

Rafi Ahammed Songram

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RESEARCH INTEREST

Machine Learning, Deep Learning, Computer Vision, Biomedical Imaging, Natural Language Processing

ACADEMIC CREDENTIALS

Bsc. in Computer Science and Engineering Rajshahi University of Engineering and Technology (RUET) ✉ CGPA: 3.38 / 4.00 [Final Year: 3.70 / 4]	Feb 2019 – May 2024 Rajshahi, Bangladesh
Notre Dame Collge (NDC) Higher Secondary School (Science) GPA : 5.00 / 5.00	Jul 2016 – Jul 2018 Dhaka, Bangladesh

RELEVANT COURSEWORK

- Machine Learning, Artificial Intelligence, Neural Network, Software Engineering, Information System and Design, Computer Security, Operating Systems, Bioinformatics, Computer Networks, Data Structures and Algorithms, Database Systems, Computer Graphics, Numerical Methods, Discrete Mathematics, Object Oriented Programming

PUBLICATIONS & RESEARCH EXPERIENCE

- 1. RAS-BengaliNet: A Novel lightweight custom Convolutional Neural Network for Enhanced Recognition of Hand- written Bangla Compound Characters** May 2023 – Feb 2024
Accepted [ICCA 2024 - International Conference on Computing Advancements]
 - Undergrad Thesis
 - Developed a lightweight CNN for Bengali character recognition, surpassing pretrained models in efficiency and interpretability via Grad-CAM.
 - **Tools and Technology:** Deep Learning(CNN), Python (Tensorflow, Keras, Scikit-learn)
 - **Supervisor(s):** S.M Mahedy Hasan ✉ (RUET) , Dr Md Al Mamun ✉ (RUET)
- 2. Network-Shield: Exploring the Efficacy of GRU Model in Intrusion Detection Using CIC-IDS 2018 Dataset** Sep 2023 – Apr 2024
Accepted (ICCA 2024 - International Conference on Computing Advancements)
 - Utilized a GRU model with SMOTE for data balancing and Random Forest for feature selection, effectively enhancing detection network intrusion.
 - **Tools and Technology:** Deep Learning(GRU), Python (Tensorflow, Keras, Scikit-learn)
 - **Supervisor(s):** Dr Md Shahid Ud Zaman ✉ (RUET)
- 3. Enhanced Osteoarthritis Classification through Transfer Learning and Hyperparameter-Tuned Multi-Layer Ensemble Models** Nov 2023 – Jun 2024
Accepted (International Conference on Innovations in Science, Engineering and Technology-ICISSET 2024)
 - Novel OA classification with fusion Fine-tuned hyperparameters and dataset balancing and Integrates pre-trained model with customized CNN
 - **Tools and Technology:** Deep Learning(CNN), Python (Tensorflow, Keras, Scikit-learn)
 - **Supervisor(s):** Azmain Yakın Srizon (RUET) ✉
- 4. Optimizing Brain Tumor Diagnosis: Hybrid Techniques Integrating Deep and Machine Learning on MRI Images** Sep 2023 – Sep 2024
Under Review (27th International Conference on Computer and Information Technology (ICCIT))
 - Innovative different hybrid techniques, merging deep learning with machine learning
 - **Tools and Technology:** Deep Learning(CNN), ML ,Python (Tensorflow, Keras, Scikit-learn)
 - **Supervisor(s):** Dr. Md. Ali Hossain (CSE Dept Head, RUET) ✉

5. SF-CXRnet: A Lightweight Dual-Channel Convolutional Neural Network for Enhanced Diagnosis of COVID-19 and Pneumonia from Chest X-Ray Images

Dec 2023 – Sep 2024

Under Review (27th International Conference on Computer and Information Technology (ICCIT))

- Innovative Lightweight Neural Architectures for COVID-19 and Pneumonia Prediction
- **Tools and Technology:** Deep Learning(CNN),Python (Tensorflow, Keras, Scikit-learn)
- **Supervisor(s):** Dr. Md. Ali Hossain (CSE Dept Head, RUET) [✉](#)

6. RAS-Compound Character Dataset: A Comprehensive Database for Handwritten Bangla Compound Characters and Recognition Using RAS-BengaliNet with Grad-CAM Visualization

May 2023 – Feb 2024

Expected [Journal: Pattern recognition-Q1]

- This work basically for optical character recognition Curated a specialized dataset to propel advancements in Natural Language Processing (NLP) research.
- **Tools and Technology:** Deep Learning(CNN), Python (Tensorflow, Keras, Scikit-learn)
- **Supervisor(s):** S.M Mahedy Hasan [✉](#) , Azmain Yakin Srizon [✉](#)

