

Abu Adnan Sadi

☎ +880-1768688586 | adnansadi52@gmail.com | [adnan-sadi.github.io](https://github.com/adnan-sadi)


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Khulna - 9100, Bangladesh

OBJECTIVE

Motivated Computer Science graduate with a deep interest in machine learning, natural language processing, and computer vision, driven by a passion for building intelligent tools that solve real-world problems. Experienced in conducting multidisciplinary AI research and publishing peer-reviewed papers. Gained hands-on experience developing AI-powered engineering tools and cloud-based web applications. Eager to take on new challenges, expand technical expertise, collaborate with domain experts, and make advancements in the field of artificial intelligence.

EXPERIENCE

- **RoboFication LLC (Remote)**  April 2025 - Present
AI Engineer Michigan, United States
 - Currently working on the development of the SysModeler, Inc. platform – a spin-out initiative from RoboFication LLC focused on the development of AI-augmented MBSE tools.
- January 2025 – April 2025
Junior AI Engineer
 - Contributed to the development of the core web platform for **RoboFication**, a centralized hub for all RoboFication tools.
 - Played a key role in building Robo Huddle Room — an AI-powered meeting assistant for engineers that provides live transcripts and automatically extracts key system design elements such as specifications, hazard analysis, and documentation.
 - Developed and deployed the backend services for RoboFication tools using Azure Kubernetes Services and Cosmos DB.
- **North South University** September 2023 - December 2024
Research Assistant | Supervisor: Dr. Mohammad Ashrafuzzaman Khan Dhaka, Bangladesh
 - Conducted research in areas related to Natural Language Processing (NLP) and its application in the medical domain.
 - Led a research that proposed a method for utilizing light-weight transformer-based models for automatic differential diagnosis based on patient medical history and symptoms.
 - Published our preprint on **ArXiv** (featured on **HuggingFace**) and a demo of the **diagnosis tool**, integrating eight fine-tuned transformer models.

EDUCATION

- **North South University** 2019 - 2022
Bachelor of Science in Computer Science and Engineering Dhaka, Bangladesh
 - **CGPA:** 3.82/4.00, **Distinction:** Summa Cum Laude

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PREPRINT, S=IN SUBMISSION

- [P.1] **Abu Adnan Sadi**, Mohammad Ashrafuzzaman Khan, and Lubaba Binte Saber. "Automatic Differential Diagnosis using Transformer-Based Multi-Label Sequence Classification.", arXiv preprint, 2024, doi: <https://doi.org/10.48550/arXiv.2408.15827>.
- [C.2] **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, doi: https://doi.org/10.1007/978-3-031-62269-4_29.
- [J.1] 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>.
- [S.1] **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, 2022, doi: <https://doi.org/10.48550/arXiv.2212.12741>.
- [C.1] 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.

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.

SKILLS

- **Programming Languages:** Python, Java, PHP, JavaScript, C, C++
- **Machine Learning & Data Analysis:** PyTorch, TensorFlow, Scikit-learn, Hugging Face, OpenCV, NumPy, Pandas, Matplotlib, NLTK
- **Web Technologies & Frameworks:** React, FastAPI, Laravel, WebSocket, Tailwind CSS, Vite, npm
- **Databases & Cloud Services:** MySQL, SQLite, MongoDB, Azure, Azure Cosmos DB, Azure Kubernetes Service
- **DevOps, Version Control & Collaboration:** Docker, Git, GitHub, Trello, Slack, Overleaf

RESEARCH INTERESTS

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

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, **Microprocessor Interfacing & Embedded Systems,** Database Management System, Digital Logic, Discrete Mathematics, Computer Organization and Architecture, **Electrical Circuits, Analog Electronics,** Operating Systems Design, Software Engineering, Concepts of Programming Language.