Md Shopon
Deep Learning Researcher | Programmer

2903, Unwin Road, Northwest Calgary, Calgary, Alberta, Canada • md.shopon@ucalgary.ca • + 1 (403) 890-8289
Linkedin: md-shopon • **Github:** mdshopon • **Researchgate:** md-Shopon

SUMMARY

I'm an enthusiast researcher working to better understand how modern artificial intelligence technologies can be used for better human life. My expertise includes deep learning, generative adversarial networks, computer vision, and the development and implementation of research tools. My primary focus is to develop scalable and robust deep learning-based solutions for real-life problems.

PROFESSIONAL EXPERIENCE

RESEARCH ASSISTANT — **Calgary, Alberta**
University of Calgary — **Sep, 2020-Present**

- Designed and developed a graph convolutional neural network-based gait recognition system for biometric authentication.
- Proposed a new classification for the various different de-identification problems.
- Developed a framework for estimating age from face and the proposed solution was elected as runner up for guess the age competition.
- Published 2 book chapters, 3 journals and 2 conference papers.

LECTURER — **Dhaka, Bangladesh**
University of Asia Pacific — **Sep, 2018-Aug, 2020**

- Conducted undergraduate-level courses. The following courses were conducted by me:
  - Introduction to Computer Science, Structured Programming, Data Structures and Algorithms, Object-Oriented Programming, Pattern Recognition
- Served as the convener of the career development club.
- Served as the trainer and co-convener of the programming contest club.

TEACHING ASSISTANT — **Dhaka, Bangladesh**
University of Asia Pacific — **Apr, 2018- Aug, 2020**

- Assisted different undergraduate-level courses and proctor for examination.
- Served as the trainer of the programming contest club.

DEEP LEARNING ENGINEER — **Dhaka, Bangladesh**
Gaze Inc. — **May, 2017- Mar, 2018**

- Developed a vehicle number plate detection and recognition system using sequential modeling and convolutional neural networks for Meghna Group of Industries.
- Developed a custom face recognition and traffic counting system.

RESEARCH ASSISTANT — **Dhaka, Bangladesh**
Machine learning lab, University of Liberal Arts Bangladesh — **Feb, 2017- Jan, 2018**

- Developed an Android application for ICT Ministry of Bangladesh to evaluate the aesthetic beauty of children's handwriting.
- Collected one of the largest Bangla handwritten character dataset which can be used for multiple purpose. The dataset was named "BanglaLekha-Isolated".
- Developed an end-to-end solution for Bangla optical character recognition.

EDUCATION

M.Sc IN COMPUTER SCIENCE (Thesis Based) — **Calgary, Alberta, Canada**
University of Calgary — **Sep, 2020- July, 2022**

B.Sc IN COMPUTER SCIENCE — **Dhaka, Bangladesh**
University of Asia Pacific — **May, 2014-Mar, 2018**

TECHNICAL SKILLS

- **Machine Learning:** Deep learning algorithms (Convolutional Neural Network, Recurrent Neural Network, Generative Adversarial Networks, Autoencoder), Predictive modeling, Decision analysis, Data Analysis, Statistical Analysis.
- **Packages:** Keras, Tensorflow, Sci-kit learn, OpenCV, PyTorch,
- **Data Structures and Algorithms:** Advanced data structures, Dynamic Programming, Graph Theory, Trees, Number Theory.
- **Operating System:** Strong knowledge of UNIX based operating systems , Windows Operating System.
- **Programming Language:** C, C++, Java, Python, Matlab.
- **Other Technical Skills:** Adobe Photoshop, Git, Latex, Arduino and Raspberry pi

PROJECTS

BanglaLekha:

- Banglalekha is a Bangladeshi Govt. funded project for improving the aesthetic quality of Bangla handwriting.
- Developed the official website of Banglalekha in wordpress.
- Developed the official android application of BanglaLekha.

Gait Recognition:

- A robust framework for gait recognition was developed that was capable of handling challenging gait patterns (Bulky cloth wearing, Free roaming, Bag carrying)
- Graph neural network was employed to develop this system.

Interpretable Visualization Tool for Convolutional Neural Network:

- This tool was developed as a course project for CPSC 683.
- An on the fly tool for visualizing the internal representation of pre-trained networks.
- This tool provides filter, feature map, Grad-CAM, Guided backpropagation visualization.

Twitter Fake Account Detection:

- This tool was developed as a course project for CPSC 601.50.
- Developed a deep learning solution for detecting fake account.

Bangla OCR:

- Developed an end-to-end method for Bangla Optical Character Recognition.
- The system was developed using stacked LSTM-CNN architecture.

Competitive Programmers Guideline:

- A static android application for guiding competitive programmers.
- The application includes tutorial for different type of algorithms.

