Abid Hasan

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Education

McGill University Montreal, Canada
MEng in Electrical Engineering, concentration in Intelligent Systems January, 2025 - Ongoing

- CGPA: 3.58/4.00

Islamic University Of Technology Gazipur, Bangladesh
BSc in Mechanical Engineering January, 2019 - May, 2023

- CGPA: 3.34/4.00
- Thesis: Significant Wave Height Prediction with Machine Learning

Experience

Expert AI Data Trainer (Mathematics) Remote
Invisible Technologies February, 2024 - December, 2024

- Annotated domain specific technical data for large language models under confidentiality constraints.
- Produced structured reasoning annotations for problems in combinatorics, probability, and number theory.

Research Experience

Surface Defect Detection Using Representation Learning Gazipur, Bangladesh
Mentorship of Final Year Project April, 2024 - October, 2025

- Co-supervised a final year thesis project on fabric surface defect detection using representation learning.
- Advised on the design of supervised (CNN and Transformer based) and unsupervised (EfficientAD) approaches for classification and segmentation.
- Provided guidance on experimental evaluation using the ZJU-Leper benchmark at pixel and region levels, including qualitative analysis and efficiency analysis.

Prediction of Significant Wave Height from Atmospheric Data using Machine Learning Gazipur, Bangladesh
Final Year Thesis Project January, 2022 - June, 2023

- Collected, cleaned, and curated large scale wave height datasets, with feature selection guided by exploratory data analysis and domain knowledge.
- Trained XGBoost, LightGBM, SNN, and ANN models; performed hyperparameter tuning for optimal performance.
- Assessed performance using MSE, MAE, and R^2.
- Trained on 2M+ samples from 47 buoys across the USA and Canada, achieving test $R^2 > 0.90$.

Developing Methods for Out of Distribution Image Detection Remote

Fatima Al-Fihri Predoctoral Fellowship research project June, 2023 - May, 2024

- Conducted a comparative analysis of contemporary out of distribution (OOD) image detection methods, with a focus on applicability and generalizability in segmentation tasks.
- Developed a zero shot, multimodal method for out of distribution (OOD) segmentation that generalizes across domains, whereas most existing methods are domain-specific.
- Proposed a method for identifying anomalous objects based on semantic similarity between predicted labels.
- Evaluated the approach on OOD segmentation benchmarks, including Segment Me If You Can (SMIYC) and Road Anomaly, using pixel level metrics (AuPRC, FPR_{95}) and component level metrics (Mean F1, PPV, sIoU).

Academic Projects

Multimodal Retrieval-Augmented Generation for Visual Question Answering using LLMs Montreal, Canada

Course project for ECSE-555 January, 2025 - April, 2025

- Developed a multimodal RAG system combining SigLIP and CLIP based encoders to retrieve both image and text documents for visual question answering (VQA).
- Benchmarked performance on TextVQA, VQAv2-Small, and a custom engineering QA dataset, evaluating with soft VQA accuracy, top-3 accuracy, and BLEU score.
- Conducted ablations on retrieval size (3–10 documents) and evaluated the effect of image captioning on retrieval relevance and model output.
- Integrated Jensen-Shannon divergence for context filtering to improve retrieval quality and model coherence.

Deep Learning-Based Classification of Dopamine Fluorescence in Parkinson's Disease Models Montreal, Canada

Course project for ECSE-552 January, 2025 - April, 2025

- Collaborated with neuroscience researchers to automate analysis of dopamine fluorescence in brain slices from Parkinson's disease mouse models treated with interferon gamma (IFNγ).
- Designed and implemented three models for classifying treatment vs. control groups: a feature based FFNN, a 1D CNN using per frame fluorescence, and a 3D CNN processing full video sequences.
- Observed improved performance with higher dimensional input, indicating 3D CNNs capture biologically relevant patterns missed by manual inspection.
- Applied interpretability techniques to assess the influence of brain slice identity and stimulation events on classification decisions.

Publications

- Minhazul Alam, Imrul Kayes, **Abid Hasan**, Tanvir Shahriar, M. Ahsan Habib, Exploring SAARC's ocean energy potential: Current status and future policies, Energy Reports 11, 754–778 (DOI: 10.1016/j.egyr.2023.12.034)
- **Abid Hasan**, Imrul Kayes, Minhazul Alam, Tanvir Shahriar, M. Ahsan Habib, Generalized Machine Learning Models to Predict Significant Wave Height Utilizing Wind and Atmospheric Parameters, Energy Conversion and Management: X 23, 100623 (DOI: 10.1016/j.ecmx.2024.100623)

Teaching Experience

Teaching Assistant — Montreal, Canada
McGill University — Winter 2026

ECSE-552: Deep Learning

Technical Skills

Languages: Python, C/C++, MATLAB, R, SQL, Julia, Markdown, LaTeX, Git, Bash
Libraries and Toolkits: TensorFlow, PyTorch, JAX, fastai, PyTorch Lightning, scikit-learn, Keras, XGBoost, LightGBM, CatBoost, Pandas, CuDF, OpenCV, FAISS, spaCy, Matplotlib, Plotly, Seaborn, Origin, Ardupilot, ROS, CoolProp
Hardware Experience: Arduino, Pixhawk, Actuators and Positional Feedback Sensors
CAD/CAM: SolidWorks

Awards & Achievements

Academic

- **2019 OIC Partial Scholarship** 2019
  Scholarship for undergraduate studies covering 75% of tuition fees.
- **2019 HSC Scholarship** 2019
  Government scholarship for academic excellence in Higher Secondary level.

Non-Academic

- **Design Award by GKN Aerospace, IMechE UAS Challenge** 2021
- **Top 25 Startups, Bangabandhu Innovation Grant (BIG)** 2021
- **10th Globally, European Rover Challenge Remote Edition** 2021
- **Highest Placed New Entrant Award, IMechE UAS Challenge** 2020
- **Media and Engagement Award presented by Leonardo, IMechE UAS Challenge** 2020
- **Business Proposition Award presented by Bombardier, IMechE UAS Challenge** 2020