TECHNICAL SKILLS

Deep learning and Neural Network

- Language : Python
- Library : Matplotlib, NumPy, and Pandas
- Framework : TensorFlow, PyTorch, Scikit-learn, Keras

Web Development

Frontend: HTML,CSS, Javascript, Bootstrap
Backend : PHP, MySQL

Network Design

Tools: Cisco packet Tracer

Hardware and Microprocessor

- Circuit design
- Assembly Programming Language (x86 and 8086)
- Verilog Hardware description Language (HDL)

Problem Solving and Competitive Programming

Language : C++ and Python
Solved 300+ problem

- URI Online Judge : solved 70+ Problem
- Codeforces : solved 100+ problems and max rank 1362
- Leetcode : solved 30+ problem

Mathematics

- Calculus | linear Algebra | Number theory

Tools

- VScode | Code-Blocks | Cisco packet Tracer |
Logisim | Digital Simulator | XAMPP | LaTeX |
Draw-io | Canva

WORK EXPERIENCE

Machine Learning Intern (Remote)

Jun 2024 – Sep 2024

Encryptix-India

[[Linkedin profile](#)] [✉](#)

ACADEMIC PROJECTS

6-bit CPU design [✉](#)

2023

- **CPU Circuit Design:** Developed using "Digital" software simulation and Verilog HDL.
- **Functional ALU:** Implements essential operations like AND, ADD, and SHR.
- **ISA-Based Architecture:** Control unit, RAM, and registers crafted to follow a specific ISA design.
- Circuit design link [✉](#)
- Verilog HDL [✉](#)

Sign Language Detection [✉](#)

2022

Tools: Scikit-learn, Keras, Tensorflow

- **Extensive Dataset:** Over 5,000 images of diverse hand gestures.
- **Inclusive Communication:** Helps specially-abled individuals express themselves effortlessly.
- **Empowering Connection:** Bridges the gap between specially-abled and non-disabled individuals.

K-Nearest Neighbors Approach: Empowering Predictive Analytics for Heart Disease Detection [✉](#)

2022

Tools : Python (Panda, Scikit-learn, Seaborn)

- **KNN Predictive Analysis:** Leverages the K-Nearest Neighbors algorithm to assess 14 key features for accurate heart disease prediction, employing thorough preprocessing and optimization techniques and reliable tool for medical diagnosis.

- **Supervisor:** Rizoan Toufiq ☑

Predicting Diabetes: Multi-Layer Neural Network Approach for Early Detection ☑

2022

Tools : Python (Panda, Scikit-learn, Seaborn)

- **Robust MLNN Design:** Develops a Multi-Layer Neural Network to analyze key features like age, BMI, and glucose levels, employing thorough data preprocessing and optimizing performance through a well-analyzed backpropagation algorithm.
- **Impactful Insights:** Facilitates informed decision-making in healthcare by delivering actionable predictions for early diabetes detection.
- **Supervisor:** Rizoan Toufiq ☑

RUET Course Registration System ☑

2021

Tools: Java , MySQL

- **Streamlined Enrollment:** Simplifies course management with ease.
- **Effortless Student Data:** Efficiently handles student information and records.
- **Seamless Payments:** Simplifies and automates the payment process.

RUET PEDIA [Online News Portal] ☑

2021

Tools : Frontend : HTML,CSS, Javascript Backend : PHP Framework (Laravel)

- **Interactive Interface:** Engaging news portal with a commenting system, navigation navbar, and sections for recent updates and achievements.
- **Efficient Management:** Secure user authentication and an admin panel for easy content editing and management.

Donate Blood ☑

2020

Tools : CSS , JavaScript , PHP , MySQL

- **Donor Search:** Search by city or blood group to find willing donors.
- **Donor Availability:** View and connect with donors ready to donate immediately.
- **Donation Restriction:** Donation option disabled for 3 months post-donation.

STANDARDIZED EXAMINATIONS

Language Proficiency

- Bengali: Native language
- English: IELTS Score (Currently preparing for the test)

ACADEMIC SCHOLARSHIPS

Secondary School Certificate Board Scholarship [Talentpool]

Junior School Certificate Board Scholarship [Talentpool-District First]

LEADERSHIP ACTIVITIES

Organizing Team Member

- *TEDx RUET Event 2019*

Notre Dame College Association of RUET (NDCAR)

Vice President

- *Organized many competitions, Games, Quizzes and Cultural Events*

Astronomy & Science Society of RUET (ASSR)

Publication & Publicity Secretary

- *Organized National Science Fair*
- *Organized Cube Contest and Math and Physics olympiad*

REFERENCES

S. M. Mahedy Hasan, Assistant Professor, CSE-RUET, [Thesis Supervisor & Advisor]
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