Ismam Nur Swapnil

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Education

Bangladesh University of Engineering and Technology — *Dhaka, Bangladesh*
BSc in Electrical and Electronic Engineering (Major in CSP) — *Feb 2020 – Feb 2025*

- **CGPA:** 3.73/4.0
- **Relevant Coursework:** Robotics and Automation, Artificial Intelligence and Machine Learning, Digital Image Processing, Random Signals and Processes, Microprocessor and Embedded Systems, Wireless Communication, Radar and Satellite Communication, Optical Communication, Control Systems, Digital Electronics, Communication Systems, Digital Signal Processing, Continuous Signals and Linear Systems etc.

Research Interests

- Artificial Intelligence
- Machine Learning
- Computer Vision
- Natural Language Processing
- Signal Processing
- Human-AI Interaction

Research Experience

- **Developed a Vision Language Model for Domain Specific Applications**

  Developed a **Vision-Language Chatbot** for skin disease detection, fine-tuned for medical diagnosis and conversations. Integrated **RAG** for real-time retrieval and **RLHF** for user-aligned responses. Optimized efficiency through **model pruning** while preserving capabilities.

- **Developing a Model Architecture for Liver Tumor Segmentation**

  Developed an optimized deep learning model for liver tumor segmentation using medical imaging datasets. Focused on data preprocessing, architecture design, and hyperparameter tuning to enhance accuracy and efficiency. The final model achieved improved segmentation quality with optimized computational performance.

Internship Experience

Bangladesh Satellite Company Limited — *Dhaka, Bangladesh*
Industrial Trainee — *June 2024*

- SOCC (Satellite Operations Control Centre)
- RFE (Radio Frequency Engineering)
- NOCC (Network Operations Control Centre)
- IT (Information Technology)

Technical Skills

- **Generative AI** : Multimodal LLM, RAG, Agents, Fine-Tuning, Reinforcement Learning with Human Feedback (RLHF), Model-pruning
- **ML-DL**: Traditional ML (Supervised and Unsupervised Learning), Deep Learning (Neural Networks, Attention Mechanisms), Image Processing (Feature Extraction, Object Detection, Segmentation and Enhancement)
- **Programming Languages**: Python, MATLAB, C/C++
- **Libraries and Tools**: PyTorch, TensorFlow, Keras, Pandas, NumPy
- **Circuit Design**: PSpice, LTSpice, Proteus, Quartus, Simulink
- **Other Tools**: Microsoft Word, Excel, PowerPoint, LaTeX

Notable Projects

- **AI Chatbot for Research Paper Analysis, Summarization and QA System**
  Built a RAG-powered chatbot with LLaMA-3.1 and FAISS for ArXiv paper retrieval, analysis, and discussion. Integrated Gradio for an NLP-based QA system, gaining experience in LangChain, HuggingFace embeddings, PDF processing, and API integration.
- **Skin Disease Classification using Concatenated Deep Learning Models**
  Developed an advanced deep learning model by combining multiple pre-trained networks to classify various skin diseases such as eczema, psoriasis, and melanoma. This approach improved classification accuracy and reduced false positives by leveraging ensemble learning techniques. Implemented extensive image preprocessing and augmentation for robust training.
- **IoT Based CCTV and Alarm System**
  Designed and implemented a smart IoT-based CCTV system integrated with motion detection and real-time alerts. The system included cloud-based storage for recorded footage and a smartphone app for remote access. It also featured an alarm system triggered by unauthorized access or suspicious activities.
- **Automated Smart Medical Waste Segregator**
  Developed an automated medical waste segregation system to classify and separate waste into biological, recyclable, and hazardous categories using sensors and AI algorithms. The system reduced human exposure to harmful materials and enhanced waste management efficiency.
- **Designing a Password-Based Bank Vault Security System using FPGA**
  Designed a secure bank vault system using FPGA technology with a multi-level password authentication mechanism. The system ensured high security by incorporating encryption techniques and resistance against brute force attacks. Simulated and tested the design for robustness and reliability.

Honors and Awards

- **University Merit Scholarship**, Bangladesh University of Engineering and Technology (BUET) — Awarded for academic excellence in 2 semesters.
- **Dean's List Award**, Bangladesh University of Engineering and Technology (BUET) — Recognized for achieving a GPA of 3.75+.
- **139th Position in BUET Undergraduate Admission Test** — Secured position among over 12,000 candidates.

References

Dr. Mohammad Ariful Haque
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Bangladesh University of Engineering and Technology
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Relationship: Undergraduate Thesis Supervisor

Dr. Mohammad Jahangir Alam
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