Fatima Nuzhat

Email: nuzhatf901@gmail.com
Web: fatima-nuzhat.github.io
Mobile: +8801401647383

Summary

I have recently completed my undergraduate degree in Computer Science and Engineering, specializing in **Computer Vision** and Machine Learning from **Shahjalal University of Science and Technology**. My expertise lies in facial emotion recognition using TensorFlow Lite on Android mobile devices, debiasing **Gait Recognition** models, and **Medical Image Segmentation**. Currently, I am working with **visual autoregressive modeling** and its implication for future scalable computer vision models and aim to reduce **data dependency** and increase **fairness** in their application in real life.

Education

Shahjalal University of Science & Technology — Sylhet, Bangladesh
B.Sc. (Engg.) in Computer Science and Engineering, — class of 2024
CGPA: **3.67/4.00** in the 85th percentile

Sylhet Government Women's College — Sylhet, Bangladesh
Higher Secondary Education, GPA: **5.00/5.00** — 2018

Skills

- **Programming Languages:** C/C++, Java, Python, SQL, JavaScript, HTML, CSS, Bash
- **Framework:** React.js, Node.js, Express
- **ML Library:** NumPy, SciPy, Scikit-learn, Keras, Pandas, Tensorflow, Tensorflow Lite, ML Kit
- **Version Control:** Git, Github

Experience

Research Internship

National University of Singapore, School of Computing, *July 2024 - Sept 2024*

- **Domain Adaptation of Gait Recognition Algorithms** During my 10-week internship under Dr. Terence Sim, I developed a novel triplet loss function to improve the generalizability of deep learning models for gait recognition. The approach addressed performance discrepancies across datasets by incorporating gait-related factors like silhouette, viewing angle, and clothing variations. The project, built on models like OpenGait and BigGait using the CCGR dataset, led to promising improvements in model performance and enhanced my technical and communication skills in a research setting.

Research work

- **Facial Emotion Recognition Using Mobile Devices: A TensorFlow Lite Approach with ML Kit Integration (2024)** Our research focused on real-time facial expression detection on Android, using TensorFlow Lite for model deployment and ML Kit for on-device processing. We developed a prototype system that extracted facial features for emotion classification, optimized for efficient resource usage and minimal power consumption, ensuring smooth performance on Android devices.
- **Cryptography** Explored cryptography algorithms including polygraphic ciphers, Vigenère, RSA, and AES (ECB, CBC, OFB) for text and image encryption. Implemented them in Bash and Python, enhancing understanding of cryptographic principles through practical applications.

Projects

- **Implementing UNet++ Segmentation Model for Respiratory Disease Detection (2024):** In this study, we use UNet++ for lung image segmentation to detect respiratory issues. While U-Net has excelled in medical image tasks, UNet++ improves IoU scores by up to 3.9 points using dense skip connections. Our model, built on this architecture, achieves strong results despite dataset limitations.
- **Cardiovascular Disease Predictor (2023):** Built a system to predict cardiovascular disease risk using logistic regression and neural networks, based on user inputs like age, weight, blood pressure, and lifestyle habits. The GitHub repository is here.
- **Apache Web Server (2023):** Utilized Apache web hosting for deploying and managing web applications, including creating dynamic forms and conducting various web development tasks. Employed Apache's features to ensure efficient and secure hosting environments.
- **Lab Management System (2022):** Built a web app using JavaScript, CSS, and MySQL to manage student profiles for practice sessions and contests. It includes progress tracking, task setting, and reminders to improve competitive programming skills. The GitHub repository is here.

Languages

- **Bengali:** Native
- **English:** CEFR Level C2
- **Korean:** CEFR Level B1

REFERENCE LIST

- **Dr. Sadia Sultana**, Associate Professor (Thesis Supervisor),
  Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet.
  Email: sadia-cse@sust.edu
  Mobile: +8801911089612
- **Dr. Mohammad Shahidur Rahman**, Professor,
  Computer Science and Engineering, Shahjalal University of Science and Technology, Sylhet.
  Email: rahmanms@sust.edu
  Mobile: +8801914930807