Md. Mehedi Hasan

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EDUCATION

Rajshahi University of Engineering & Technology — Rajshahi, Bangladesh
*M.Sc. in Computer Science & Engineering; **GPA: 3.75/4.00*** — *Mar 2020 − May 2023*
*B.Sc. in Computer Science & Engineering; **GPA: 3.76/4.00*** — *Jan 2015 − Aug 2019*

RELEVANT COURSEWORK & THESIS

M.Sc. Coursework: Machine Learning, Advanced Digital Image Processing, Biometrics, Pattern Recognition, Software Testing, Evolutionary Algorithms

M.Sc. Thesis: *Bengali Handwritten Consonant Conjuncts Recognition by Utilizing Deep Convolutional Neural Network*

M.Sc. Supervisor: *Prof. Dr. Md. Ali Hossain*

B.Sc. Coursework: Data Structure, Computer Algorithms, Discrete Mathematics, Object Oriented Programming, Vector Analysis and Linear Algebra, Statistics and Queuing Theory, Database Systems, Computer Architecture and Design, Artificial Intelligence, Neural Network and Fuzzy Logic, Digital Image Processing, Software Engineering

B.Sc. Thesis: *A Combind Approach using Image Processing & Deep Learning to Detect Pneumonia from Chest XRay Image*

B.Sc. Supervisor: *Prof. Dr. Mir Md. Jahangir Kabir*

WORK EXPERIENCE

Rajshahi University of Engineering & Technology — Rajshahi, Bangladesh
Lecturer, Department of Mechatronics Engineering — *Jun 2021 − Present*
- Supervised 10 students in their undergrad thesis.
- Helped upgrading a laboratory named "Artificial Intelligence and Computer Simulation Lab".
- Courses Taught: Computer Fundamentals & Programming, Software Engineering, Microcontroller and Interfacing, Network and Communication Systems, Machine Learning Algorithms, Artificial Intelligence, Signal and Linear Systems and their corresponding sessional courses.

Bangladesh Army University of Engineering & Technology — Natore, Bangladesh
Lecturer, Department of Computer Science and Engineering — *Sep 2019 − May 2021*
- Supervised 15+ students in their undergrad thesis.
- Vice President of BAUET Computer Society, Vice President of BAUET Programming Club.
- Courses Taught: Computer Fundamentals, Introduction to Computer Systems, Structured Programming Language, Object Oriented Programming Language, Computer Network, Operating System, Software Engineering, Artificial Intelligence, VLSI Design and their corresponding sessional courses.

PUBLICATION & RESEARCH EXPERIENCE

Journals & Review Articles

- **M. M. Hasan**, M.A. Hossain, A.Y. Srizon, and A. Sayeed. "TaLU: A Hybrid Activation Function Combining Tanh and Rectified Linear Unit to Enhance Neural Networks." arXiv preprint arXiv:2305.04402 (2023).

- A. Y. Srizon, M. A. Hossain, **M. M. Hasan**, A. Sayeed, "Bornomala-Net: An Attention-Based Low-Cost Convolutional Neural Network for Bengali Handwritten Character Recognition", Pattern Analysis and Applications. Springer. [Under Review].

- A.R. Anik, K. Islam, M. Islam, **M.M. Hasan**, S.K. Das and M.F. Ali, "Non-invasive Portable Technologies for Monitoring Breast Cancer Related Lymphedema to Facilitate Telehealth: A Scoping Review", IEEE Journal of Biomedical and Health Informatics (J-BHI), 2023.

- S.H. Chowdhury, M. Sany, M. Ahamed, S.K. Das, F.R. Badal, P. Das, Z. Tasneem, **M. Hasan**, M. Islam, M. Ali, and S.H. Abhi, "A State-of-the-Art Computer Vision Adopting Non-Euclidean Deep-Learning Models", International Journal of Intelligent Systems, 2023.

- Mazumder, A., et al. "Towards next generation digital twin in robotics: Trends, scopes, challenges, and future." Heliyon (2023).

- C. Das et al., "Toward IoRT Collaborative Digital Twin Technology Enabled Future Surgical Sector: Technical Innovations, Opportunities and Challenges," in IEEE Access, vol. 10, pp. 129079-129104, 2022, doi: 10.1109/ACCESS.2022.3227644.

