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RESEARCH INTERESTS

Language and Speech Processing: Information extraction, Text to speech, speech to text, Conversational AI, speech-to-speech Models

Generative AI : Large Language Models (LLMs), Retrieval Augmented Generation (RAG), Agentic AI

Computer Vision: Smart traffic monitoring systems, Vehicle detection, OCR, Biometric Recognition, Biomedical signal processing (ECG, EEG, PPG)

EDUCATION

Khulna University of Engineering & Technology, Khulna   *February, 2017 - April, 2022*

Department of Computer Science and Engineering   *B.Sc.(Eng.), CGPA: 3.41/4.00*

Thesis: An Study of Building Infrastructure Recognition Using Deep Learning Methods [GitHub]
Advisor: Prof. Dr. Sk. Md. Masudul Ahsan

RESEARCH PAPERS

F. Ahmed, M. Mahmudul Islam and S. M. Masudul Ahsan, "Building Infrastructure Classification with Hybrid Convolutional Neural Network Architecture," 2021 5th International Conference on Electrical Information and Communication Technology (EICT), Khulna, Bangladesh, 2021, pp. 1-6, doi: 10.1109/EICT54103.2021.9733635. [Link]

WORK EXPERIENCE

Business Automation Limited, Dhaka, Bangladesh   *November, 2024 - Present*

Machine Learning Engineer

- Developed an automatic speech recognition system for the English language.
- Developed a transformer-based AI model for next-word prediction for auto-suggestion in a product.
- Developed cluster-based remark suggestions in a product
- Developed a time series forecasting model for a product registration count.
- Data analysis on project cost estimation in the company data and perform EDA.
- Developed a website backend service using FastAPI and PostgreSQL that includes SMS and email sending modules, payment gateway integration, and custom PDF generation.

Next Solution Lab, Dhaka, Bangladesh   *February, 2024 - October, 2024*

AI Engineer

- Developed deep learning-based product, Virtual try-on. This application allows digitally try on clothes and accessories without the need to spend time traveling to and from stores. [Product Link]

- Developed deep learning-based OCR solution according to the business requirements

- Research and develop transformer-based Non-English Language model for text classification, question answering, text summarizing, etc.

AI Engineer (Associate)   *April, 2022 - January, 2024*

- Developed industrial analog and digital meter recognition solutions using object detection, text recognition. [Product Link]

- Developed name entity recognition (NER) solution for non-English documents for business requirements

- Conduct different R&D for Computer Vision and NLP-based paper implementation and product feature improvements. [QA on contract agreements]

SKILLS

Languages	Python, Java, C/C++, JavaScript, LaTex
Database	MySQL, PostgreSQL, MongoDB
ML/DL Framework	Tensorflow, Keras, Pytorch, SpaCy, Transformer, Scikit-learn, LangChain
ML/DL Tools	Ollama, EasyOCR, OpenCV, NLTK, Scipy, Pandas, Plotly, Gradio
Web development	FastAPI, Flask, Django, React JS, PHP

PROJECTS

Bangla Sentence Punctuation Restoration [GitHub]

A transformer-based Bangla model was used to build the sentence punctuation model. Llama 3.2 was also used to infer with non-punctuation sentence correction. FastAPI was used to prepare the API for deployment with Docker.

Tech Stack: BanglaBERT, LLM, Llama 3.2, FastAPI

Chat Bot using LLM with Gradio [GitHub]

The chatbot is built with Flask for the backend and uses a pre-trained model from Hugging Face for generating responses.

Tech Stack: LLM, Gen AI, Flask, Hugging Face

Chattogram language to standard bangla language conversion [GitHub]

Developed a transformer-based Seq2Seq model to convert local Chattogram language to standard Bangla. The data was processed by the sentencepice tokenizer.

Tech Stack: Python, PyTorch, Transformers, Seq2Seq

Automatic Wrong Side Vehicle Detection System [GitHub]

Developed a YOLO v10-based wrong-side vehicle movement detection. The wrong side vehicle was detected using a custom-trained YOLO v10 model and the license plate number was extracted using EasyOCR.

Tech Stack: Python, PyTorch, YOLOv10, EasyOCR

Named Entity Recognition using SpaCy transformers [GitHub]

Developed a transformer-based NER model to extract the entity of a document. The model was trained on the resume dataset.

Tech Stack: Python, PyTorch, Transformers, RoBERTa

Image Cryptography with Autoencoders [GitHub]

Image encryption and decryption using a chaotic map sequence and an autoencoder. It includes code for generating chaotic map sequences, shuffling and deshuffling images, preparing datasets, and computing performance metrics .

Tech Stack: Python, TensorFlow, OpenCV, CNN, Security

Bangla Roberta Question and Answer [GitHub]

Bangla Question Answering model architecture is the BERT-based Roberta Model, which is trained on Bangla QA data. For training this model, the Bangla QA data is converted into the SQuAD v2 format.

Tech Stack: Python, PyTorch, Transformer

Predicting Telco Customer Chrun using Machine Learning [GitHub]

Customer churn, which refers to customers ceasing their relationship with a company, is a significant metric that companies track to understand their service performance.

Tech Stack: Python, EDA, Scikit-learn

EXTRA CURRICULUM ACTIVITIES

Published Computer Science related tutorials in YouTube [Link] [26K+ views and 370+ subscribers]

Published **Natural Language Processing with Python** course on YouTube [Video Link] [GitHub]

General Secretary, Software Research & Development Community of KUET *Sep, 2020 - Apr, 2022*

REFERENCES

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