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

Education

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

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

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

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

Undergraduate (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
- 2025, 2024: 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 – Jul 2018 **Lead Engineer**, *Samsung R&D Institute*, Bangladesh.

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 – May 2023 **Research Collaborator**, *Verizon wireless*.
- 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 – Aug 2020 **Research Ph.D. Intern**, *Badger Technologies*, Nicholasville, KY, USA.
Project: Deep learning on autonomous robots in the ROS environment

Jan 2013 – Feb 2013 **Undergraduate Intern**, *Semicon PVT. LTD*, Dhaka, Bangladesh.
Project: Mobile App Development, IT system Management

Awards and Honors

Professional and Academic

2018 – 2023 Full-Tuition Merit Scholarship, TA and RA, Clarkson University, NY.

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

Available upon request