- M. Mashiata, T. Ali, P. Das, Z. Tasneem, M.F.R. Badal, S.K. Sarker, **M. M. Hasan** et al. "Towards assisting visually impaired individuals: A review on current status and future prospects." Biosensors and Bioelectronics: X 12 (2022): 100265.

- M. M. H. Sifat, S. M. Choudhury, S. K. Das, M. H. Ahamed, S. M. Muyeen, **M. M. Hasan**, M. F. Ali et al. "Towards electric digital twin grid: Technology and framework review." Energy and AI (2022): 100213.

- A. Biswas et al., "State-of-the-Art Review on Recent Advancements on Lateral Control of Autonomous Vehicles," in IEEE Access, vol. 10, pp. 114759-114786, 2022, doi: 10.1109/ACCESS.2022.3217213.

- A. Sayeed, Jungpil Shin, Md Al Mehedi Hasan, Azmain Yakin Srizon, and **M. M. Hasan**, "BengaliNet: A low-cost novel convolutional neural network for Bengali handwritten characters recognition." Applied Sciences 11, no. 15 (2021): 6845.

Conferences

- **M. M. Hasan**, M. A. Hossain, A.Y. Srizon and A. Sayeed, "JuktoMala: A Handwritten Bengali Consonant Conjuncts Dataset for Optical Character Recognition Using BiT-based M-ResNet-101x3 Architecture," 3rd International Conference on Electrical, Computer and Communication Engineering (ECCE 2023), Chottogram, Bangladesh, 2023, pp. 1-4

- A. Y. Srizon, M. A. Hossain, A. Sayeed and **M. M. Hasan**. "An Effective Approach for Handwritten Punctuation Recognition by Using a Low-cost Convolutional Neural Network." In 2022 4th International Conference on Sustainable Technologies for Industry 4.0, pp.1-6. IEEE, 2022.

- J. Uddin, I. Fahmida, S.I. Moyeen and **M. M. Hasan**, "DOTA2 Winner Team Prediction based on Stacked Bidirectional LSTM Network," 2022 4th International Conference on Electrical, Computer Telecommunication Engineering (ICECTE), 29-31 December 2022, Rajshahi-6204, Bangladesh

- P. Das, N. A. Asif, **M. M. Hasan**, S. H. Abhi, M.J. Tatha, S. D. Bristi, "Intelligent Door Controller Using Deep Learning-Based Network Pruned Face Recognition," 2022 International Conference on Computer and Information Technology (ICCIT), Cox Bazar, Bangladesh, 2022, pp. 1-4

- **M. M. Hasan**, M. A. Hossain, A.Y. Srizon and A. Sayeed, "ComNet: A Deep Convolutional Neural Network Capable of Classifying Compound Bengali Handwritten Characters High Number of Classes in a Data-Scarce State," 2022 International Conference on Computer and Information Technology (ICCIT), Cox Bazar, Bangladesh, 2022, pp. 1-4

- **M. M. Hasan**, A. Y. Srizon, A. Sayeed and M. A. M. Hasan, "High Performance Classification of Caltech-101 with a Transfer Learned Deep Convolutional Neural Network," 2021 International Conference on Information and Communication Technology for Sustainable Development (ICICT4SD), Dhaka, Bangladesh, 2021, pp. 35-39, doi: 10.1109/ICICT4SD50815.2021.9396917.

- **M. M. Hasan**, A. Y. Srizon, A. Sayeed and M. A. M. Hasan, "Bengali Handwritten Isolated Compound Characters Recognition by Applying Transfer Learned Deep Convolutional Neural Network," 2020 23rd International Conference on Computer and Information Technology (ICCIT), DHAKA, Bangladesh, 2020, pp. 1-6, doi: 10.1109/ICCIT51783.2020.9392699.

- **M. M. Hasan**, A. Y. Srizon, A. Sayeed and M. A. M. Hasan, "Classification of American Sign Language by Applying a Transfer Learned Deep Convolutional Neural Network," 2020 23rd International Conference on Computer and Information Technology (ICCIT), DHAKA, Bangladesh, 2020, pp. 1-6, doi: 10.1109/ICCIT51783.2020.9392703.

- **M. M. Hasan**, A. Y. Srizon, A. Sayeed and M. A. M. Hasan, "Accurate Recognition of Leukemia Sub-types by Utilizing a Transfer Learned Deep Convolutional Neural Network," 2020 11th International Conference on Electrical and Computer Engineering (ICECE), Dhaka, Bangladesh, 2020, pp. 427-430, doi: 10.1109/ICECE51571.2020.9393031.

