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# NUR-E SARJINA KHAN

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Uttara, Dhaka-1230, Bangladesh

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## Professional Summary

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Analytical Computer Science professional focused on AI, Human-Computer Interaction, and robust system architecture. Proven aptitude for translating complex computational research into user-centric enterprise solutions through the development of sophisticated, multi-stack applications. Committed to advancing ethical AI and intuitive digital platforms by leveraging rigorous problem-solving to address high-level engineering challenges and enhance the synergy between users and technology.

## Education

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### American International University-Bangladesh (AIUB)

Dhaka, Bangladesh

September 2022 – December 2026 (Expected)

B.Sc. in Computer Science and Engineering

- CGPA: 3.98 / 4.00 (Up to 10th Semester) — Dean's List Recipient (three consecutive semesters)

### Uttara High School and College

Dhaka, Bangladesh

2021

Higher Secondary Certificate (HSC)

- GPA: 5.00 / 5.00

### Uttara High School and College

Dhaka, Bangladesh

2019

Secondary School Certificate (SSC)

- GPA: 5.00 / 5.00

## Publications

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### Conference Papers

- [C.1] **Nur-E Sarjina Khan**, Saumyadip Das, Muhammad Hasibur Rashid Chayon (2026). "Decoding Rider Risk: A Behavioral Archetype and XAI-Driven Approach to Predict Motorcycle Accident Severity." *16th IEEE International Conference on Control System, Computing and Engineering (ICCSCCE 2026)*, IEEE. Penang, Malaysia. **Accepted**; presented 28 June 2026. To be indexed in IEEE Xplore.
- [C.2] **Nur-E Sarjina Khan**, Saumyadip Das, Sazia Sharmin, Kamruddin Nur (2026). "A Comparison of State-Space Model and CNN Baselines: MambaOut-tiny vs. ResNet-50 and MobileNetV2 for Rice Leaf Disease Classification." *2026 IEEE 2nd International Conference on Quantum Photonics, Artificial Intelligence & Networking (QPAIN 2026)*, IEEE. 16–18 April 2026, Chattogram, Bangladesh. **Accepted**; presented 17 April 2026. To be indexed in IEEE Xplore.
- [C.3] Saumyadip Das, **Nur-E Sarjina Khan**, Md. Ahasan Habib Alif, Raiyan Bin Alam, Mahima Afroz, Niloy Paul, Md Sajid Hossain (2025). "SoilSense: An IoT-Based Soil Health Monitoring System for Smallholder Farmers in Bangladesh to Support Sustainable Agriculture." *7th International Conference on Electrical Information and Communication Technology (EICT 2025)*, IEEE. 18–20 December 2025, Khulna, Bangladesh. DOI: 10.1109/EICT68394.2025.11355612

### Journal Papers

- [J.1] Md. Owafeeuzzaman Patwary, Abtahi Islam, **Nur-E Sarjina Khan** et al. (2026). "The Ethics of AI Technology in Academic Work: Assessing the Line Between Assistance and Plagiarism." *International Journal of Electrical and Computer Engineering (IJECE)*, Vol. 16, Issue 2, pp. 924–944. DOI: 10.11591/ijece.v16i2.pp924-944

### Manuscripts Under Review

- [S.1] **Nur-E Sarjina Khan**, Saumyadip Das, Muhammad Firoz Mridha (2026). "DARENet: A Lightweight CNN-Transformer Framework for Resource-Constrained IoT-Based Aerial Object Classification." Submitted to *IEEE International Conference on Microwave, Antennas, RF and Sensors (MARSCON 2026)*.
- [S.2] Ranak Debnath, Ariful Islam, **Nur-E Sarjina Khan**, Saumyadip Das, Anik Kumar Saha, Firoz Ahmed (2026). "LLM-Driven Cardiovascular Disease Risk Prediction and the Predominant Influence of Smoking." Submitted to *IET Information Security*.

- [S.3] Samin Yasir, **Nur-E Sarjina Khan**, Saumyadip Das, Md. Nafi Al Tahosin Khan, Munif Shahrier Niloy, Anika Tahmina Chowdhury, Anik Kumar Saha (2026). "Reasoning Drift in Compressed Transformers: An Explainability Analysis of BERT, DistilBERT, and TinyBERT." Submitted to *International Journal of Modern Education and Computer Science (IJMECS)*.
- [S.4] **Nur-E Sarjina Khan**, Saumyadip Das et al. (2026). "HCNT-Net: An Explainable Hybrid ConvNeXt-Transformer Framework for Robust Rice Disease Classification via Cross-Dataset Analysis." Submitted to *IEEE International Conference on Engineering and Frontier Technologies (ICEFronT 2026)*.
- [S.5] Raiyan Bin Alam, Saumyadip Das, **Nur-E Sarjina Khan** et al. (2026). "A Joint CLAHE-Enhanced CNN-Transformer Framework for Imbalanced Nail Disease Classification." Submitted to *IEEE International Conference on Engineering and Frontier Technologies (ICEFronT 2026)*.

