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Muhammad Zubair Hasan

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Education

University of North Texas *August 2024 – Present*
MSc in Computer Science and Engineering (Ongoing). Current **CGPA 4.0/4.0**

Military Institute of Science and Technology (MIST) *February 2017 - March 2021*
B.Sc in Computer Science and Engineering. **Last 2 semester CGPA 3.82/4.0**

Research Interest

Computer Vision, NLP, Machine Learning(ML/DL/RL), Medical Imaging, Multi-Modal Learning, Human-Computer Interaction

Publications & Conference Presentations (Google Scholar)

1. Hasan, M.Z., Rifat, F.Y. (2025). Hybrid Ensemble of Segmentation-Assisted Classification and GBDT for Skin Cancer Detection with Engineered Metadata and Synthetic Lesions from ISIC 2024 Non-Dermoscopic 3D-TBP Images. arXiv preprint arXiv:2506.03420. https://arxiv.org/abs/2506.03420
2. Rahman, M., Mushfik, S., Rupak, M.A., Hasan, M.Z., Farukee, M.B., Suter, S.K. (2024). Exploring Challenges and Innovations in E-Commerce Recommendation Systems: A Comprehensive Review. In: Kumar, S., Balachandran, K., Kim, J.H., Bansal, J.C. (eds) Fourth Congress on Intelligent Systems. CIS 2023. Lecture Notes in Networks and Systems, vol 869. Springer, Singapore. https://doi.org/10.1007/978-981-99-9040-5_8
3. M. J. Alam, S. N. Ali and M. Z. Hasan, ***"A Robust CNN Framework with Dual Feedback Feature Accumulation for Detecting Pneumonia Opacity from Chest X-ray Images,"*** *in 2020 11th International Conference on Electrical and Computer Engineering (ICECE), 2020, pp. 77-80, doi: 10.1109/ICECE51571.2020.9393157.* Link
4. Alam, M.J., Hasan, M.Z., Rahman, M.M., Rahman, M.A., Sarker, N.H., Azad, S., Islam, T.N., Paul, B., Anjum, T., Halder, B., Fattah, S.A. (2025). An Optimized YOLOv5 Based Approach For Real-time Vehicle Detection At Road Intersections Using Fisheye Cameras. arXiv preprint arXiv:2502.04566. https://arxiv.org/abs/2502.04566

Research Experience

Toddler Activity Recognition **August 2024 - Present**
- Working on tracking toddler activity using accelerometer on hip and video data, to find correlation between cognitive development and early childhood activities. Current model improved baseline score by **5%**. Submitted paper to IEEE BHI 2025.

Diabetic Foot Ulcer (DFU) Classification & Segmentation Grand Challenge 2021 and 2022 **July 2022 — Present**
- The 2021 classification challenge was to detect infection, ischemia, none (no infection or ischemia), and both (infection and ischemia). Developed a novel **convolutional VIT-based** architecture which **placed 1st** in the live leaderboard.
- Proposed DFUSegNet for the 2022 DFU segmentation task, integrating a learnable preprocessor, multiscale encoder, boundary enhancement, and attention modules; achieved 70.78% state-of-the-art score. Paper currently under review at Pattern Recognition.

Brain Hemorrhage Segmentation from MRI **Oct 2022 - Dec 2022**
- Used **Atlas dataset**. For our research, 2D lesions were created from 3D MRI data.
- Implemented a modified CLCI-Net-based network with custom adaptive attention and loss function achieving 63% dice score.

Real-Time Vehicle Detection and Tracking at Junction from Fisheye Cameras Code **July 2020 — Nov 2020**
- Worked on this project as part of an international student competition **(VIP Cup)** organized by IEEE
- After Testing object detection models like YOLOV5, SSD, FRCNN and Efficietnet, YOlOV5x was selected.
- Handled fisheye and night-time image challenges like distortion, glares from traffic lights, etc., by creating separate pipelines for day and night. The imbalanced class issue was handled by upsampling pre-training on datasets (BDD-100k).
- Achieved accuracy of **92%** in the final round of the competition and **ranked runner-up**

Professional Experience April 2021 — Present

Graduate Teaching Assistant / University of North Texas, Denton, TX **Aug 2024 – Present**
- Taught lab sessions and graded students for the Introduction to Programming Using C/C++ (undergraduate) and software development for AI course (graduate).