- D. Tasmere, B. Ahmed and **M. M. Hasan**, "Bangla Sign Digits: A Dataset For Real Time Hand Gesture Recognition," 2020 11th International Conference on Electrical and Computer Engineering (ICECE), Dhaka, Bangladesh, 2020, pp. 186-189, doi: 10.1109/ICECE51571.2020.9393070.

- **M. M. Hasan**, A. Y. Srizon, A. Sayeed and M. A. M. Hasan, "High-Performance Object Recognition by Employing a Transfer Learned Deep Convolutional Neural Network," 2020 11th International Conference on Electrical and Computer Engineering (ICECE), Dhaka, Bangladesh, 2020, pp. 250-253, doi: 10.1109/ICECE51571.2020.9393032.

- **M. M. Hasan**, A. Y. Srizon, A. Sayeed and M. A. M. Hasan, "Handwritten Numerals Recognition by Employing a Transfer Learned Deep Convolution Neural Network for Diverse Literature," 2020 11th International Conference on Electrical and Computer Engineering (ICECE), Dhaka, Bangladesh, 2020, pp. 431-434, doi: 10.1109/ICECE51571.2020.9393079.

- A. Sayeed, **M. M. Hasan** and A. Y. Srizon, "Bengali Sign Language Characters Recognition by Utilizing Transfer Learned Deep Convolutional Neural Network," 2020 11th International Conference on Electrical and Computer Engineering (ICECE), Dhaka, Bangladesh, 2020, pp. 423-426, doi: 10.1109/ICECE51571.2020.9393087.

- **M. M. Hasan**, A. Y. Srizon, A. Sayeed and M. A. M. Hasan, "Bengali Handwritten Compound Characters Recognition by Utilizing Transfer Learning," 2020 11th International Conference on Electrical and Computer Engineering (ICECE), Dhaka, Bangladesh, 2020, pp. 218-221, doi: 10.1109/ICECE51571.2020.9393097.

- **M. M. Hasan**, A. Y. Srizon, A. Sayeed and M. A. M. Hasan, "Classification of Sign Language Characters by Applying a Deep Convolutional Neural Network," 2020 2nd International Conference on Advanced Information and Communication Technology (ICAICT), Dhaka, Bangladesh, 2020, pp. 434-438, doi: 10.1109/ICAICT51780.2020.9333456.

- **M. M. Hasan**, A. Y. Srizon and M. A. M. Hasan, "Classification of Bengali Sign Language Characters by Applying a Novel Deep Convolutional Neural Network," 2020 IEEE Region 10 Symposium (TENSYMP), Dhaka, Bangladesh, 2020, pp. 1303-1306, doi: 10.1109/TENSYMP50017.2020.9230658.

- **M. M. Hasan**, M. Md. Jahangir Kabir, M. R. Haque and M. Ahmed, "A Combined Approach Using Image Processing and Deep Learning to Detect Pneumonia from Chest X-Ray Image," 2019 3rd International Conference on Electrical, Computer & Telecommunication Engineering (ICECTE), Rajshahi, Bangladesh, 2019, pp. 89-92, doi: 10.1109/ICECTE48615.2019.9303543.

- M. Ahmed, M. M. Jahangir Kabir, M. Kabir and **M. M. Hasan**, "Identification of the Risk Factors of Cervical Cancer Applying Feature Selection Approaches," 2019 3rd International Conference on Electrical, Computer & Telecommunication Engineering (ICECTE), Rajshahi, Bangladesh, 2019, pp. 201-204, doi: 10.1109/ICECTE48615.2019.9303554.

- **M. M. Hasan**, M. R. Haque and M. M. J. Kabir, "Breast Cancer Diagnosis Models Using PCA and Different Neural Network Architectures," 2019 International Conference on Computer, Communication, Chemical, Materials and Electronic Engineering (IC4ME2), Rajshahi, Bangladesh, 2019, pp. 1-4, doi: 10.1109/IC4ME247184.2019.9036627.

Awards & Achievements

Recipient of Technical Scholarship of RUET Awarded Technical Scholarship for excellent result throughout the Bachelor period (2015-2019) with full tuition weiver and stipend.