## Technical Skills

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**Programming Languages:** Python, C, C++, Java, C#, R

**Machine Learning & Deep Learning:** TensorFlow, PyTorch, Keras, Scikit-learn, CNN, State Space Model (SSM), Transformer, ResNet, MobileNet, MambaOut, ConvNeXt

**NLP & Large Language Models:** BERT, LSTM, LLM, Bangla NLP, Text Classification, Lemmatization

**Explainable AI (XAI):** SHAP, LIME, GradCAM, GradCAM++, feature importance analysis, model interpretability

**Data Science & Analytics:** NumPy, Pandas, Matplotlib, Seaborn, Joblib, Google Colab, Microsoft Power BI, SPSS, MATLAB

**Web Technologies:** HTML5, CSS3, JavaScript, PHP

**Database Systems:** MySQL, Oracle SQL, Microsoft SQL Server

**DevOps & Version Control:** Docker, Git, GitHub

**Design & Prototyping:** Figma, Autodesk AutoCAD

**Other Tools:** Microsoft Office Suite, Microsoft Project

**Soft Skills:** Critical thinking, Attention to detail, Problem-solving, Collaboration, Time management

## Projects

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### DocReader BD (Work in Progress)

*April 2026 – Present*

*NLP | Python, Transformers, OCR*

- Building an intelligent Bangla document reading and comprehension system that extracts, parses, and semantically understands text from scanned Bangla documents using OCR and transformer-based NLP models.
- Integrates multi-stage Bangla OCR preprocessing pipelines and layout analysis for structured document understanding, targeting 100M+ Bengali-speaking users.

### Bangla Lemmatizer (Work in Progress)

*April 2025 – Present*

*NLP Research Project | Python, NLTK, MySQL, HTML5, CSS, JavaScript, PHP*

- Co-developing a Bangla lemmatizer that maps inflected Bengali words to their root (lemma) forms using a novel English-subsidiary approach, leveraging cross-lingual morphological mappings to resolve Bengali morphological ambiguity.
- System architecture includes a lexicon database, suffix-stripping rules, and a web-based interface for interactive lemma lookup and validation.

### SafePath – Community Safety & Extremism Monitoring System

*Spring 2025 – Summer 2025*

*Full-Stack Web App + UI/UX | HTML5, CSS, JavaScript, PHP, MySQL, Figma*

- Built a full-stack web application for community-driven incident reporting, citizen voting, and administrative case resolution supporting 3 distinct user roles: citizen, authority, and admin.
- Designed a complete UI/UX prototype using Figma following the Prototyping SDLC model; published on Figma Community.

### SoilSense – IoT and Machine Learning-Based Soil Health Monitoring System

*Spring 2025*

*IoT + ML | ESP32, Microcontroller, Sensors, Python*

- Co-developed an ESP32-based IoT system monitoring real-time environmental data and applied machine learning regression to predict NPK values, enabling precision agriculture.
- Published at IEEE EICT 2025 and indexed in IEEE Xplore. DOI: 10.1109/EICT68394.2025.11355612

### Life of a River – Computer Graphics Simulation

*Spring 2025*

*Computer Graphics | C++, GLUT/OpenGL*

- Developed an animated OpenGL simulation depicting 5 ecological stages of a river with dynamic scene transitions illustrating the human impact on river ecosystems.

### Real Estate Management System

*Fall 2024 – 2025*

*Desktop Application | C#, .NET Framework, Microsoft SQL Server*

- Developed a scalable desktop application to manage property portfolios using asynchronous C# and SQL Server, with automated report generation and role-based access control.

### Doctor Appointment Management System

*Spring 2023 – 2024*

*Database + Desktop App | Java Swing, Oracle SQL, JDBC*

- Architected a normalised relational database (3NF) with JDBC connectivity for secure doctor-patient record management, appointment scheduling, and availability tracking via a Java Swing GUI.

## Gadget Shop Management System

Fall 2023 – 2024

Desktop Application | Java Swing, Oracle SQL, JDBC

- Built a retail inventory application using Java Swing and Oracle SQL with JDBC-driven CRUD operations for real-time stock tracking and automated sales processing.

## Experience

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### Private Educator — Physics, Chemistry, Mathematics (Classes 8–12)

2019 – 2024

Dhaka, Bangladesh

- Developed and delivered customised lesson plans simplifying advanced scientific principles to improve student comprehension and academic performance.
- Adapted teaching strategies to individual learning styles, consistently achieving measurable improvements in exam scores.

## Honors and Awards

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### Dean's List — Academic Excellence (3 consecutive semesters)

Fall 2023–2024, Spring 2023–2024, Fall 2024–2025

American International University-Bangladesh

- Awarded three consecutive semesters for maintaining a CGPA of 3.98/4.00.

### Quarter Finalist — Climate Science Olympiad 2023

June 2023

Global Competition | 55,000+ participants from 190+ countries

- Placed in the top quartile demonstrating expertise in climate mitigation strategies and sustainable development solutions.

### Excellent Performance Award (Freshmen Group)

December 2022

Science Poster Contest 2022, Department of Physics, AIUB

- Led a 3-person team to earn a Certificate of Appreciation for outstanding research and presentation at the AIUB Physics Department poster contest.

## Leadership and Volunteer Experience

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### Volunteer

July 2024

National STEAM Olympiad, organised by iTesseract

- Contributed to the successful execution of a national STEAM education event promoting Science, Technology, Engineering, Arts, and Mathematics to a national audience.

## Professional Memberships

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Student Member — IEEE AIUB Student Branch, IEEE Bangladesh Section

April 2026 – Present

General Member — AIUB Community of Engineering Students (ACES)

January 2023 – Present

## Certifications

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Introduction to Python — SoloLearn

March 2025

Dean's List Certificate (Fall 2024–2025) — AIUB

June 2025

Dean's List Certificate (Spring 2023–2024) — AIUB

June 2024

Dean's List Certificate (Fall 2023–2024) — AIUB

December 2023

Quarter Finalist, Climate Science Olympiad 2023

June 2023

Excellent Performance, Science Poster Contest 2022 — AIUB

December 2022

## Additional Information

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**Languages:** Bengali (Native), English (Duolingo Score: 130)

**Research Interests:** Explainable AI (XAI), Human-Computer Interaction (HCI), Deep Learning, Natural Language Processing, Computer Vision, IoT-Based Intelligent Systems

**Interests:** Problem solving, music, social commentary, mathematics and puzzles