

Computer Science-ES 109B
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🌐 [Dr-M-G-Sarwar-Murshed](#)
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Md Golam Sarwar Murshed

Summary

I develop efficient and robust deep learning systems that bridge state-of-the-art AI performance with real-world deployment constraints. My research spans computer vision, biometrics, and cybersecurity, with contributions including CRFSEG (97.17% fingerprint matching accuracy, outperforming commercial solutions) and EdgeLite (92.37% accuracy on edge devices with 13% parameter reduction). My work has garnered 740+ citations and attracted funding from DHS, NSF-CITeR, Verizon, Badger Technologies, and WiSys. I bring 5 years of industrial experience from Samsung R&D, combining theoretical depth with practical implementation expertise in efficient and trustworthy AI systems.

Academic Appointments

Aug 2023 – **Assistant Professor in Computer Science**, *University of Wisconsin-Green Bay*.
Present

Education

Aug 2018 – **Ph.D. in Electrical and Computer Engineering**, *Clarkson University, Potsdam, NY*.
Aug 2023 Dissertation: [Efficient and Resource-Aware Deep Learning for Improved Object Detection](#)
Advised by Faraz Hussain

Aug 2018 – **M.S. in Electrical Engineering**, *Clarkson University, Potsdam, NY*.
Aug 2020 Thesis: Machine Learning at the network edge
Advised by Faraz Hussain

Mar 2009 – **B.S. in Computer Science and Engineering**, *Chittagong University of Eng & Tech*,
Sep 2013 *Bangladesh*.

Research Interests

My research focuses on developing efficient, robust, and explainable deep learning systems for real-world deployment. Core areas include: resource-aware deep learning and edge AI for computer vision applications; trustworthy AI systems for biometrics and cybersecurity with enhanced interpretability; and adaptation of foundation models (LLMs) for resource-constrained settings.

Publications

- Citation Google Scholar statistics: total of 744 citations (as of 1-Jan-2026).
- IET Biometrics 2025 **Conditional Synthetic Live and Spoof Fingerprint Generation.**
Syed Konain Abbas, Sandip Purnapatra, **M. G. Sarwar Murshed**, Conor Miller-Lynch, Lambert Igene, Soumyabrata Dey, Stephanie Schuckers, and Faraz Hussain. *IET Biometrics (Institution of Engineering and Technology)*, 2025
- BIOSIG 2025 **Deep Learning-Based Approaches for Contactless Fingerprints Segmentation and Extraction.**
M. G. Sarwar Murshed, Syed Konain Abbas, Sandip Purnapatra, Daqing Hou, and Faraz Hussain. *24th International Conference of the Biometrics Special Interest Group*, Darmstadt, Germany, 2025
- Electronics 2025 **Explainable Face Recognition via Improved Localization.**
Rashik Shadman, Daqing Hou, Faraz Hussain, and **M. G. Sarwar Murshed**. *Electronics*, 2025, 14(14): 2745
- TBIOM 2024 **Deep Age-Invariant Fingerprint Segmentation System.**
M. G. Sarwar Murshed, Keivan Bahmani, Stephanie Schuckers, and Faraz Hussain. *IEEE Transactions on Biometrics, Behavior, and Identity Science*, 2024
- CSCI 2023 **The Utility of Feature Reuse: Transfer Learning in Data-Starved Regimes.**
Rashik Shadman; **M. G. Sarwar Murshed**, Edward Verenich, Alvaro Velasquez, and Faraz Hussain. *International Conference on Computational Science and Computational Intelligence*, 2023
- ASCE ICTD 2023 **A vision-based system for road crack detection using hybrid deep learning architectures.**
M. G. Sarwar Murshed, S. M. Safayet Hossain, Aksel Seitllari, and Kibria K. Roman. *ASCE International Conference on Transportation & Development*, 2023
- ICCE-Asia 2021 **Deep Slap Fingerprint Segmentation for Juveniles and Adults.**
M. G. Sarwar Murshed, R. Kline, K. Bahmani, F. Hussain, and S. Schuckers. *IEEE International Conference on Consumer Electronics-Asia*, 2021, pp. 1–4
- ACM Computing Surveys 2021 **Machine Learning at the Network Edge: A Survey.**
M. G. Sarwar Murshed, C. Murphy, Daqing Hou, Nazar Khan, Ganesh Ananthanarayanan, and Faraz Hussain. *ACM Computing Surveys*, vol. 54, no. 8, 2021
- AISC 2021 **Efficient deployment of deep learning models on autonomous robots in the ROS environment.**
M. G. Sarwar Murshed, James J. Carroll, Nazar Khan, and Faraz Hussain. *Springer, Advances in Intelligent Systems and Computing*, 2021

