Mehedi Hasan Nipu

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Education

B.Sc. in Computer Science and Engineering January 2019 – January 2024
North South University Dhaka, Bangladesh
Undergraduate Thesis Title: Comparative Analysis of Deep Learning Algorithm for Multiple Disease Prediction
Number of Credits: 138

Work Experience

DEXIAN (BANGLADESH) LIMITED

Application Developer May 2025 – Present
Dhaka, Bangladesh

- **SFAGent: AI-Powered Salesforce Agentic Compliance System**
  - Created **Salesforce Apex Classes** to handle **Post and Get operations** seamlessly within Salesforce, allowing for easy interaction with Salesforce data through natural language queries.
  - Developed **Custom Functions** to manage the integration of Apex classes with **authentication tokens**, ensuring secure and efficient API communication.
  - Integrated **Azure AI Foundry Agent** to power the Agentic operations, enabling automated Salesforce workflows based on natural language inputs.
  - Developed a **FastAPI** for both text and **speech-to-text (STT)** functionality, leveraging **Azure OpenAI Whisper** for accurate audio-to-text conversion.
  - Built an intuitive **frontend** for both text and audio input, enabling users to perform Post and Get operations via natural language with an automatic **Agentic flow**, enhancing usability and efficiency.

  Tech Stack Used: Salesforce Sandbox, Apex Class, Azure AI Foundry, GPT-4.1, Whisper, FastAPI
  Live Link: SalesForce AI Agent

- **AI-Powered Automated Check Fraud Detection**
  - Developed an **AI-based automated check fraud detection system** that uses advanced machine learning techniques to identify fraudulent checks.
  - Leveraged **Azure Document Intelligence**, utilizing the prebuilt **US Bank Check Model** to validate critical components of the check, ensuring accuracy in verification.
  - Trained a **Siamese Neural Network** for signature matching, utilizing blacklist and reference signatures to detect fraudulent signatures and verify authenticity.
  - Categorized check images into three categories: **Safe, Suspicious, and Fraud**, to streamline the validation process and enhance fraud detection.
  - Developed a modern, responsive web application for seamless user interaction and **real-time fraud detection**, ensuring an efficient and secure experience for users.

  Tech Stack Used: Python, Azure Document Intelligence, Siamese Neural Network, React, Django, TensorFlow
  Demo: Interactive Application Demo
  Live Link: NFCU AI-Powered Check Fraud Detection System

- **GeoViz: Modern Flight-Based Compliance System**
  - Developed a modern, responsive web application for **geographic data visualization and coordinate analysis**, built with **Next.js, React, and shadcn/ui components**.
  - Integrated **real-time geographic data tracking** with **Leaflet.js maps** for dynamic coordinate visualization, supporting multiple data layers, including flights and pipelines.
  - Implemented sophisticated data analysis tools for accurate coverage calculation using the **Haversine formula** and the seamless integration of geographic and pipeline data.
  - Designed a modern **UI/UX system** with responsive design, optimized for desktop, tablet, and mobile devices, built with **shadcn/ui components, Tailwind CSS, and Lucide React icons**.
  - Created **dynamic geographic views** with multi-layer support, including combined views of flights and geographic data to streamline operational and compliance workflows.

  Tech Stack Used: Python, Next.js, React, Leaflet.js, shadcn/ui, Tailwind CSS, Lucide React, GeoJSON, Haversine Formula, Axios, Django
  Live Link: GeoViz - Geographic Data Visualization & Analysis

TIME RESEARCH AND INNOVATION LTD

AI and Machine Learning Researcher December 2024 – May 2025
Portsmouth, United Kingdom

- **GenBot: Advanced RAG-Based Web Chatbot with CrewAI**
  - Developed a pipeline for **vectorizing and storing unstructured data** (e.g., JSON files) using **OpenAI embeddings and ChromaDB** for fast retrieval.
  - Implemented **RAG-based agents** for data retrieval and dynamic chatbot responses, integrating **vector databases and external web search APIs**.
  - Designed a system for **refining and combining knowledge sources** to improve response accuracy and relevance in real-time chatbot interactions.
  - Designed **frontend with React JS** for an intuitive chatbot interface.
  - Evaluated **embedding models with RAGAS** to select the most effective model for specific needs.

