

# Mahdi Islam

 mahdiislam79.github.io   in  kaggle

## EDUCATION

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**Erasmus Mundus Joint Master: Medical Imaging & Applications (MAIA)** | [Link](#) Sept. 2023 – Present  
**University of Girona, University of Cassino, University of Burgundy** **Cumulative GPA: 9.06/10.00**

Relevant Courses: Image Processing, Advanced Image Analysis, Machine and Deep Learning, Medical Image Segmentation and Applications, Medical Image Registration and Applications, Computer Aided Diagnosis, Computer Aided Surgery

**Bachelor of Science: Electrical & Electronic Engineering** Jan. 2018 – May 2022  
**Islamic University of Technology (IUT), Bangladesh** | [Link](#) **Cumulative GPA: 3.63/4.00**

Relevant Courses: Digital Signal Processing, Artificial Neural Networks and Fuzzy Logic

## RESEARCH & WORK EXPERIENCE

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**Visiting Research Student, Master Thesis** February 2025 - Present  
Medical University of Innsbruck, Austria | [Link](#)  
Project Title: Semi-Supervised Aorta Segmentation for Optimized TAVI Access Route Planning  
Project Supervisor: Enrique Almar Munoz

**Lecturer, Department of Computer Science & Engineering** August 2022 - June 2023  
Metropolitan University, Bangladesh | [Link](#)

- Introduced concepts of machine learning and deep learning for research, mentoring sophomore students, and contributing to a 20% increase in students who opt for a thesis over a project in their final semester.

**Undergraduate Research Assistant, Department of Electrical & Electronic Engineering** April 2021 - April 2022  
Islamic University of Technology, Bangladesh  
Project Supervisor: Mirza Munstasir Nishat

- Created a novel dataset from sensor-acquired foot sole heat-map videos using image augmentation techniques.
- Developed a real-time multiclass classification model to detect types of gait anomalies using the Keras-Tensorflow framework.

## PUBLICATIONS

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**M. Islam, M. Tabassum, M. Elbatel, A. Mayr, C. Kremser, M. Haltmeier, E. Almar.** *"Semi-Supervised Transformer-Based Cervical Segmentation: FUGC 2025 Challenge."* In: **International Symposium on Biomedical Imaging (ISBI) 2025 Challenges**, Houston, TX, USA. (Accepted, publication forthcoming)  
**Publisher:** Springer  
**Keywords:** Fetal Ultrasound, Semantic Segmentation, Weak-to-Strong Consistency, Vision Transformer.

**M. Islam, M. Tabassum, M. M. Nishat, F. Faisal and M. S. Hasan,** *"Real-Time Clinical Gait Analysis and Foot Anomalies Detection Using Pressure Sensors and Convolutional Neural Network"*, In: **7th International Conference on Business and Industrial Research (ICBIR)**, Bangkok, Thailand, 2022, pp. 717-722, doi: 10.1109/ICBIR54589.2022.9786472.  
**Publisher:** IEEE Xplore  
**Keywords:** Legged locomotion; Pressure sensors; Biological system modeling; Transfer learning; Data models; Complexity theory; Classification algorithms; Convolutional Neural Network (CNN); Gait Analysis; Foot Anomalies; Predictive Analysis.

## PROJECTS

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**Deep Learning-Based Brain Tissue Segmentation Using U-Net and MRI Data** | [Project Link](#)  
University of Girona November 2024 - January 2025

- Developed a U-Net-based deep learning model for brain tissue segmentation, focusing on cerebrospinal fluid (CSF), gray matter (GM), and white matter (WM) from MRI scans from IBSR18 dataset.
- Preprocessed MRI data with advanced normalization, slice selection, and one-hot encoding while applying data augmentation to enhance model generalizability.
- Achieved improved Dice similarity coefficients by leveraging a robust training pipeline using PyTorch and Weights & Biases for efficient tracking and hyperparameter optimization.

**4D Chest CT Volume Registration: DIR-Lab Challenge** | [Project Link](#)  
University of Girona November 2024 - January 2025

- Developed a baseline registration model using elastix to align thoracic structures in different respiratory phases of patients with chronic obstructive pulmonary disease (COPD).
- Building a deep learning pipeline using VoxelMorph to enhance registration accuracy and compare with the baseline.

#### **Skin Cancer Detection from Dermoscopic Images: Comparing ML & DL Approaches** | [Project Link](#)

University of Girona

September 2024 - January 2025

- Performed image pre-processing tasks such as hair removal, color normalization, and ROI extraction, followed by feature extraction using methods such as GLCM, LBP, Gabor filters, and HOG to capture critical color, texture, and gradient characteristics.
- Implemented SVM, Random Forest, and XGBoost classifiers for binary and multiclass classification, addressing data imbalance through resampling techniques.
- Currently exploring advanced deep learning methods, including EfficientNet, to enhance classification accuracy and performance.

#### **Automatic Knee Rehabilitation Exercises using Collaborative Robot** | [Project Link](#)

University of Girona

September 2024 - January 2025

- Developed a system to perform knee rehabilitation exercises with a collaborative robot Universal Robot 3.
- Automated knee flexion/extension movements while also calculating range of motion during the simulation.

