








# MD. NAZRUL HUDA SHANTO

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## EDUCATION

### Oklahoma State University

Stillwater, Oklahoma, USA

Master of Science -Computer Science; GPA: 4.00/4.00

JAN 2024 - DEC 2025

## TECHNICAL SKILLS

**Languages:** Java, Python, JavaScript, SQL.

**AWS Tools:** Textract, Lambda, ECR, Opensearch, AmazonMQ, Secret Manager, S3, HTTP APIs.

**Backend Frameworks:** Node.js, Django, SpringBoot, Flask

**Machine Learning Platforms/Frameworks:** TensorFlow, PyTorch.

**Python Libraries:** Scikit-learn, Fitz, OpenCV, Pandas, Matplotlib, Tkinter, Seaborn, Numpy.

**Developer Tools:** Git, Heroku, HTML/CSS, Bootstrap, Linux

**Cloud and DevOps Tools:** Kubernetes, Docker, VirtualBox, Istio

## EXPERIENCE

### Graduate Research Assistant—Department of Computer Science, Oklahoma State University

Supervisor: *Dr. Sharmin Jahan*, Assistant Professor, *Oklahoma State University*

JAN 2024 - Present

- Set up microservices using Kubernetes and Istio.
- Extracted source IP, request behavior, and other traffic information from microservices using Envoy access logs and distributed tracing with Zipkin in Istio.
- Created a dataset using the extracted traffic requests and developed an ML model to detect suspicious users.
- Implemented adaptive security in distributed systems with Kubernetes and Istio service mesh.

### Junior Software Engineer—Tirzok Private Ltd.

February 2023 - December 2023

Dhaka, Bangladesh

**Project:** *Mortgage Management System.* **Client:** *Kramasoft* **Tasks:** *Automatic Document Validation*

- Implemented classifiers to identify document types, enhancing the system's ability to handle diverse document formats.
- Engineered a specialized document trimmer employing advanced classifiers to intelligently remove irrelevant pages from documents
- Developed robust data extraction processes using AWS Textract for various document types, ensuring the retrieval of crucial field values with precision.
- Built RESTful APIs using Spring Boot and PostgreSQL to facilitate auto validation processes.
- Integrated AmazonMQ (RabbitMQ) for seamless internal communication and Deployed in AWS Lambda using ECR.

**Project:** *Government-Citizen Interaction Portal.* **Client:** *Confidential* **Tasks:** *Citizen Portal, Role Management.*

- Crafted RESTful APIs for the citizen portal using Node.js and MongoDB.
- Architected a robust Role Management System using JWT authentication, Node.js, and MongoDB, ensuring secure and tailored access control.

**Project:** *Payroll and Tax Management System.* **Client:** *Payconz.* **Tasks:** *Multi Currency Conversion.*

- Developed a Flask-based currency conversion API integrated with PostgreSQL, facilitating real-time multi-currency payroll processing.
- Implemented APIs to generate comprehensive currency history reports for preceding months.

### Undergraduate Research Assistant—BRAC University

Remote

Lab: *Computing for Sustainability and Social Good (C2SG) Lab*

October 2020 - January 2023

Supervisor: *Jannatun Noor*, Assistant Professor, *Brac University.*

Consultant: *Prof. Dr. A. B. M. Alim Al Islam*, Professor, *Bangladesh University of Engineering and Technology.*

- Developed a novel framework for HCI4D researchers to approach HVECs in [Andharmanik](#) and [Ruma](#), executing Linear Regression with SPSS to understand participants' needs.
- Performed descriptive analysis to identify barriers in indigenous education in Bandarban District, created multiple prototypes, and finalized Indigenous Primary Education (IPE) content in three local indigenous languages.
- Decreased user waiting time for progressive JPEG by 54% and image size by 27% without compromising image quality; tested image qualities using SSIM and analyzed results from custom and [COCO Dataset](#).
- Emulated a blockchain network with 50 Nginx VM servers and used proxy servers to detect and mitigate 66.7% of DDoS attacks using memory management of the VMs.

## PROJECTS

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### Tackling Sexual Harassment on Public Transport with Deep Neural Network | *Pytorch*

[\[Link\]](#)

- Used kaggle dataset "[Car License Plate Detection](#)" for training and testing.

