# NASIM MAHMUD NAYAN

smnoyan670@gmail.com     +8801742957256     nmnayan57.github.io/Portfolio/

## Education

- **University Of Information Technology And Sciences** B.Sc. in Computer Science Engineering
Graduated: Feb 2023 | GPA: 3.62/4.0

  **Relevant Coursework**: Object Oriented Programming, Databases, Discrete Maths, Data Structures and Algorithms, Operating Systems, Computer Networks, Machine Learning, Data Mining, Advance Data Structures and Algorithms, Information Retrieval, Image Processing.

## Research Interests

Artificial Intelligence, Machine Learning, Health Informatics, Medical Cyber-Physical Systems, Internet of Things (IoT), and Healthcare.

## Research Experience

- **Research Assistant,** July 2022 - Ongoing
Conducting independent research under Professor Mohammad Mobarak Hossain,
Shanto-Mariam University of Creative Technology, Department of Computer Science and Engineering
  - Developed a machine learning-based system to predict maternal health risks in collaboration with the professor. Implemented ML algorithms to identify critical patterns and risk factors, achieving 99% prediction accuracy for maternal health complications
  - Integrated Homomorphic encryption techniques to ensure secure handling and protection of patient data.
  - Systematically reviewed recent research on the Internet of Things used in different healthcare domain

- **Research Assistant,** Aug 2022 - Ongoing
Conducting independent research with Rising Research Lab
  - Developed an integrated and original method to forecast different types of illness (Diabetes, Parkinson's, Heart Disease, Breast Cancer) with Machine Learning and real-time application.
  - Developed IoT device to capture different Air elements to measure air pollution and implemented Machine learning to forecast air quality.

- **Research Assistant,** Jan 2023 - Ongoing
Conducting independent research with EMPATHY LAB IUB
  - Conducted advanced search and evaluation of articles to investigate the application of computer vision(CV) in the medical field. Identified Convolutional Neural Networks (CNN) as the dominant approach in medical CV research.
  - Conducted data preprocessing, including data balancing and feature engineering, to enhance predictive model accuracy. Implemented various machine learning algorithms and fine-tuned hyperparameters to optimize model performance and present findings in conferences and publications.

## Publications

Authored **9 publications**, including **7 Scopus-indexed** papers, with **60+** citations (**Google Scholar**).

### JOURNAL ARTICLES

- Hossain, M. M., **Nayan, N. M.**, et al. "A Medical Cyber-Physical System for Predicting Maternal Health in Developing Countries Using Machine Learning." Healthcare Analytics 2024, 100285. (Scopus-indexed, **Cited 28 times**). **Link**

- Hossain, M. M., Kashem, M.M., **Nayan, N. M.**, et al. "Artificial Intelligence-Driven Approach for Predicting Maternal Health Risk Factors." IEEE SEEDA-CECNSM 2024, pp. 153–158. (Scopus indexed, **Cited 2 times). Link**

- Alam, M., Islam, M.M., **Nayan, N. M.**, et al. "An IoT-Based Real-Time Environmental Monitoring System for Developing Areas." JARASET 2025, 52(1):106–121. (Scopus indexed, **Cited 1 time**). **Link**

- Sahidullah, Md, **Nayan, N. M.**, et al. "Date Fruit Classification with Machine Learning and Explainable Artificial Intelligence." IJCA 2023, 975:8887. (DOAJ indexed **, Cited 14 times). Link**

## JOURNAL ARTICLES CONTINUED

- Shakil, S.U.P. ,Kashem, M.A. , Islam,M.M., **Nayan, N. M.**, et al. "Investigation of Air Effluence Using IoT and Machine Learning." Springer ICETiC 2023, pp. 183–202. (Scopus indexed, **Cited 4 times). Link**

- Islam, M., **Nayan, N. M.**, et al. "Recent Advancements of Computer Vision in Healthcare: A Brief Review." IEIE Transactions on Smart Processing and Computing. (Scopus-indexed, **Cited 1 time**). **Link**

## CONFERENCE PAPERS

- **Nayan, N. M.**, et al. "SMOTE Oversampling and Near Miss Undersampling Based Diabetes Diagnosis from Imbalanced Dataset with XAI Visualization." IEEE ISCC 2023, pp. 1–6. (Scopus-indexed, **Cited 13 times**)**. Link**

- Islam, M. M., Shakil, S.U.P., **Nayan, N. M.**, et al. "Air Pollution Monitoring Using IoT and Machine Learning in the Perspective of Bangladesh."AETIC 2024, 8(3).(Scopus indexed)**. Link**

- Hossain, M. M., **Nayan, N. M.**, et al. "Enhancing the Security of Pregnancy Health Data Transmission through Homomorphic Encryption: An Advanced Model." Auerbach IoT Applications 2023, pp. 146–169. (Scopus-indexed).**. Link**

## Under Review Papers

- **Nayan, N. M.**, et al. "A Multi-Disease Prediction Framework: Leveraging Machine Learning and Real-Time Applications for Improved Health Outcomes." PLOS ONE. (Under review, Scopus-indexed).

- **Nayan, N. M.**, et al. "Machine Learning-Based Parkinson's Disease Prediction Utilizing SMOTE and Explainable AI Techniques." PLOS ONE. (Under review, Scopus-indexed).