#### **Colorectal Cancer Tissue Classification and Gland Segmentation from Histopathology Images** | [Project Link](#)

University of Cassino

March 2024 - May 2024

- Developed an image processing segmentation pipeline using K-means clustering and Watershed algorithms, improving segmentation accuracy with grayscale morphology, smoothing, and circularity-based estimation.
- Created a machine learning pipeline for multi-class classification, extracting GLCM, Local Binary Patterns, and Gabor features, and used classifiers such as XGBoost, LightGBM, and SVM for improved classification.
- Engineered a deep learning segmentation pipeline using PyTorch, experimenting with UNet and UNet++ architectures and backbones like VGG16, ResNet, and EfficientNet.

#### **Web Development Project- “MedAnalytica”: A System to Empower Healthcare Decisions through Advanced Data Analysis** | [Project Link](#)

University of Cassino

March 2024 - June 2024

- Developed a website to enhance the healthcare data management process with improved accuracy and efficiency.
- A system where users can interact with physicians remotely and get suggestions.
- A system with a feature to register and login.
- A system with a feature to upload medical images for further processing by physicians with the advanced image processing tools and artificial intelligence.

#### **Stock Trends Prediction** | [Project Link](#)

University of Cassino

March 2024 - May 2024

- Conducted exploratory data analysis to handle missing values, outliers, and identify key predictors, improving data integrity for stock trend modeling.
- Performed multivariate analysis to uncover relationships among financial indicators, identifying crucial variables for trend prediction.
- Implemented an ensemble model using LightGBM and XGBoost, achieving accuracy in stock trend forecasting.

#### **AI Generated Text Detection System** | [Project Link](#)

University of Burgundy

September 2023 - December 2023

- Built a web application to detect AI-generated sentences, using a Byte-Pair tokenizer followed by a TFIDF vectorizer for word embeddings.
- Developed a classification model using an ensemble of LightGBM, CatBoost, SGD, and Logistic Regression classifiers.
- Created the web interface using Streamlit for real-time user interaction.

### **ACCOMPLISHMENTS**

#### **Fetal Ultrasound Grand Challenge** | ISBI 2025

March 2025

- Ranked 9<sup>th</sup> overall among all participating teams

#### **Associate Data Scientist Certificate** | DataCamp | [Certificate Link](#)

November 2024

#### **LLM - Detect AI Generated Text** | The Learning Agency Lab | Kaggle Competition

December 2023

- Top 30% among all participants
- Built the base classifier for my AI Text Detection Application.

#### **Bangladesh Physics Olympiad, Divisional Round** | Rank 5

2015

#### **SUST Astro Carnival** | Champion

2014

#### **Bangladesh Physics Olympiad, National Round** | Rank 7

2012

## EXTRACURRICULAR ACTIVITIES

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**Deputy Coordinator - IT and Web Design**, Erasmus Mundus Association Bangladesh    January 2025 - December 2025

- Working with the IT Team to ensure the development and proper maintenance of the Erasmus Mundus Bangladesh official website.

**Captain**, IUT University Tennis Club

April 2021 - May 2022

- Secured funding to improve illumination conditions for night-time play, enhancing the overall playing experience and safety for participants.
- Organized intra-doubles and intra-singles tournaments with 16 and 32 teams respectively, significantly increasing participation compared to previous years.
- Fostered greater student engagement in sports through improved facilities and well-organized tournaments.

## SKILLS

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- **Programming:** Python, R, SQL, MATLAB, C++, JavaScript, Java
- **Deep Learning:** VLMs, CNNs, LSTMs, RNNs, LLMs, RAG, Langchain
- **Deep Learning & Machine Learning Frameworks:** PyTorch, TensorFlow, Keras, Hugging Face, Scikit-learn
- **Medical Image Processing Tools:** ITK-SNAP, Elastix, SPM, Transformix
- **Data Processing:** EDA, Feature Selection, Data Wrangling, PCA
- **Visualization:** Matplotlib, Seaborn, OpenCV, Skimage, PIL, Pandas, NumPy
- **Robotics & Scripting:** Universal Robot Script
- **Web Development:** MySQL, Apache, XAMPP, Streamlit

## STANDARDIZED TEST SCORES

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**IELTS:** Listening 9 | Reading 9 | Speaking 7 | Writing 7 | **Overall 8**

## RESEARCH INTERESTS

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Deep Learning, Machine Learning, Computer Vision, Neuroscience, Biomedical Image Processing, Semi/Weakly Supervised Segmentation, Foundational Models, Multimodal Data Analysis, Image Registration, Biomarker and Radiomics Analysis, Image Reconstruction and Synthesis for Diagnosis, Prognosis, and Treatment Outcome Prediction.

## REFERENCES

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**Dr. Xavier Lladó**, Full Professor

Computer Vision and Robotics Institute

Dept. d'Arquitectura i Tecnologia de Computadors (ATC)

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**Mirza Muntasir Nishat**, Assistant Professor | Thesis Supervisor

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