PUBLICATIONS

Book Chapters:

1. **Shopon, M.,** Hossain Bari, A. S. M., Bhatia, Y., Narayanaswamy, P. K., Tumpa, S. N., Sieu, B., & Gavrilova, M. (2022). Biometric System De-identification: Concepts, Applications, and Open Problems. *In Handbook of Artificial Intelligence in Healthcare (pp. 393-422). Springer, Cham.*
2. M. Gavrilova, F. Anzum, AWS H. Bari, Y. Bhatia, F. Iffath, Q. Ohi, **Md. Shopon**, Z. Wahid, A Multi-Faceted Role of Biometrics in Online Security, Privacy and Trustworthy Decision Making, Chapter, in Breakthroughs in Digital Biometrics and Forensics, Kevin Daimi (Ed), Springer, 2022 (in print).

Journals:

1. Biswas, M., Islam, R., Shom, G. K., **Shopon, M.**, Mohammed, N., Momen, S., & Abedin, A. (2017). Banglalekha-isolated: a multi-purpose comprehensive dataset of handwritten bangla isolated characters. *Data in brief, 12, 103–107.*
2. **Shopon, M.**, Bari, A. H., & Gavrilova, M. L. (2021). Residual connection-based graph convolutional neural networks for gait recognition. *The Visual Computer, 1-12.*
3. **Shopon, M.**, Tumpa, S. N., Bhatia, Y., Kumar, K. N., & Gavrilova, M. L. (2021). Biometric Systems De-Identification: Current Advancements and Future Directions. *Journal of Cybersecurity and Privacy, 1(3), 470-495.*
4. **Shopon, M.**, Hsu, G. S. J., & Gavrilova, M. L. (2022). Multi-view Gait Recognition on Unconstrained Path Using Graph Convolutional Neural Network. *IEEE Access*.

Conference:

1. **Shopon, M.,** Mohammed, N., & Abedin, M. A. (2016). Bangla handwritten digit recognition using autoencoder and deep convolutional neural network. *In Computational intelligence (iwci), international workshop on (pp. 64–68). IEEE.*
2. **Shopon, M.**, Mohammed, N., & Abedin, M. A. (2017). Image augmentation by blocky artifact in deep convolutional neural network for handwritten digit recognition. *In Imaging, vision & pattern recognition (icivpr), 2017 ieee international conference on (pp. 1–6). IEEE.*
3. **Shopon, M.**, Adnan, M. A., & Mridha, M. F. (2016). Krill herd based clustering algorithm for wireless sensor networks. *In Computational intelligence (iwci), international workshop on (pp. 96–100). IEEE.*
4. Mahmud, A., Adnan, M. A.,& **Shopon, M.** (2018, April). An incremental clustered gradient method for wireless sensor networks. In 2018 21st Saudi Computer Society National Computer Conference (NCC) (pp. 1-6). IEEE.
5. Ahmed, S., Islam, M., Hassan, J., Ahmed, M. U., Ferdosi, B. J., Saha, S., & Shopon, M. (2019). Hand sign to bangla speech: A deep learning in vision based system for recognizing hand sign digits and generating bangla speech. *arXiv preprint arXiv:1901.05613*.
6. **Shopon, M**., Diptu, N. A., & Mohammed, N. (2020). End-to-End Optical Character Recognition Using Sythetic Dataset Generator for Noisy Conditions. *In Proceedings of International Joint Conference on Computational Intelligence (pp. 515-527). Springer, Singapore*.
7. Nishat, Z. K., & **Shopon, M.** (2020). Unsupervised Pretraining and Transfer Learning-Based Bangla Sign Language Recognition. *In Proceedings of International Joint Conference on Computational Intelligence (pp. 529-540). Springer, Singapore.*
8. Nishat, Z. K., & **Shopon, M**. (2019, September). Synthetic Class Specific Bangla Handwritten Character Generation Using Conditional Generative Adversarial Networks. *In 2019 International Conference on Bangla Speech and Language Processing (ICBSLP) (pp. 1-5). IEEE.*
9. **Shopon, M.** (2020). Bidirectional LSTM with Attention Mechanism for Automatic Bangla News Categorization in Terms of News Captions. *In Electronic Systems and Intelligent Computing (pp. 763-773). Springer, Singapore.*
10. Karim, M. A., Razin, M. J. I., Ahmed, N. U., **Shopon, M.,** & Alam, T. (2021). An Automatic Violence Detection Technique Using 3D Convolutional Neural Network. *In Sustainable Communication Networks and Application (pp. 17-28). Springer, Singapore.*
11. Hossain Sani, S., **Shopon, M.,** Hossain Khan, M., Hasan, M., & Mridha, M. F. (2020, November). Short-term and Long-term Air Quality Forecasting Technique Using Stacked LSTM. I*n 2020 the 6th International Conference on Communication and Information Processing (pp. 165-171).*
12. Sani, S. H., **Shopon, M.**, & Rakib, S. H. (2021). Air Quality Index Prediction Using Azure IoT & Machine Learning for Smart Cities. *In Proceedings of International Conference on Computational Intelligence, Data Science and Cloud Computing (pp. 721-733). Springer, Singapore.*
13. Shahin, M. M. H., Ahmmed, T., Piyal, S. H., & **Shopon, M.** (2020, June). Classification of bangla news articles using bidirectional long short term memory. In *2020 IEEE Region 10 Symposium (TENSYMP)* (pp. 1547-1551). IEEE.
14. **Shopon, M.**, Yanushkevich, S., Wang, Y., & Gavrilova, M. Graph Convolutional Neural Network for Reliable Gait-based Human Recognition, *IEEE International Conference on Autonomous Systems (IEEE ICAS 2021).*
15. Lin, Y. H., Tang, C. H., Chen, Z. T., Hsu, G. S. J., **Shopon, M.**, & Gavrilova, M. (2021, September). Age-Style and Alignment Augmentation for Facial Age Estimation. *In International Conference on Computer Analysis of Images and Patterns (pp. 297-307). Springer, Cham.*
16. Sultana, N., Mridula, D. T., Sheikh, Z., Iffath, F., & **Shopon, M.** (2022). Dense Optical Flow and Residual Network-Based Human Activity Recognition. *In New Approaches for Multidimensional Signal Processing (pp. 163-173). Springer.*