Data Scientist / Celloscope Ltd, Dhaka, Bangladesh **Dec 2022 — July 2024**
- Developed an automated e-KYC pipeline which includes Face-Match, Video Liveness Detection, and National ID (NID) info extraction services. The system reduced manual verification time by **80%** and currently serving **500,000+ users**. Current **facial recognition solution is NIST compliant.**
- Developed APIs using FastAPI and deployed services using docker, CI/CD. Improved service RPS by **36%** using model quantization.
- Developed a system for Bengali license plate recognition which improved existing solution by 10%.

Jr Data Scientist / Kona Software Labs Ltd, Dhaka, Bangladesh **Apr 2021 — Nov 2022**

- Increased coupon redemption rates by **18%** by building a recommendation system integrating RFM and demographic features. Developed Flask APIs and automated deployment pipeline with Bash scripting and CI/CD, reducing deployment time by **50%**.
- Developed KNN-driven customer segmentation reports that identified top-performing coupons in each segment, guiding targeted marketing campaigns and improving overall coupon ROI by **15%**. **Cloudera** was used to analyze **10M+** user data.
- Implemented content-based, SVD-based, and hybrid recommendation models for similar food menu suggestions (for RnD)

Intern / Robi Axiata Ltd, Dhaka, Bangladesh **Dec 2019 — Jan 2020**

- Robi Axiata Ltd is the **second largest telecom company** in Bangladesh. Here, I analyzed pros and cons of Tableau and Power BI tool and submitted a report to the CTO
- Learned basic **tableau operations** like numeric ops, table joining, sorting, filtering, plotting and creating simple dashboards

Highlighted Undergraduate & Personal Projects

FinBot: AI-Powered-Chatbot-For-Personal-Finance-Management Code **Aug 2024 — Dec 2024**

- An AI-driven mobile app **(Flutter)** automating transaction tracking, budget monitoring, plot generation from user prompts, and **receipt-based expense categorization with >90% accuracy**. Features a FastAPI backend and a PostgreSQL database.
- Backend containerized using Docker and deployed on **GCP with CI/CD** pipelines, reducing deployment time by **50%**. Project followed an Agile workflow managed via a Kanban board.

App-based Bangla Book Reader System For The Blind (Capstone Project) Demo Backend App **Nov 2019 — Jan 2021**

- As part of the **capstone project**, an Android app was developed that takes pictures of book pages as input and sends them to our server, where our model converts the image to text and then to speech and sends back the output.
- The hardware part of the project consists of a book stand, smartphone, buttons, Arduino, and a Bluetooth module.
- Created our Bangla word dataset (no open source data was available) and trained EfficientnetB3 model for word classifier. Used OpenCV's EAST detector for word segmentation. Used Google's Bangla TTS API for TTS conversion

Android Malware Detection Using Machine Learning Code **November, 2021**

- Used the **Drebin and malware genome** dataset, Conducted EDA, calculated correlation of features, RFE for feature selection, and created a pipeline for testing multiple tree-based ensembling algorithms. Finally, **LightGBM** was selected, and an accuracy of 98% was achieved. I also created a script to extract permissions from APKs to test the model.

IoT Based Automated Entry System For Covid-19 Symptom Detection Code **Nov 2021 — Dec 2021**

- Created a **Raspberry Pi-based** entry system with **three levels** of risk detection.
- Interfaced an RFID **rc522** sensor for entry and login mechanics, a camera to get video feed for mask detection, an **MLX90614** temperature sensor for body temp, and an **MAX30100** SPO2 sensor for oxygen saturation measurement.
- For mask detection, a pre-trained ResNet-50 model was finetuned on the facial mask dataset. The model achieved 99% accuracy. Afterward, an automated workflow was programmed to execute each step properly (RFID, mask, temp, and oxygen saturation detection). Based on the risk points, users were validated, and data was stored in a **Firebase DB.**

Image Compression and Watermarking Tool Using Java Code **July 2018 — Nov 2018**

Online Courses

- Deep Learning Specialization by DeepLearing.AI Certificate Link
- The Data Science Course 2021: Complete Data Science Bootcamp Certificate Link
- Taming Big Data with Apache Spark and Python - Hands On! Certificate Link

Skills

Programming Languages:	Python, SQL, Bash, Java, MATLAB
Database Systems:	MySQL, Apache Hive, Firebase, PostgreSQL
ML Tools & Frameworks:	PyTorch, Tensorflow, Keras, Numpy, Pandas, Scikit-learn, Statsmodels, Surprise, OpenCV, Fastai, Albumentation, PySpark(MLLib), Transformers
Data Visualization:	Matplotlib, Seaborn, Plotly
Big Data Framework:	Cloudera, Hue, Impala
Web Development:	HTML, Flask, FastAPI

References

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