- XAI DTCS 2021 **Mitigating the Class Overlap Problem in Discriminative Localization: COVID-19 and Pneumonia Case Study.**
Edward Verenich, **M. G. Sarwar Murshed**, Nazar Khan, Alvaro Velasquez, and Faraz Hussain. Springer, *Explainable AI Within the Digital Transformation and Cyber-Physical Systems*, 2021
- ICMLA 2020 **Resource-aware On-device Deep Learning for Supermarket Hazard Detection.**
M. G. Sarwar Murshed, James J. Carroll, Nazar Khan, and Faraz Hussain. *19th IEEE International Conference on Machine Learning and Applications*, 2020, pp. 871–876
- ISVLSI 2020 **Fast Resilient-Aware Data Layout Organization for Resistive Computing Systems.**
Baogang Zhang, **M. G. Sarwar Murshed**, Faraz Hussain, Rickard Ewetz. *IEEE Computer Society Annual Symposium on VLSI*, 2020, pp. 72–77
- OpML 2020 **FlexServe: Deployment of PyTorch Models as Flexible REST Endpoints.**
E. Verenich, A. Velasquez, **M. G. Sarwar Murshed**, and F. Hussain. *USENIX Conference on Operational Machine Learning*, 2020
- HotEdge 2020 **Hazard Detection in Supermarkets using Deep Learning on the Edge.**
M. G. Sarwar Murshed, E. Verenich, C. Gende, J. J. Carroll, N. Khan, and F. Hussain. *3rd USENIX Workshop on Hot Topics in Edge Computing*, 2020 [poster]

Research Grants

- 2024 – 2025 **Artificial Intelligence (AI)-powered Pavement Distress Detection.**
- Role: PI
 - Name of Funding Organization: [WiSys](#)
 - Award Date: 30 May 2024
 - Period of Grant Award: 1 Year
- 2022 – 2023 **Robust Contactless Fingerprint Processing Tool.**
- PI Name: Faraz Hussain, Daqing Hou
 - Name of Funding Organization: [CITeR](#)
 - Award Date: 15 May 2022
 - Period of Grant Award: 1 Year
 - Role on Project: Wrote the proposal and completed all milestones proposed in the proposal through collaboration with PIs.
- 2021 – 2023 **Fingerprint image segmentation using deep learning.**
- PI Name: Faraz Hussain, Stephanie Schuckers
 - Name of Funding Organization: [CITeR](#)
 - Award Date: 15 January 2021
 - Period of Grant Award: 2 Years
 - Role on Project: Wrote the proposal and completed all milestones proposed in the proposal by collaborating with PIs and other students.

- 2020 – 2022 **Fingerprint template security.**
- PI Name: Stephanie Schuckers, Faraz Hussain, Mahesh Banavar, Chen Liu
 - Name of Funding Organization: [Verizon wireless](#)
 - Award Date: 15 May 2020
 - Period of Grant Award: 2 Year
 - Role on Project: Wrote the proposal, completed all milestones proposed in the proposal through collaboration with PIs, and helped to write an extension of the proposal.
- 2020 – 2021 **Evaluate and test the Robot Operating System (ROS) of the Marty Robot.**
- PI Name: Faraz Hussain, James Carroll
 - Name of Funding Organization: [Badger Technologies](#)
 - Award Date: 1 March 2020
 - Period of Grant Award: 1 Year
 - Role on Project: Developed software to complete the preliminary experiments, generated preliminary results, and completed all milestones set for this project through collaboration with PIs and students.

