

Elias Hossain

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RESEARCH FOCUS

Deep Learning, Natural Language Processing, Biomedical Imaging and Cyber Security.

PUBLICATION SUMMARY

- Journal Articles-7 published [5 first-author, 3 Q1 Journal, IF: 3.772]
- Conference Articles-3 published [2 first-author]
- Book Chapters-6 published [2 first-author]
- Indexing: IEEE Xplore, Springer, Science Citation Index Expanded (SCIE), Scopus, PubMed and Elsevier.

IELTS SCORE

Overall: 6 [L: 7, S: 6.5, R: 5, W: 6]

SCHOLASTIC ACHIEVEMENTS

1. **DIU Research Award**, In Recognition of Scholarly publication in Reputed Indexed Journals for 2019, 2020 and 2021, Organized by Division of Research, Daffodil International University, 08th March 2021, Bangladesh.
2. **Finalist**, Dr. Pradeep P Thevannoor Innovation Awards (PPTIA) 2019, Organized by SCMS School of Engineering and Technology (SSET), 16-17 November, Kerala, India.
3. **Champion**, University of Asia Pacific (UAP) Software and Hardware Carnival 2018 in the Best Innovative Mobile Application Development category.
4. **Global Champion**, NASA SPACE APPS Challenge 2017 on the best use of NASA data resources category, Organized by Bangladesh Association of Software and Information Services (BASIS), 29th – 30th April 2017.

RESEARCH & TECHNICAL SKILLS

- **Programming Languages:** Python and Java.
- **Software Development Framework/Skills:** Django, Flask and Apps Development.
- **Cutting-edge Research:** Supervised Machine Learning, Deep Learning, Natural Language Processing, Data Science and Biomedical Imaging.
- **Open-Source Library:** Pandas, TensorFlow, Keras, PyTorch, Matplotlib, NLTK and Docker.
- **Deployment/Backend:** Django REST, Firebase, PostgreSQL, MySQL, AWS, Version Controlling (GitHub) and Node Js.
- **Others:** SAS, ggplot2, Tableau, PowerBI, Apache Spark, BigML, Wekan and Pycaret.

EMPLOYMENT EXPERIENCE

Software Engineer – ML/AI

REVE Systems, Dhaka, Bangladesh

Dec 2022-present

Major Responsibilities:

- Exploring and identifying state-of-the-art NLP techniques to bridge the gap between Automatic Speech Recognition (ASR) and finding possible solutions to solve the underlined gaps in the downstream NLP tasks
- Data cleaning (denoiser, echo cancels, speech condensation), augmentation (noise injection, shifting time, changing pitch and speed), and transforming the raw audio data into Mel Spectrogram.
- Implemented advanced deep learning models such as Wav2Vec2, Hubert, End-to-End Listen, Attender, and Spelling (LAS) model and Deepspeech2 architecture in terms of speech-to-text (STT) for the Bangla audio samples along with the transcribed text.
- Building inference to measure the model's output and using beam search technique to convert the matrix to a phoneme sequence and timestep-wise phoneme prediction (N-best and corresponding score).

Research Assistant (International Collaboration)

IoT Health Research Lab, University of Southern Queensland, Australia

April 2022-Dec 2022

Advisor: Dr. Rajib Rana (Professor of Computer Science Department)

Major Responsibilities:

- Analyzed and identified current research gaps in natural language processing in the healthcare domain and conducted a critical analysis of the existing research paper.
- Conducted a systematic review article on natural language processing in electronic health records (EHRs), focusing on the current state-of-the-art machine learning and deep learning.
- Analysed research data using various statistical methods and wrote reports to summarize data and implications of the results.
- Attended project meetings with international collaborators, prepared research progress reports and contributed to publications.

Machine Learning Researcher (R&D)

Time research & innovation, Dhaka, Bangladesh

Oct 2020-Nov 2022

Major Responsibilities:

- Developed deep learning algorithms to detect COVID-19 from large-scale biomedical imaging data, such as chest X-rays and computed tomography (CT). [Status: Published in Springer].
- Developed X-Ray bone abnormalities classification model using InceptionV3, VGG19 and MobileNet CNN architecture.
- Developed customized algorithms (InceptionV3, VGG16, VGG19, and ResNet50) to obtain better performance on medical image and text data.
- Conducted a systematic literature review on the healthcare domain, identifying current research trends, flaws, obstacles, and cutting-edge methodologies to provide effective solutions for medical professionals.
- Develop new tools using cutting-edge technology focusing on efficiency and automation and collaborate with colleagues from science, engineering, and business backgrounds.
- Performed the position of Work Based Learner (WBL) instructor and impart core courses in machine learning, NLP, and elementary research methods in Bangladesh and the UK.