VOLUNTEERING

MENTOR **Calgary, Alberta**
Schulich Ignite **Sep, 2020-April, 2021**

- **Purpose**: Free computer coding courses led by University of Calgary student mentors.
- **Responsibility:** Mentoring programming enthusiast students about programming and debugging

VICE PRESIDENT SOCIAL **Calgary, Alberta**
Computer Science Graduate Society, University of Calgary **Sep, 2020-April, 2021**

- **Purpose**: To promote student activity in UofC computer science graduate community.
- **Responsibility:** Organize different social events and activities.

MENTOR **Dhaka, Bangladesh**
Prospective Bangladeshi Students in Canadian Universities (PBSCU) **Aug, 2020-***

- **Purpose**: A non profit organization aiming to change the attitudes towards higher studies in Canada for prospective students
- **Responsibility:** As a mentor, my responsibility is to mentor prospective students about their journey towards studying in canda. From SOP writing to visa applications I help prospective students.

CONVENER **Dhaka, Bangladesh**
Career Development Club, CSE-UAP **SEP, 2018-May, 2020**

- **Purpose**: Departmental club for UAP that works for students career welfare.
- **Responsibility:** Organizing workshops, seminars, student counseling, career advice.

CO-CONVENER **Dhaka, Bangladesh**
Programming Contest Club, CSE-UAP **SEP, 2018-May, 2020**

- **Purpose**: Departmental club for UAP that works for training students for competitive programming.
- **Responsibility:** Training students, organizing programming competitions. (Previously, was the president of this club during my student life)

HONORS AND AWARDS

- **Vice Chancellor's Award** - Spring 2015 (Unviersity of Asia Pacific, Dhaka, Bangladesh)
- **Vice Chancellor's Award** - Fall 2015 (Unviersity of Asia Pacific, Dhaka, Bangladesh)
- **Vice Chancellor's Award** - Spring 2017 (Unviersity of Asia Pacific, Dhaka, Bangladesh)
- **Vice Chancellor's Award** - Fall 2017 (Unviersity of Asia Pacific, Dhaka, Bangladesh)
- **Champion** - UAP Inter Department Programming Contest - 2015
- **Champion** - Programming Contest Section (UAP Hardware & Software Exposition - 2016)
- **Runner Up** - Guess the Age Competition 2021 (19th International Conference on Computer Analysis of Images and Patterns CAIP 2021, University of Salerno, Italy)
- **Ranked 8th in Canada** (IEEE XTREME, 15.0 International Programming Contest)

PROGRAM COMMITTEES

- **Problem Writer and Judge** - UAP Inter Department Programming Contest - 2019
- **Organizer & Head of Technical Committee** - 3rd UAP CSE, Software and Hardware Carnival
- **Judge** - Hackathon Section, 3rd UAP CSE, Software and Hardware Carnival
- **Problem Writer and Judge** - UAP Inter Department Programming Contest, 2018
- **Lead - Technical Team** - International Conference on Computer and Information Technology (ICCIT), 2017
- **Lead - Technical Team** - ACM International Collegiate Programming Contest, Dhaka Regional, 2017

REFERENCES

1. **Marina L. Gavrilova, Ph.D:**
    - **Professor and Associate Head, Department of Computer Science, University of Calgary**
    - **Email: mgavrilo@ucalgary.ca**
2. **Nabeel Mohammed, Ph.D**
    - **Associate Professor, Department of Electrical and Computer Engineering, North South University**
    - **Email: nabeel.mohammed@northsouth.edu**