Saad Hossain

s42hossa@uwaterloo.ca | linkedin.com/in/s42hossa | github.com/sdhossain | saad-hossain.github.io
+1 (347) 706 5547 | Unit 501, 251 Platt's Lane, London ON, N6H 4P4

Education

Bachelor of Applied Science (BASc) in Biomedical Engineering — Sep. 2020 – Apr 2025
University of Waterloo — Specialization in **Medical Artificial Intelligence** — *GPA: 94/100*

Publications

- [1] R. Chaudhary, J. Ho, D. Smith, **S. Hossain**, J. Hargun, B. VanBerlo, N. Murphy, R. Prager, K. Rikhraj, J. Tschirhart, R. Arntfield. Diagnostic accuracy of an automated classifier for the detection of pleural effusions in patients undergoing lung ultrasound. *American Journal of Emergency Medicine*, 2025. [Link]
- [2] C. Liu, **S. Hossain**, C. Thomas, K. Lai, R. Vemulapalli, S. Rambhatla, A. Wong. LangDA: Language-guided Domain Adaptive Semantic Segmentation. *Advances in Neural Information Processing Systems* (NeurIPS) Workshop on Adaptive Foundation Models, 2024. [Link]
- [3] J. Park, K. Kaai, **S. Hossain**, N. Sumi, S. Rambhatla, P. Fieguth. Domain-Guided Spatio-Temporal Self-Attention for Egocentric 3D Pose Estimation. *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* (KDD), 2023. [Link] [GitHub]
- [4] K. Kaai, **S. Hossain**, S. Rambhatla. Are all classes created equal? Domain Generalization for Domain-Linked Classes. *Advances in Neural Information Processing Systems* (NeurIPS) Workshop on Distribution Shifts: New Frontiers with Foundation Models, 2023. [Link] [GitHub]
- [5] J. Park, F. Barnard, **S. Hossain**, S. Rambhatla. Implicit Stylization for Domain Adaptation. *International Conference on Learning Representations* (ICLR) Domain Generalization Workshop: What do we need for successful domain generalization?, 2023. [Link]
- [6] J. Park, K. Kaai, **S. Hossain**, N. Sumi, S. Rambhatla, P. Fieguth. Building Spatio-temporal Transformers for Egocentric 3D Pose Estimation. Joint International Workshop on Egocentric Perception, Interaction and [Link] Computing (EPIC) and Ego4D, IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR), 2022.
- [7] **S. Hossain**, S. Vajpayee, S. Rambhatla. SafeTuneBed: A Toolkit for Benchmarking LLM Safety Alignment in Fine-Tuning. *Manuscript Under Review*, 2025.
- [8] C. Liu, B. Balaji, **S. Hossain**, C. Thomas, K. Lai, R. Vemulapalli, S. Rambhatla, A. Wong. Building Context Awareness via Language for Domain Adaptive Semantic Segmentation. *Manuscript Under Review*, 2025. [Link]
- [9] K. Kaai, **S. Hossain**, S. Rambhatla. Domain Generalization For Domain-Linked Classes. *Manuscript Under Review*, 2025. [Link]

Experience

Machine Learning Research Intern — Jan. 2024 – Aug. 2024
Kolena Inc. — *Vancouver, British Columbia, Canada*

- Automated evaluation of Generative AI to cut **review time by 300%** by fine-tuning Vision-Language models.
- Improved accuracy on **financial data by 8%** through improved PDF-parsing & LLM-prompting in RAG.
- Enhanced detection of AI model errors for users by building data analysis pipeline **identifying edge cases**.
- Accelerated creation of **text datasets by 15x** by building an LLM-powered web-application using Streamlit.

Machine Learning Developer — Sep. 2022 – Aug. 2024
Deep Breathe — *London, Ontario, Canada*

- Developed AI based screening tool confirming with **96% certainty** the presence of fluid in lung ultrasound scans.
- Achieved **80% accuracy (IoU)** in segmenting effusions and consolidations in lung-ultrasound using TensorFlow.
- Reduced **dataset preparation time by 91%** through cross-platform deployment of pipeline producing **7.8 million** M-Mode images from 140,000 B-Mode videos per version, automated through Unix & Shell scripting.

Research Assistant Jan. 2022 – Present
University of Waterloo — Apple, Nissan *Waterloo, Ontario, Canada*

- Built infrastructure for algorithm that improved **tumor-detection accuracy by 9%** on data from new hospitals.
- Surpassed **state of the art accuracy** on three segmentation benchmarks by building context-aware models.
- Outperformed egocentric pose estimation **baselines by 38%** via insertion of spatio-temporal Transformer models.