PUBLICATIONS

Peer-reviewed Journals

1. **Hossain, E.**, Alshehri, M., Almakdi, S., Halawani, H., Rahman, M. M., Rahman, W., ... & Mia, S. (2022). [Dm-Health App: Diabetes Diagnosis Using Machine Learning with Smartphone](#). CMC-COMPUTERS MATERIALS & CONTINUA, 72(1), 1713-1746.
2. **Hossain, E.**, Hossain, M. S., Hossain, M. S., Al Jannat, S., Huda, M., Alsharif, S., ... & Rashed, A. N. Z. [Brain Tumor Auto-Segmentation on Multimodal Imaging Modalities Using Deep Neural Network](#). CMC-COMPUTERS MATERIALS & CONTINUA, 72(3), 4509-4523.
3. **Hossain, E.**, Alshehri, M., Almakdi, S., & Rahman, W. (2022). News Modeling and Retrieving Information. Intelligent Automation & Soft Computing. [Status: In Press]
4. **Hossain, E.**, Alazeb, A., Almudawi, N., Almakdi, S., Alshehri, M., Faruque, M. G. G., & Rahman, W. [Forecasting Mental Stress Using Machine Learning Algorithms](#). CMC-COMPUTERS MATERIALS & CONTINUA, 72(3), 4945-4966.
5. Siddiqui, S., Arifeen, M., Hopgood, A., Good, A., Gegov, A., **Hossain, E.**, ... & Masum, S. (2022). [Deep Learning Models for the Diagnosis and Screening of COVID-19: A Systematic Review](#). SN computer science, 3(5), 1-22.
6. Hossain, M. M., Swarna, R. A., Mostafiz, R., Shaha, P., Pinky, L. Y., Rahman, M. M., ... & Iqbal, M. S. (2022). [Analysis of the performance of feature optimization techniques for the diagnosis of machine learning-based chronic kidney disease](#). Machine Learning with Applications, 100330.
7. **Hossain, M. E.**, Rahman, M. W., Islam, M. T., & Hossain, M. S. (2019). [Manifesting a mobile application on safety which ascertains women salus in Bangladesh](#). International Journal of Electrical and Computer Engineering, 9(5), 4355.

Book Chapters

8. Siddiqui, S., **Hossain, E.**, Asaduzzaman, S. M., Al Jannat, S., Niloy, T. S., Rahman, W., ... & Gegov, A. (2022). [Analysing and Identifying COVID-19 Risk Factors Using Machine Learning Algorithm with Smartphone Application](#). In *Inventive Systems and Control* (pp. 775-788). Springer, Singapore.
9. Siddiqui, S., **Hossain, E.**, Ferdous, R., Arifeen, M., Rahman, W., Masum, S., ... & Gegov, A. (2022). [A Comparative Study of Deep Learning Models for COVID-19 Diagnosis Based on X-Ray Images](#). In *Smart and Sustainable Technology for Resilient Cities and Communities* (pp. 163-174). Springer, Singapore.
10. **Hossain, E.**, Kaysar, N., Joy, J. U., Md, A. Z., Rahman, M., & Rahman, W. (2022). [A Study Towards Bangla Fake News Detection Using Machine Learning and Deep Learning](#). In *Sentimental Analysis and Deep Learning* (pp. 79-95). Springer, Singapore.
11. Siddiqui, S., Hopgood, A., Good, A., Gegov, A., **Hossain, E.**, Rahman, W., ... & Khan, Z. (2022). [A Next-Generation Telemedicine and Health Advice System](#). In *Proceedings of Sixth International Congress on Information and Communication Technology* (pp. 981-989). Springer, Singapore.
12. **Hossain, M.**, Qaiduzzaman, K. M., & Rahman, M. (2020, February). [Sightless helper: an interactive mobile application for blind assistance and safe navigation](#). In *International Conference on Cyber Security and Computer Science* (pp. 581-592). Springer, Cham.
13. Qaiduzzaman, K. M., Khatun, S., Afsa, M., Sobhan, S., **Elias Hossain, M.**, Shaharum, S. M., & Rahman, M. (2020). [A Mutation Triggering Method for Genetic Algorithm to Solve Traveling Salesman Problem](#). In *Embracing Industry 4.0* (pp. 159-170). Springer, Singapore.