Invited Talks and Presentations

Invited Talks

- 2024 **Challenges and Opportunities of Generative AI in Higher Education – Practical Experience**, *AI in Higher Education Conference*, Lakeshore Technical College.
Presented with Dr. Tanim Ahsan on the integration of generative AI tools in academic settings, addressing practical implementation challenges and pedagogical opportunities.
- 2023 **Contactless Fingerprint Segmentation and Recognition**, *CITeR Webinar Series*.
Presented research findings on contactless fingerprint processing systems to government and industry stakeholders including DHS, Public Safety Canada, and Home Office UK.
- 2022 **Deep Learning-Based Fingerprint Segmentation Systems**, *CITeR Webinar Series*.
Demonstrated novel approaches for fingerprint segmentation using deep learning techniques, showcasing results from DHS-funded research.

Research Proposal Presentations

- 2022 **Robust Contactless Fingerprint Processing Tool**, *CITeR Annual Meeting*.
Presented research proposal to funding organizations, including DHS, Public Safety Canada, Home Office UK, and Qualcomm.
- 2021, 2022 **Fingerprint Image Segmentation Using Deep Learning**, *CITeR Research Showcases*.
Presented project proposals and progress updates for contact-based and contactless fingerprint segmentation systems to federal and industry stakeholders.

Conference Presentations

- 2021 Deep Slap Fingerprint Segmentation for Juveniles and Adults, IEEE ICCE–Asia
- 2020 Resource-aware On–device Deep Learning for Supermarket Hazard Detection, IEEE ICMLA
- 2020 Fast Resilient–Aware Data Layout Organization for Resistive Computing Systems, IEEE ISVLSI

2020 Hazard Detection in Supermarkets Using Deep Learning on the Edge, USENIX Hot-Edge

Teaching Experience

Assistant Professor, University of Wisconsin - Green Bay

[†]Course developed and introduced to the curriculum

Fall 2025 Artificial Intelligence, Advanced Object-Oriented Design, Discrete Mathematics, Web Programming

Summer 2025 Discrete Mathematics (Online)

Spring 2025 Advanced Object-Oriented Design, Cloud Computing[†]

Fall 2024 Advanced Object-Oriented Design, Discrete Mathematics, Introduction to Computing & Internet

Spring 2024 Advanced Object-Oriented Design, Cloud Computing[†]

Fall 2023 Advanced Object-Oriented Design, Discrete Mathematics, Introduction to Computing & Internet

Teaching Assistant, Clarkson University

Fall 2019 Introduction to Object-Oriented Programming and Software Design

Spring 2019 Embedded Systems/Microprocessors

Fall 2018 Introduction to Object-Oriented Programming and Software Design

Student Mentorship

Ph.D. (Research mentor)

- Syed Konain Abbas — Contactless fingerprint segmentation & spoof synthesis — (2023–Present)— 2 publications
- Rashik Shadman — Explainable face recognition & transfer learning — (2021–2025) — 2 publications
- Afzal Hossain — Biometric recognition & security — (2021–2023) — Completed MS 2023

Under-graduate (Advisor)

- Logan Dewick — Efficient object detection using AI — (2023–2025)
- Bibesh Pyakurel — Pavement distress detection using AI — (2023–2025)
- Kong Yang — Pavement distress detection using AI — (2023–2025)
- Conrad Gende — Edge hazard detection / deployment — (2021–2022) — 1 publications

Leadership and Voluntary Activities

2024– **Founder & Director**, GBAI Lab (*Green Bay AI Lab*) University of Wisconsin–Green Bay.