- Jibon, F. A., **Nayan, N. M.**, et al. "An Intelligent Dual-Mode Fish Disease Detection Based on Hybrid Deep Learning Framework."Journal Name TBD. (Under review, Scopus-indexed)

# Professional Experience

### Machine Learning Engineer(Remote) | Programming Hero | Dec 2023 - Present.

- **Voice-Based Sell Agent:** Developed a voice-based virtual sales agent for a real estate agency using RAG, LangChain, DSPy, and FastAPI, enabling dynamic conversational capabilities (voice-to-text, text-to-response, response-to-speech) for organizational use.
- **Bad Posture Detection:** Designed a posture correction system using computer vision, integrated into the AI fitness guide, to detect bad posture and eye strain in real-time, providing feedback and desk setup recommendations. Technologies: Python, Mediapipe, Facemesh, OpenCV.
- **Assignment Score Prediction:** Built an assignment score prediction system by retrieving data via API, structuring it into a CSV file, and applying machine learning techniques (validation, hyperparameter tuning, ensemble methods, feature engineering, preprocessing, and data augmentation) to enhance prediction accuracy.

### AI Engineer | Primacy Infotech Ltd | July 2023 - Nov 2023.

- **Tour guide :** Spearheaded a team effort to create AI-powered tour planning tools for six historical sites in Bangladesh. These tools facilitated itinerary customization according to user preferences, enhancing the overall tour experience.

- **Virtual Trail Project:** Led a team in the development of an augmented reality tool aimed at enhancing online try-on experiences using a media pipeline.

# Teaching And Mentoring Experience

### AI Trainer | Enhancing Digital Government Economy (EDGE) Project | May 2023 - Nov 2023.

- Trained 50+ students in AI topics, including machine learning, natural language processing, and computer vision.
- Developed educational materials and provided mentorship to enhance students' AI skills

### Research Mentor, UITS Summer Research Program | Summer 2023 , 2024.
**University of Information Technology and Sciences**

- Mentored two individual undergraduate students, one group of three students, and one group of four students in research projects focused on machine learning and IoT applications.
- Guided the students in project design, data collection, implementation, and presentation of findings.

# Honors And Awards

- **Fastest problem solver:** UITS Victory Day Programming Contest — UITS , 2021
- **2nd/45:** Inter-university Programming Contest — UITS , 2022
- **1st/25:** Inter-university PowerPoint Presentation Competition — UITS , 2020
- **Employee of the month(August):** Primacy Infotech LTD — Primacy Infotech LTD, 2023

# Selected Undergraduate Project

- **Maternal App for Real-Time Maternal Health Risk Prediction**
  Developed a mobile app within a Medical Cyber-Physical System, using IoT and an XGBoost model (99% accuracy) to Predict maternal health risks in real-time for expectant mothers in Bangladesh. Enabled secure patient-doctor communication via chat. Technologies: Python, Streamlit, XGBoost, Scikit-learn, IoT sensors. Live, GitHub.
- **Multiple disease prediction systems using machine learning**
  An ML-based web application developed using the Streamlit framework allows users to monitor their real-time health condition by simply inputting values. Live, GitHub.
- **Dual-Mode Fish Disease Detection System using CNNs:**
  Developed an innovative fish disease detection system utilizing a dual-mode approach. Achieved 98.99% accuracy with Edge-Guided Analysis and compared performance across raw image mode models. Technologies & Tools: CNN, DenseNet169, VGG16, Xception, Python, OpenCV, TensorFlow. GitHub.

# Skills

- **Competitive Programming**
  **300+ problem solve**
  **Codeforces:** NM Nayan.
  **Beecrowd:** NMNAYAN.
- **Standardized Tests:**
  **GRE:** 307/340 (Q: 153, V: 154, A&W: 3.0)
  **TOEFL:** 98/120 (R: 28, L: 28, W: 21, S: 21)
  **Duolingo:** 135/160 ( P: 115, L:145, C:140,C:120)
  **IELTS:** 6.5/9.0 ( L: 7.0, S: 6.5, W: 5.5, R: 6.0)

- **Technical Skills**
  **Programming Language:** Python, C, C++, HTML, CSS
  **Machine Learning:** Sklearn, Tensorflow, Pandas, Matplotlib, Numpy, Openai, etc.
  **Framework:** Streamlit, Flaskapi, PyTorch,FastApi
  **Version Control:** Git, Github, Docker
  **Others:** Data structures · Algorithms
- **Research Skills:** Methodology, Data Analysis, Experimental Design, Literature Review, Data Manipulation.

# Campus Activities

**Junior executive |** programmer hub wings at UITS computer club — Jan. 2022 - Aug. 2022

**Senior executive |** research hub wings at UITS computer club — Oct. 2022 - Jan.2023

- Played a key role as an organizing member of UITS Zero One Fest 2022, collaborating with my team to coordinate the poster presentation event and ensure smooth execution.

# References

**Mohammad Mobarak Hossain,** Professor, Faculty of Engineering and Technology,
Shanto-Mariam University of Creative Technology
**Email:** mobarak.hossain@smuct.ac.bd
**Mobile:** +880 1715-659054

**Dr Jia Uddin,** Assistant Professor,
AI and Big Data Department, Endicott College, Woosong University, Daejeon, South Korea.
**Email:** jia.uddin@wsu.ac.kr
**Mobile:** 0082-1072620727

**Dr Jasim Uddin,** Senior Lecturer in Electronics Engineering, And Programme Director in Electronics & Computer Systems Engineering, Cardiff School of Technologies, Cardiff Metropolitan University, Uk
**Email:** juddin@cardiffmet.ac.uk
**Mobile:** +447737987851

**A.S.M Shafi,** Assistant professor
Department of Department of Computer Science and Engineering
University of Information Technology and Sciences
**Email:** asm.shafi@uits.edu.bd
**Mobile:** +8801741030289