Recipient of Bangladesh Education Board Scholarship-SSC level Awarded Bangladesh Education Board Scholarship for excellency in Secondary School Certificate (SSC) examination in General Grade-Full Tuition Fee waiver and stipend in Higher Secondary Certificate (HSC) for the period of 2012 to 2014.

Recipient of Bangladesh Education Board Scholarship-Grade 8 Awarded Bangladesh Education Board Scholarship for excellency in Grade 8 Scholarship examination in Talent-pool Grade-Full Tuition Fee waiver and stipend during Secondary School for the period of 2010 to 2011.

Recipient of Bangladesh Education Board Scholarship-Grade 5 Awarded Bangladesh Education Board Scholarship for excellency in Grade 5 Scholarship examination in Talent-pool Grade-Full Tuition Fee waiver and stipend during Secondary School for the period of 2007 to 2009.

Training & Volunteering Activities

Trainer "Hands on Python: Introduction to Machine Learning Universe", arranged by IEEE Robotic and Automation Society, Rajshahi University of Engineering & Technology, Bangladesh from 18-19 May 2023.

Trainer "Introduction to Oracle", arranged by Ministry of ICT, Bangladesh. 60 Hours long training session.

Trainer "Introduction to Blockchain Technology", arranged by Ministry of ICT, Bangladesh. 60 Hours long training session.

Judge "Hult Prize 2023", Department of Computer Science and Engineering, Bangladesh Army University of Engineering & Technology, Natore, Bangladesh on 28 February 2023

Judge "Mind Storm", arranged by the Department of Computer Science and Engineering, Bangladesh Army University of Engineering & Technology, Natore, Bangladesh

PROJECTS

Blockchain based Vending Machine | *GitHub*
- It's an example of Blockchain technology particularly Ethereum. Very simple vending machine project where the owner can initiate the machine, add resupply, cash out into another account if needed. Customers can purchase product through ether.
- Written in Solidity.

Juktomala dataset | *GitHub*
- There are 400+ active bengali characters used in the literature according to Bangla Academy, 293 of them are compound characters. This dataset is a collection of those compound characters and augmented to create 50 samples per class in total.

Online Coding Lab | *GitHub*
- This is an web app for grading students code written in C/C++. Student will create account, teacher will approve the account. Teacher can upload problem number and the correct output to the database. After that, student will submit the code and it will be processed by JDoodle API and return the output of the code. If the output matches with the databases' output, the code is accepted.
- Written in PHP, JDoodle API has been used.

Exam Hall | *GitHub*
- During COVID, students couldn't attend physical class and tests. This software aims at tacking the challenge of taking tests from home. If the student opens any software when this software is running, a log will be created and the software will automatically be closed. The software includes questions which can be fetched via internet from a database. Students can switch between different questions without finishing every single one.
- Written in Java, JDBC driver has been used along with MySQL for Database.

Mat2CSV | *GitHub*
- Convert any .mat file into CSV format
- Written in Python

Image Cropping Manually | *GitHub*
- Crop any image manually. After loading the image, user will be able to select the area they wish to crop and save.
- Written in Python

Bangla Sign Digits | *GitHub*
- There are 10 sign digits in Bengali Language. This project is a collection of those in sign language format.

Basic AutoML | *GitHub*
- If a preprocessed CSV dataset is provided, user can select any machine learning model from Linear Regression, Naive ayes, K Nearest Neighbor, Support Vector Machine etc. and the model will be run 10 folds and the mean accuracy with standard deviation will be printed.
- Written in Python

Neural Network from Scratch | *GitHub*
- Some basic neural network was implemented using Python without any library such as Perceptron, Hopfield Architecture, Kohonen Architecture etc.
- Written in Python

Facebook Twitter Data Collector and Analyzer | *GitHub*
- This software can retrive tweet based on provided hastags and Facebook posts from any Facebook group. The data pulled from the platforms can be saved into JSON format for further use.
- Written in Java, Facebook4J and Twitter4J API were used.

Root Finder | *GitHub*
- This android app can calculate and print the steps of finding root using some method like Newton Raphson etc.
- Written in Java, XML.

Skills

Programming: Python, C, C++, Java, JavaScript, PHP, MATLAB, MySQL, ORACLE
Technologies: Git, Tensorflow
Operating System: Windows, Mac, Linux
Languages: Bangla (Native), English (Professional)

References

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