

Tahir Hasan

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PROFILE

Computer vision and machine learning researcher completing an MSc in Computer Vision, Robotics and Machine Learning at the University of Surrey (90.5% semester average). Experienced in applying deep learning to complex, real-world imagery such as medical (gastrointestinal) image analysis and large-scale video datasets, with first-author publications and a record of turning research into working systems.

EDUCATION

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| University of Surrey
<i>MSc in Computer Vision, Robotics and Machine Learning (Avg. Mark 90.5% for Semester 1)</i>
• Courses Taken: Robotics, Medical Robotics, Advanced Topics In Computer Vision And Deep Learning, Computer Vision and Pattern Recognition, Speech & Audio Processing & Recognition, Applied Machine Learning, Artificial Intelligence of Things. | Guildford, UK
Sep. 2025 – Present |
| Rajshahi University of Engineering & Technology (RUET)
<i>Bachelor of Science in Mechatronics Engineering (CGPA: 3.54/4.00)</i>
• Thesis: Implementation of Bangla Sign Language (BdSL) Recognition in Continuous Real Time.
• Core Courses: Machine Learning, Digital Image Processing, Control Systems, Embedded Systems. | Rajshahi, Bangladesh
Feb. 2019 – May 2024 |

RESEARCH EXPERIENCE

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| Advanced Machine Intelligence Research Lab (AMIR)
<i>Research Assistant</i>
• Developing a hierarchical coarse-to-fine classification framework for gastrointestinal image analysis.
• Designed a “router” model to determine anatomical origin (Upper vs. Lower GI) before passing data to location-specific expert models, improving diagnostic accuracy by over 12%.
• Conducted extensive experiments using PyTorch and customized CNN architectures (ResNet/EfficientNet). | Feb. 2024 – Present
Rajshahi, Bangladesh (Remote) |
| Undergraduate Researcher (Thesis)
<i>Dept. of Mechatronics Engineering, RUET</i>
• Developed a real-time Bangla Sign Language (BdSL) recognition system using MediaPipe Holistic and LSTMs.
• Curated a novel video dataset of 9,010 videos across 530 words, addressing the scarcity of BdSL resources.
• Implemented an attention-based mechanism to improve sentence formation accuracy in continuous signing. | Jan. 2023 – May 2024
Advisor: Sumaya Ishrat Moyeen |

PUBLICATIONS

First-Author Publications

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| T. Hasan , et al. “An Explainable AI based Plant Disease Identification using a Two-Stage Detection-Classification Pipeline with YOLO and ECA-NFNet Framework.” <i>28th Int. Conf. on Computer and Information Technology (ICCIT)</i> . DOI: 10.1109/ICCIT68739.2025.11490422 | 2025 |
| T. Hasan , M. Ahmed, S. I. Moyeen. “Implementation of Bangla Sign Language (BdSL) Recognition in Continuous Real Time.” (<i>Submitted for Review</i>). | 2025 |

Co-Authored Publications

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| S. M. Taron, T. Hasan , et al. “IoT Based Multi-Purpose Smart Automated Gas Hazard Prevention System.” <i>5th Int. Conf. on Mechanical, Industrial and Materials Engineering (ICMIME)</i> . | 2022 |
| M. Ahmed, T. Hasan . “A Comprehensive Review on Advancements in Real Time Detection and Conversion of Sign Gestures.” (<i>Manuscript in Preparation</i>). | 2025 |

TEACHING & PROFESSIONAL EXPERIENCE

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| Varandra University
<i>Lecturer, Department of Computer Science and Engineering</i>
• Instructing undergraduate courses on Computer Algorithms and System Analysis and Design .
• Designing curriculum and laboratory modules for theoretical algorithms and practical implementation.
• Mentoring students on projects related to machine learning and basic AI. | Feb. 2025 – Aug. 2025
Rajshahi, Bangladesh |
| Monno Ceramic Industries Limited
<i>Industrial Trainee</i>
• Analyzed automated production systems including PLC-controlled Kilns and power generation units.
• Assisted engineering team in routine maintenance and fault detection of robotic arms used in glazing. | March 2022 – April 2022
Dhaka, Bangladesh |

SELECTED TECHNICAL PROJECTS

Hierarchical Coarse-to-Fine GI Image Analysis | *Python, PyTorch, Deep Learning*

- Architected a two-stage deep learning framework utilizing a “router” network to localize anatomical regions (Upper/Lower GI) before routing to specialized expert models.
- Decoupled localization from pathology detection, significantly reducing inter-class confusion and enhancing diagnostic precision for gastrointestinal imagery.

Classification of Usable Tea Leaves using CNNs | *Python, TensorFlow, OpenCV*

- Engineered a binary classification system to distinguish between usable and non-usable tea leaves for industrial automation.
- Implemented Canny edge detection for feature extraction and custom CNN with attention layers, achieving 90%+ accuracy.

Robotic Arm Kinematics Analysis Suite | *MATLAB, Linear Algebra, Jacobian*

- Built a computational library for serial manipulators (e.g., Kuka LBR) to compute Forward Kinematics via Modified Denavit-Hartenberg parameters.
- Implemented C2-continuous cubic spline trajectory generation and Recursive Geometric Jacobians for precise velocity analysis and static torque estimation.

Content-Based Image Retrieval (CBIR) Engine | *Python, OpenCV, Scikit-learn*

- Engineered a visual search system comparing SIFT+BoVW against texture descriptors to handle high inter-class ambiguity in the MSRC v2 dataset.
- Optimized a Spatial Grid-based LBP descriptor using PCA dimensionality reduction, achieving 68% accuracy and outperforming complex Bag-of-Visual-Words models.

Embedded System for Urban Light Pollution Reduction | *C++, Arduino, IoT*

- Designed a smart streetlight control system using NodeMCU and Piezo-electric sensors to adjust intensity based on traffic.
- Integrated Blynk IoT platform for real-time cloud monitoring and manual override control.

Gossip: Android Social Media Application | *Java, Android Studio, Firebase*

- Developed a full-stack social platform featuring real-time messaging, dynamic news feeds, and user profiling using Android Studio and XML.
- Integrated Firebase Realtime Database and Authentication for synchronized cloud data storage and secure user session management.

SKILLS & STANDARDIZED TESTS

Languages/Frameworks: Python (PyTorch, TensorFlow, OpenCV, Pandas), C/C++, MATLAB, SQL, Java.

Tools & Design: Git, Docker, SolidWorks, AutoCAD, Proteus, ROS 2, Unity Engine.

Standardized Tests: IELTS: 8.5 (R:9, L:9, S:8, W:7.5)

HONORS & GRANTS

University Innovation Hub Program (UIHP) | *ICT Division, Govt. of Bangladesh* 2024

- Secured pre-seed funding for a hydroponics startup; designed automated monitoring systems for urban gardening.

Top Innovator (Ennovator 7.0) | *Banglalink Digital Communications Ltd.* 2023

- Selected as a top finalist for presenting AI-driven solutions for social development.

REFERENCES

Prof. Simon Hadfield, Professor of Robot Vision & Autonomous Systems, Centre for Vision, Speech and Signal Processing (CVSSP), University of Surrey. Email: s.hadfield@surrey.ac.uk

Md. Firoj Ali, Assistant Professor & Head, Dept. of Mechatronics Engineering, RUET. Email: firoj@mte.ruet.ac.bd