

Abu Adnan Sadi

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RESEARCH INTERESTS

- Artificial Intelligence
- Machine Learning
- Natural Language Processing
- Computer Vision
- Explainable AI (XAI)
- Healthcare Informatics

EDUCATIONAL QUALIFICATION

North South University, Dhaka, Bangladesh

Bachelor of Science in Computer Science and Engineering (BSCSE) | 2019 - 2022

CGPA: 3.82 (out of 4.00), **Distinction:** Summa Cum Laude

EXPERIENCE

Junior AI Engineer | RoboFication LLC

Jan 2025 - Present

- Develop AI-driven automation solutions to optimize workflows.
- Currently building a full-stack web app utilizing real-time WebSocket communication and AI APIs (Speech-to-Text, LLMs).

Research Assistant | North South University

Supervisor: Dr. Mohammad Ashrafuzzaman Khan | Sep 2023 - Dec 2024

- Conducting research related to Natural Language Processing (NLP) and its application in the medical domain.
- Led a project that focused on developing an NLP-based assistive tool for performing automatic differential diagnosis.

PUBLICATIONS

Published:

- Abu Adnan Sadi**, Ziaul Hossain, Ashfaq Uddin Ahmed, and Md Tazin Morshed Shad. "A Comparative Study on Plant Diseases Using Object Detection Models." In Science and Information Conference, pp. 419-438. Cham: Springer Nature Switzerland, 2024.
- Md Yearat Hossain, Ifran Rahman Nijhum, Md Tazin Morshed Shad, **Abu Adnan Sadi**, Md Mahmudul Kabir Peyal, and Rashedur M. Rahman, "An end-to-end pollution analysis and detection system using artificial intelligence and object detection algorithms," Decision Analytics Journal, vol. 8, p. 100283, 2023, doi: <https://doi.org/10.1016/j.dajour.2023.100283>.
- Md Yearat Hossain, Ifran Rahman Nijhum, **Abu Adnan Sadi**, Md Tazin Morshed Shad, and Rashedur M. Rahman, "Visual Pollution Detection Using Google Street View and YOLO," 2021 IEEE 12th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON), New York, NY, USA, 2021, pp. 0433-0440, doi: [10.1109/UEMCON53757.2021.9666654](https://doi.org/10.1109/UEMCON53757.2021.9666654).

Preprints:

- Abu Adnan Sadi**, Mohammad Ashrafuzzaman Khan, and Lubaba Binte Saber. "Automatic Differential Diagnosis using Transformer-Based Multi-Label Sequence Classification." arXiv preprint [arXiv:2408.15827](https://arxiv.org/abs/2408.15827) (2024).
- Abu Adnan Sadi**, Labib Chowdhury, Nusrat Jahan, Mohammad Newaz Sharif Rafi, Radeya Chowdhury, Faisal Ahamed Khan, and Nabeel Mohammed. "Lmfloss: a hybrid loss for imbalanced medical image classification." arXiv preprint [arXiv:2212.12741](https://arxiv.org/abs/2212.12741) (2022).

RELEVANT UNDERGRADUATE COURSEWORK

Artificial Intelligence, Data Mining, Natural Language Processing (Special Topics), Data Structure & Algorithm, Design and Analysis of Algorithms, Introduction to Theory of Computation, Database Management System, Digital Logic, Discrete Mathematics, Computer Organization and Architecture, Operating Systems Design, Software Engineering, Concepts of Programming Language, Microprocessor Interfacing & Embedded System

TECHNICAL SKILLS

Languages: Python, Java, PHP, Javascript, C, C++

Frameworks: PyTorch, Laravel, Tensorflow, React, FastAPI

Python and ML Libraries: Scikit-learn, Hugging Face, OpenCV, Numpy, Pandas, Matplotlib, NLTK

Database: MySQL, SQLite, MongoDB, Azure Cosmos DB

Development Tools & Platforms: Docker, Node Package Manager, Azure

Version Control and Collaboration Tools: Git, Github, Trello, Slack, Overleaf

COMPLETED PROJECTS

Automatic Differential Diagnosis using Transformer-Based Multi-Label Sequence Classification.

Supervised by: Dr. Mohammad Ashrafuzzaman Khan

The project's aim was to utilize encoder-based transformer models to predict differential diagnoses based primarily on a patient's medical history and symptoms. We proposed an approach for transforming tabular patient data into textual patient reports to provide context to the language models. We fine-tuned models such as BERT, DistilBERT, RoBERTa, and Bio-BERT. We also designed several behavioral tests to stress test the models, identifying the limitations and areas for improvement.

LMFLOSS: A Hybrid Loss for Imbalanced Medical Image Classification.

Undergraduate Capstone Project | Supervised by: Dr. Nabeel Mohammed

In order to address the imbalance issue of medical image datasets, we proposed a hybrid loss framework called LMFLOSS. We performed a quantitative analysis of the performance of LMFLOSS along with existing loss functions across multiple datasets and CNN networks. Additionally, we provide qualitative analysis using Grad-CAM attention maps and UMAP projections.

Visual Pollution Detection using Google Street View and Object Detection Algorithms.

Supervised by: Dr. Mohammad Rashedur Rahman

The goal of this project was to use object detection models for the automatic detection of visual pollutants present in the environment. We created a new 'Visual Pollutant Dataset' by manually collecting images of Dhaka city from Google Street View. We cleaned and annotated the images, and then fine-tuned object detection models to detect the pollutants. Our findings were published in the 2021 IEEE UEMCON conference and the Decision Analytics Journal.

A Comparative Study on Plant Diseases Using Object Detection Models.

Supervised by: Dr. Ziaul Hossain

We performed a detailed comparative analysis of the performance of different object detection models for plant disease detection. We preprocessed and annotated image data from two datasets to prepare a hybrid dataset. We compared the performance of multiple models, such as YOLOv5, Scaled YOLOv4, and SSD. Our findings were published at the 12th SAI Computing Conference 2024.