

Abu Adnan Sadi

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RESEARCH INTEREST

- Artificial Intelligence
- Machine Learning
- Computer Vision
- Deep Learning
- Natural Language Processing
- 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)

EXPERIENCE

Research Assistant

North South University, Supervisor: Dr. Mohammad Ashrafuzzaman Khan | September 2023 - Present

- Conducting research on the application of Natural Language Processing (NLP) in the medical domain.
- Currently leading a project that focuses on developing an NLP-based assistive tool for performing automatic differential diagnosis.
- Published our findings as an Arxiv preprint entitled "Automatic Differential Diagnosis using Transformer-Based Multi-Label Sequence Classification."

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).

PROJECTS

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

Supervised by: Dr. Mohammad Ashrafuzzaman Khan

- This project aimed to explore the use of encoder-based transformer models for performing differential diagnosis through multi-label classification (MLC).
- Developed a data processing method to convert tabular patient data from a medical dataset and engineer them into patient reports suitable MLC.
- Developed a pipeline to fine-tune models such as BERT, DistilBERT, RoBERTa, and Bio-BERT.
- Designed several behavioral tests to stress test the models, identifying their robustness and areas for improvement for future work.

LMFLOSS: A Hybrid Loss For Imbalanced Medical Image Classification.

Undergraduate Capstone Project | Supervised by: Dr. Nabeel Mohammed

- Developed and implemented a novel hybrid loss framework (LMFLOSS) to handle the imbalance issue in medical image classification.
- Compared and analyzed the performance of different existing loss functions for imbalanced classification on multiple CNN network architectures.
- Extracted features from deep neural networks and generated attention maps, t-SNE, and UMAP projections for further analysis and understanding of the results.

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

Supervised by: Dr. Mohammad Rashedur Rahman

- Created a custom 'Visual Pollutant Dataset' by collecting images from Google Street View.
- Annotated the image data and fine-tuned object detection models for the task of visual pollution detection.
- Published our preliminary findings at the **2021 IEEE UEMCON** conference. An extension study of the conference paper was later published in the **Decision Analytics Journal**.

A Comparative Study on Plant Diseases Using Object Detection Models.

Supervised by: Dr. Ziaul Hossain

- Performed detailed comparative analysis of the performance of different object detection models for plant disease detection.
- Preprocessed and annotated image data from two datasets to prepare a hybrid dataset.
- Trained multiple variants of YOLO, such as YOLOv5-s, YOLOv5-x, and Scaled YOLOv4.
- Published our findings at the 12th **Computing Conference 2024**.

TECHNICAL SKILLS

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

Frameworks: PyTorch, Laravel, Tensorflow

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

Database: MySQL, SQLite

Version Control: Git, Github

Project Management Tools: Trello, Slack, Overleaf

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