Conference Articles

14. **Hossain, M. E.**, Najib, A. U., & Islam, M. Z. (2020, December). [Combating domestic violence during COVID-19 pandemic in Bangladesh: using a mobile application integrated with an effective solution](#). In *2020 23rd International Conference on Computer and Information Technology (ICCIT)* (pp. 1-6). IEEE.
15. **Hossain, M. E.**, Rahman, M., Qaiduzzaman, K. M., Shakir, A. K., & Hassan, M. M. (2019, October). [Efficient Anti-Kidnapping and Anti-Harassment \(Avoidance-Detection-Notification\) Mobile Application for Unwanted Incidents](#). In *2019 IEEE Student Conference on Research and Development (SCORED)* (pp. 112-116). IEEE.
16. Kulsum, M. U., Najib, A. U., & **Hossain, M. E.** (2019, November). [Design And Development Of MGA System: A Maternity Guidance Light Weight Mobile Application](#). In *2019 IEEE International Conference on Signal Processing, Information, Communication & Systems (SPICSCON)* (pp. 54-58). IEEE.

Manuscript Under Consideration

17. Jannat, S.A., Hossain, S., & **Hossain, E.** (2022). An Automated Disease Prognosis Tool Towards Classifying Medical Disease Using Hybrid Architecture of Deep Learning Paradigm. In *2022 25th International Conference on Computer and Information Technology (ICCIT)*. [Status: Accepted]
18. **Hossain, E.**, Rahman, M.E., Siddiqui, S., & Masum, S. (2022). Hybrid Machine Learning model for A Next-Generation Ecofriendly Travelling and Guides to reduce carbon emissions. In *2022 25th International Conference on Computer and Information Technology (ICCIT)*. [Status: Accepted].
19. **Hossain, E.**, Rana, R., Higgins, N., Soar, J., Barua, P.D., Pisani, A.R., & Turner, K. (2022). Use of AI/ML-enabled State-of-the-Art Method in Electronic Medical Records: A Systematic Review. *Computers in Biology and Medicine*. [Status: Under Review]

EDUCATION

Master of Science (MS) in Computer Science & Engineering
North South University, Dhaka 1229, Bangladesh

Dec- 2022- Present

Bachelor of Science in Software Engineering

Daffodil International University (DIU), Dhaka 1207, Bangladesh
CGPA: 2.91 [out of 4.00 scale]

2016- 2020

PROJECTS (AI/ML)

Diabetes Prediction Web App

[Duration: 8 Months] | [GitHub](#)

- Integrated LightGBM model in the application's backend to expedite performance of diabetes prediction.
- The model was deployed in the production environment and integrated into software system using Flask framework.

COVID-19 Detection Web App

[Duration: 9 Months] | [GitHub](#)

- Developed an automatic system to detect COVID-19 from X-ray and CT scan images using deep learning techniques.
- Implemented various pre-trained models such as VGG16, VGG19, ResNet50 and InceptionV3 to classify COVID-19.

CONFERENCE ATTENDING

1. **Presenter**, 2nd International Conference on Cyber Security and Computer Science (ICONCS 2020), 15-16 February, Daffodil International University, Dhaka, Bangladesh.
2. **Presenter**, 2019 IEEE International Conference on Signal Processing, Information, Communication & Systems (SPICSCON), 28-30 Nov. 2019, Dhaka, Bangladesh.
3. **Presenter**, International Conference on Computer and Information Technology (ICCIT), Dhaka, Bangladesh.
4. **Presenter**, International Conference on Sentimental Analysis and Deep Learning, Prince of Songkla University, Thailand, 18-19, June 2021. [Virtual].

CERTIFICATIONS

- IBM Online Course. "**Data Science Professional Certificate Course**", acquired practical experience working on large-scale exploratory data analysis and implementing supervised machine learning models.
- Online Course. "**Artificial Intelligence for Medicine Specialization**", DeepLearning.ai, Obtained fundamental and practical ideas on deep learning for diagnosing diseases from x-rays and 3D MRI brain images.

REFERENCES

References are available upon requests