### Devising Faster Video Streaming Architecture with Low Bandwidth Video Compression Techniques |

[\[Link\]](#)

- This project is a part of the [Research Proposal](#). Compared different codecs for live video streaming.
- Used FFmpeg's libx264 for H.264, libx265 for H.265, and libvpx-vp9 for VP9. To compare qualities, used SSIM, PSNR, and VMAF. Tuned the settings in real-time functionality to imitate live video streaming.

### BRACU-ResearcherHub | *Django, Bootstrap, PostgreSQL*[\[Link\]](#)

- Social media for BRAC University researchers to find collaborators. Researchers can create separate research labs within specific research areas. If other researchers find the lab interesting; they can join and comment on the lab. An efficient way to find the next research collaborator.
- Used Django for backend and HTML, CSS and, Bootstrap for frontend.

### Imago | *Tkinter, Opencv*

[\[Link\]](#)

- Beautify your pictures by using filters, cropping, rotating, and lots of other features.
- Used Opencv to transform images and Tkinter to create the Graphical User Interface.

## PUBLICATIONS

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- J. Noor, **M. N. H. Shanto**, J. J. Mondal, M. G. Hossain, S. Chellappan and A. B. M. A. A. Islam, "Orchestrating Image Retrieval and Storage over A Cloud System," in *IEEE Transactions on Cloud Computing (IEEE TCC)*, doi: [10.1109/TCC.2022.3162790](#), March, 2022. [**Q1, Impact Factor: 5.938**] [\[PDF\]](#)
- **M. N. H. Shanto**, J. Noor, M. G. Z. A. Husna, and A. B. M. A. A. Islam, "Darkness under The Lamp: Shedding Light over Digital Divide And Its Consequences in The Little-Known Indigenous Communities Living over mountains in Bangladesh," in *CSCW 2024* [**Accepted for major revision**]. [\[PDF\]](#) [*Nominated for the second round (top 48.1%) in CHI '23; received notification on November 8, 2022*]
- F. F. Khan, N. M. Hossain, **M. N. H. Shanto**, S. B. Anwar and J. Noor, "Mitigating DDoS Attacks Using a Resource Sharing Network" in *2022 9th International Conference on Networking, Systems and Security (NSysS)*, doi: [10.1145/3569551.3569560](#) [\[PDF\]](#)
- J. Noor, T. Azhar, S. S. Karmakar, **M. N. H. Shanto**, F. E. Jannat, S. M. B. Hossain, and A. B. M. A. A. Islam, "Leveraging Pre-Primary Education of Indigenous Communities in Bangladesh through Participatory and Iterative Development of Online Resources.," in *Information Technology for Development*, [**In Review**]. [\[PDF\]](#)
- N. Rashid, J. Saha, R. I. Prova, N. Tasfia, **M. N. H. Shanto**, J. Noor. (2022). "Towards Devising a Fund Management System Using Blockchain." in *International Journal of Computer Science & Information Technology (IJCSIT)*, 12 (18), 225-238. doi: [10.5121/csit.2022.121820](#) [\[PDF\]](#)
- J. Noor, **M. N. H. Shanto**, M. G. Z. A. Husna, and A. B. M. A. A. Islam, "Towards Decolonizing HVECs-HCI: Multi Level Digital Divide of the little known highly vulnerable ethnic communities in Southeast Bandarban," in *CHI 2024* [**In Review**]. [\[PDF\]](#)

## RESEARCH ACHIEVEMENTS

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- Presented "Mitigating DDoS Attacks Using a Resource Sharing Network" in **9th International Conference on Networking, Systems and Security (9th NSysS 2022)**, on 20th December, 2022.
- Presented poster "Orchestrating Image Retrieval and Storage over A Cloud System" **8th International Conference on Networking, Systems and Security, December 21-23, 2021 (8th NSysS 2021)**
- Invited to attend **2022 ACM International Joint Conference on Pervasive and Ubiquitous Computing (Ubicomp'22)**, September 11—15, Atlanta, USA and Cambridge, UK.
- Received partial funds from "**Bangladesh University of Engineering and Technology**" to conduct fieldwork in Andharmanik.
- Received **US National Science Foundation under Grant 2014547** to pay additional page charges for publishing "Orchestrating Image Retrieval and Storage over A Cloud System" in *IEEE Transactions on Cloud Computing*.
- Invited to present our work in [ICCCN 2021 Workshops](#) by **The 30th International Conference on Computer Communications and Networks (ICCCN 2021)**, July 19 - 22, 2021, Athens, Greece.