Tanvir Rahman Anik

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Professional Experience

Research Assistant

Al Jouf University. | Sakaka, Saudi Arabia

- Successfully managed all phases of research projects remotely under the supervision of Dr. Mohammad Azad, from experiment design and model development to manuscript preparation and journal submission.
- Conducted a review on diffusion models in health informatics, focusing on their use in medical imaging (anomaly detection, classification, generation, reconstruction, translation) and proposed future research to improve explainability, clinician involvement, and real-time applications.
- Developed a stacked ensemble model for KOA classification using Xception, EfficientNetB5, and InceptionV3, achieving high accuracy in both binary and multi-class tasks. Implemented advanced preprocessing techniques and explainability tools (Grad-CAM, Faster Score-CAM, LIME) for enhanced transparency.
- Currently investigating advanced diagnostic techniques for chronic kidney disease (CKD) using MRI and PET scan datasets, focusing on renal fibrosis detection and segmentation accuracy, while incorporating explainable AI for enhanced model transparency and early detection support.

Machine Learning Engineer

Bista Solutions Inc. | Dhaka, Bangladesh

- Designed a RAG Application (Acumen Helpbot) for seamless interaction with PDF documents, leveraging prompt engineering and NLP techniques to boost accuracy in extracting and responding to user queries based on embedded document data.
- Utilized BeautifulSoup for dynamic web scraping, transforming data into structured text datasets and stored embedding into ChromaDB for efficient retrieval. Developed a multi-agent chatbot for Odoo Co-pilot, integrated with GPT-4 and other LLMs to enhance conversational accuracy and domain-specific queries.
- Worked with leading LLMs (OpenAI GPT, Anthropic, LLaMA, Claude) for Text-to-SQL conversions. Fine-tuned LLaMA3.1 on specific Odoo database queries to significantly enhance precision and query handling.
- Developed chatbot APIs using Django and Flask, integrating real-time SQL query result visualizations to assist in data-driven decision-making within ERP systems.

Academic Credentials

Ahsanullah University of Science and Technology

Bachelor of Science in Computer Science and Engineering.

- **Relevant Courses:** Computer Architecture, Algorithms, Database, Numerical Methods, Information System Design and Software Engineering, Operating Systems, Computer Networks, Artificial Intelligence, Digital Image Processing.
- Thesis : "Skin Disease Classification Using Different Machine Learning techniques." Supervisor : Md. Emam Hossain, Developed an automated system using machine learning and deep learning to classify skin diseases, achieving over 90% accuracy on a custom dataset of 9,665 images, with Xception reaching 99.33% accuracy.

Publications

Journal

- 1. "A Systematic Review on Impact of Diffusion Models in Health Informatics: The Role of Explainable AI and Clinician Involvement." Mohammad Azad; Tanvir Rahman Anik. Computer Methods and Programs in Biomedicine (Under Reveiw).
- 2. "Automated Knee Osteoarthritis Diagnosis: A Stacked Ensemble Deep Learning Approach with Explainable AI Techniques." Mohammad Azad; Tanvir Rahman Anik. Journal of King Saud University - Computer and Information Sciences (Under Review).

Conference

- 1. "Analysis of Automated Skin Disease Classification Exploiting Different Machine Learning Techniques."- Tanvir Rahman Anik; Purnendu Talukder; Ishmam Faruki; Ifti Sam Ibn Rahman; Emam Hossain . 2023 IEEE 13th Annual Computing and Communication Workshop and Conference (CCWC 2023)Las Vegas, USA. Published Version:(IEEE Xplore).
- "An Empirical Study on Bengali News Headline Categorization Leveraging Different Machine Learning Techniques"-Aysha Gazi Mouri; Purnendu Talukder; Tanvir Rahman Anik; Ifti Sam Ibn Rahman; Sajib Kumar Saha Joy; Md. Tanvir Rouf Shawon. 25th International Conference on Computer and Information (ICCIT 2022) - Cox's Bazar, Bangladesh. Published Version: (IEEE Xplore).

July 2023 - Present

CGPA: 3.378/4.00

April 2018 - January 2023

May 2024 - Present

Technical Skills

•	Languages	: Python, C, C++, Java, HTML.		
•	Frameworks & Libraries	: Langchain, OpenCV, Django, Flask, Tensorflow, Py-Torch, Keras, Pandas, Numpy,		
		Seaborn, Android, Selenium WebDriver.		
•	Database	: MSSQL, PostgreSQL, Oracle.		
•	Machine Learning	: Regression, Clustering, Classification, Ensemle Learning, CNN, DNN, Transformers.		
•	DevOps Tools	ools : Git, Github, Docker, Python, CICD Pipeline, Nginx , Virtualization (VMWare).		
•	Others	thers : Latex, Arduino, Proteus, Microsoft Office, Adobe Photoshop, Adobe After Effects.		

Standardized Test Score

International English Language Testing System (IELTS) - 12th May, 2023

Overall	Listening	Reading	Writing	Speaking
7.0	7.5	7.0	6.5	6.0

Projects

• <u>LLM-Finetuning</u>

Django, PostgreSQL, GPT-4.0

This project involved fine-tuning the LLaMA3.1 model on specific Odoo database queries to significantly enhance the precision and handling of complex database interactions.

• Django-Chatbot

Django, PostgreSQL, GPT-4.0

The objective of this project is to build a chatbot using OpenAI's robust GPT4.0 language model. A Django web application incorporates the chatbot, enabling users to communicate with it in real-time and receive responses based on natural language inputs.

• WebChat

Flask, ChromaDB, Sentence Transformer, PSQL

Developed a chatbot using Sentence Transformer for embedding creation to understand website context, and implemented an API for seamless user interaction.

• Tech Review Point

C#, Asp.Net MVC, JS

A web application where users can share feedback, rating, and reviews of different tech products, and engage in discussions.

<u>Watch Price Prediction</u>

Python, Regression

A simple project on watch price prediction by training machine learning algorithms on a custom dataset. See all projects <u>here</u>

Co-Curricular Activities

- Second runner up in software project showcasing in AUST CSE Week 2022.
- Participated in Intra AUST Programming Contest 2018,2019,2020,2021.
- Participated in Soccer Bot section at Codeware Spring-19 in Ahsanullah University of Science & Technology.
- Participated in Line Follower Robot section at Codeware Spring-18 in Ahsanullah University of Science & Technology.

Extra Curricular Activities

- Worked actively in the organizing committee of Bappi Football Fieasta Spring 2022(Intra department football tournament) & AUST CSE El Cultivo Reliving (Cultural Festival) Spring 2022.
- Worked as a Biology teacher at a science coaching center, teaching students from various schools and colleges(2018-2022).
- General member at Ahsanullah University of Science and Technology Innovation & Design Club(2021-2022).

References

Mr. Emam Hossain (Undergraduate Thesis Supervisor) Assistant Professor Department of CSE, Ahsanullah University of Science & Technology, Dhaka, Bangladesh. Email : <u>emamhossain.cse@aust.edu</u> Dr. Mohammad Azad Assistant Professor Department of Computer Science, College of Computer and Information Sciences, Jouf University, Sakaka, Saudi Arabia. Email : <u>mmazad@ju.edu.sa</u>