Software Engineer Jan. 2022 – Apr. 2022
IntelliSports *Montreal, Quebec, Canada*

- Boosted **cheat-detection accuracy by 30%** by feature engineering IMU Sensor data using Scikit-learn & SciPy.
- Elevated **mission count by 2.3x** by deploying detection pipelines on EC2 for punch, crunch, high-knee, & jump.
- Identified onboarding flow with **+50% retention** by conducting decision-tree & SVM analysis on early user data.
- Built data visualization platform, showcasing user physical activity **growth of 300%**, employed in pitches that secured **$1.4 million** in funding using PHP and MySQL.

Robotics Research Intern May. 2021 – Dec. 2021
University of Waterloo — HCRMI, SIRRL Labs *Waterloo, Ontario, Canada*

- Delivered **99.3%** on LFW (Face ID) and **72.7%** on FER2013 (Emotion) benchmarks using DLIB and Tensorflow.
- Deployed facial identity and emotion recognition pipeline using ROS, Flask and PostgresSQL on the Reem-C robot, highlighted by researchers in **International Robotics conferences**.

Honours and Awards

- Best Capstone Design Project - Biomedical Engineering *$500*
- CRA Outstanding Undergraduate Researcher Award - *Honorable Mention*
- Best Paper Award *Conference on Vision and Imaging Systems* 2024
- Yuen Family Foundation Award for Final Year Design Project *$10,000*
- President's Research Award *$1,500*
- Engineering International Student Scholarship *$10,000*
- President's Scholarship of Distinction *$2,000*
- Term Dean's Honour List. Fall '2023 & Winter '2023 & Fall '2021 & Fall '2020
- Top AS Level Exam Scorer in Country *Cambridge International Examinations* 2019

Panels and Media

- Featured in News Article: BME undergraduate student received Honorable Mention for Outstanding Undergraduate Researcher Award, University of Waterloo SYDE News, 2025. [Link]
- Enhancing AI Testing : The Power of Metadata Hydration. Live Webinar Hosted by Kolena, Inc. *Invited as Key Speaker*, 2024. [Link]
- Mastering RAG Systems for LLMs: From Pitfalls to Performance. Live Webinar Hosted by Kolena, Inc. *Invited as Panelist*, 2024. [Link]
- Crash Workshop on Physiological Computing, Univeristy of Waterloo. *Presenter on Inertial Measurement Unit (IMU) Feature Extraction*, 2022. [Link]

Thesis and Capstones

- PneumoGuide: Leveraging Augmented Reality to Guide Ultrasound Sonography for Detecting Lung Conditions. *Final Year Design Project*, 2025.

Software Toolkits

- SafeTuneBed: A Toolkit for Benchmarking LLM Safety Alignment in Fine-Tuning. *Leading Project Design*, 2025.
- HRI Physiolib: A software framework to support the integration of physiological adaptation in Human Robot Interaction. *Contributed to IMU Signal Processing Tools*, 2022. [Link] [GitHub]

Performance Evaluations

- Kolena Inc. - Outstanding Performance, Winter '2024 & Spring '2024
- Deep Breathe - Outstanding Performance, Fall '2022 & Spring '2023
- IntelliSports - Outstanding Performance, Winter '2022
- University of Waterloo (HCRMI Lab) - Outstanding Performance, Spring '2021

Selected Personal & Course Projects

- Fareeka: An Audiobook Platform for Classical Arabic Texts. [Link] — *Vercel, PostgresSQL, OpenAI, ElevenLabs*
- Investigating Safety Alignment Properties of Parameter Efficient Fine-Tuning Methods, MSE 598: Applied Engineering Research Final Project. — *Python, PyTorch, HuggingFace, Transformers, Galore-Torch*
- Stylization for Label Scarce Unsupservised Domain Adaptive Semantic Segmentation, SYDE 577: Deep Learning Final Project. — *Python, PyTorch, HuggingFace, Transformers, Numpy*
- Brain Wave Gaming & Speech: *60,000+ impressions.* [Link] — *Python, OpenAI, SciPy*

Technical Skills

Languages: Python, C++, C#, MySQL, PostgresSQL, PHP, HTML
Tools and Technologies: PyTorch, TensorFlow, Sklearn, Git, OpenCV, ROS, EC2, Linux, Shell, AWS, Azure, Pandas
Interests: Travelling, Basketball, Calisthenics, Robotics, Computer Vision, LLMs, Generative AI, Languages (Spoken)

References

Blake Vanberlo
- Director of Machine Learning, DeepBreathe
- Email: bvanberlo@uwaterloo.ca

Gordon Hart
- Chief Product Officer, Kolena
- Email: gordon@kolena.com

Paul Fieguth
- Professor, Associate Vice President - Academic Operations - University of Waterloo
- Email: pfieguth@uwaterloo.ca

Sirisha Rambhatla
- Assistant Professor, Leader of Critical ML Lab - University of Waterloo
- Email: sirisha.rambhatla@uwaterloo.ca