  Tech Stack Used: Python, OpenAI, ChromaDB, LangChain, React, Google Custom Search API, WebCrawler, Playwright
  Live Link: GenBot Platform

- **Company Competitor Service Analysis and SWOT AI Agent**
  - Developed an **AI-powered agent system** for analyzing company details, extracting services, and identifying top competitors using **web scraping and OpenAI GPT models**.
  - Built a workflow to perform a **comprehensive SWOT analysis** of the company and its competitors, leveraging **dynamic AI responses** based on web content.
  - Implemented seamless integration of **data extraction, analysis, and report generation** to provide detailed insights into company positioning and the competitive landscape.

  Tech Stack Used: Python, OpenAI, Streamlit, BeautifulSoup, Pandas, GPT-4, OpenAI API, CrewAI
  Link: SWOT Analysis Agent

- **LLM Powered Legal Contract Generator**
  - Developed a **Flask-based web app** that enables seamless legal contract generation by leveraging **AI and OCR** to extract and refine contract text.

- Integrated **Groq's AI model and LLaMA Vision** for highly accurate processing of complex legal text, ensuring precision in content generation.
- Enabled users to input contract details through an intuitive interface, automating **section creation, content formatting, and legal language refinement** to generate professional formal agreements with minimal effort.
- Incorporated **OCR technology** for extracting text from scanned or image-based documents, making it easier to digitize and process existing legal contracts.
- Optimized contract flow by enabling **easy customization, error-free document formatting, and auto-generation of legal clauses** based on user inputs.

Tech Stack Used: Python, Flask, Groq API, LLaMA Vision, PyMuPDF, OpenCV
Live Link: PropoSign Contract Generator

Technical Skills

Programming Languages: Python, C
Web Development: HTML5, CSS3, FastAPI, Flask, React JS, Next.js, Streamlit
Database: MySQL
Deep Learning Frameworks: TensorFlow, Keras, PyTorch
LLM Application Frameworks: LangChain, LangSmith, Ragas, DeepEval, CrewAI
Cloud Services: Azure OpenAI, Azure AI Foundry, Azure SQL Database, Azure App Service, Azure Blob Storage, Docker, Azure Boards
Others: Vector Database, OpenCV, GitHub, GitHub Copilot, Linux, LLM Fine-tuning, Design Architecture and Data Flow Diagram, Data Scraping, Data Annotation, Data Analysis

Publications

Journals

- H. Ghosh, P. K. P, I. S. Rahat, **M. M. Hasan Nipu**, G. Rama Krishna, and J. V. R. Ravindra. "From Pixels to Pathology: The Power of CNNs in Detecting Tuberculosis." *EAI Endorsed Transactions on Pervasive Health and Technology*, Vol. 10, 2024. [Scopus Indexed] Link
- **B-LLM: A Unified Bayesian Framework for Uncertainty-Aware Medical Language Modeling.** [Under Review]
- **Persona-Driven Multi-Turn Reasoning: A Framework for Trustworthy and Interpretable Clinical Decision Support.** [Under Review]
- **Safe and Scalable Collaboration in Multi-Agent LLM Systems: A Comprehensive Review.** [Under Review]

Conference Proceedings

- I. S. Rahat, H. Ghosh, M. Al Adnan, **M. M. H. Nipu**, M. A. Ahmed and Q. S. T. Naz. "Deep Learning-Based Classification of Rice Varieties for Agricultural Applications." *2024 International Conference on Augmented Reality, Intelligent Systems, and Industrial Automation (ARIIA)*, Manipal, India, 2024, pp. 1-6, doi: 10.1109/ARIIA63345.2024.11051570. Link

Research Interests

Large Language Models, LLM Agents, Computer Vision, Human-LLM Interaction, AI in Healthcare, Trustworthy AI, Machine Learning Applications, Medical AI, Multi-Agent Systems, Natural Language Processing.