- 2013 – 2018 **Lead Engineer**, *Samsung R&D Institute of Bangladesh*, IoTivity Group.
 2021 – 2022 **President**, *Bangladeshi Students' Association at Clarkson University*.
 2011 – 2012 **Organizer**, *Inter-university Programming contest in CUET, 2012*.

Academic Service

- 2025 – **Member**, *AI Policy & Guidelines Committee*, UW–Green Bay.
 2024 – **Member**, *Computer Science Curriculum Review Committee*, UW–Green Bay.

Other Professional Service

- Program Committee 24th IEEE International Conference on Machine Learning and Applications, 2025
- Journal Reviewer
- 2024-2025: Journal of Ambient Intelligence and Humanized Computing (Springer Nature)
 - 2025: Concurrency and Computation: Practice and Experience (Wiley)
 - 2023: Journal of Network and Computer Applications (Elsevier)
- Conference Reviewer
- 2021 – 2025: IEEE ICMLA
 - 2022 – 2024: IEEE International Conference on Web Services (ICWS)
 - 2023 – 2024: IEEE World Congress on Services / IEEE SERVICES
 - 2023: Joint International Conference on Data Science & Management of Data

Professional Memberships

- 2023–Present Member, IEEE (Institute of Electrical and Electronics Engineers)

Industry Work Experience

- Sep 2013 – **Lead Engineer**, *Samsung R&D Institute*, Bangladesh.
- Jul 2018 Project: IoTivity (www.IoTivity.org) - An open Linux Foundation Project for the IoTs
- Designed and developed the build systems for the IoTivity framework
 - Developed different APIs for the IoTivity and Samsung S Health framework
 - Evaluated the performance of Device-to-Device (D2D) Communication, Cloud Communication, and Security system of the IoTivity project
 - Designed and developed APIs for IoT automatic test software, different web applications, and robot automation test cases
 - Developed test app (C++, Java) based on IoTivity communication and security protocol
 - Designed and implemented an auto code coverage framework for quality assurance of the IoTivity project
 - Designed and implemented memory leak tools for the IoTivity project
- Aug 2020 – **Research Collaborator**, *Verizon wireless*.
- May 2023
- Developing deep learning-based biometrics recognition and template protection systems for multiple modalities including face, finger, and iris.
 - Deploying Fully Homomorphic Encryption (FHE) on biometric template protection systems

Technical Skills

- **Programming Languages:** Python, C, C++, Java, UNIX Shell Scripting
- **AI frameworks:** TensorFlow, PyTorch, Keras, Detectron2
- **Data analysis tools:** NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn
- **Cloud platform:** AWS, Azure
- **Version control system:** Git
- **Project management:** JIRA, Agile Project Management System
- **Build automation tools:** SCons, Gradle, Maven, Ant
- **Database:** MongoDB, MySQL, Oracle 11g

Internship Experience

- Jul 2020 – **Research Ph.D. Intern**, *Badger Technologies*, Nicholasville, KY, USA.
Aug 2020 Project: Deep learning on autonomous robots in the ROS environment
- Jan 2013 – **Undergraduate Intern**, *Semicon PVT. LTD*, Dhaka, Bangladesh.
Feb 2013 Project: Mobile App Development, IT system Management

Awards and Honors

Professional and Academic

- Aug 2018 – Full-Tuition Merit Scholarship, TA and RA, Clarkson University, NY.
Aug 2023
- 2016 Achieved Advanced Level in Software Capability Test in Samsung Electronics Co Ltd.
- 2014 – 2015 Achieved top 20% annual performance evaluation grade in 2 consecutive years 2014 & 2015 at Samsung. Electronics Co Ltd
- 2009 – 2013 University Merit Scholarship, Chittagong University of Eng and Tech, Bangladesh.

Programming

- 2011 Inter-university programming contest(Chittagong Zone) – runner up
2010 Inter department programming contest (CUET), – runner up

Work Authorization

- U.S. Permanent Resident (Green Card Holder)

Language Skill

- English (Full professional proficiency), Bengali (Native)

References

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