for processing scraped articles.

Skills

Programming	Python, JavaScript
Technologies	Git, Docker, Linux, MySQL, MongoDB, ImageJ, Google Firebase, Amazon EC2
Libraries	PyTorch, OpenCV, Pandas, NumPy, Librosa, FastAPI, Matplotlib, SciKit-learn, Django, Flask, Selenium, RabbitMQ, Gradio, Scrapy, BeautifulSoup, ReactJS, SvelteJS
Languages	English, Bengali

Presentations and Talks

Water Analytics Tools: Quality & Quantity Monitoring and Purification Using IoT, ML & Nanotechnology   **2022**

Poster Presentation at Brac University Research Day 2022

Workshop on Python by NSU ACM Student Chapter R&D   **2020**

A workshop on Python held internally within NSU ACM Student Chapter. Covered fundamentals of python programming.

Honours and Awards

☆ Merit-based Scholarship from North South University (50% Tuition Waiver)   **2016 – 2020**

☆ The Daily Star O and A-Level Awards for Academic Excellence   **2015, 2017**

Certificates and Additional Education

Deep Learning Summer School   **July 2022**

Neuromatch Academy

Topics covered include MLPs, Optimization and Regularization, Convolutional Neural Networks, Generative Models, Time Series, NLP, Attention and Transformers, and Reinforcement Learning.

Certificate in Quantum Computing – Qubit x Qubit   **October 2020 – May 2021**

The Coding School

Topics covered include Mathematics for Quantum Physics, Quantum Mechanics, Quantum Programming and Quantum Algorithms.

Extracurriculars

NSU ACM Student Chapter   **2017 – 2020**

Chapter Officer, Webmaster from December 2019 to December 2020

- Organized and led research and development meetings. Assisted in organizing workshops on Python and Motion Graphics, plus group study for Machine Learning.
- Additionally, directed social media presence and outreach of the Chapter. Successfully promoted national-scale competitive events with up to 600 participants.
- Member from 2017 to 2019. *Awarded Best Member of Publications Team.*

Other

- Water Innovation Challenge Competition 2021 by Bangladesh 2030 Water Resources Group, *Final Round*
- Wordsmiths 2018 by NSU Department of English and Modern Languages and NSU Communications Club. *Won Second Place*