



# SHIHAB AAQIL AHAMED

## Curriculum Vitae



"A self-motivated and highly-talented undergrad student equipped with the strong fundamental background knowledge and technical skills in mathematics, computer science, and related fields with solid research experience, excellent programming skills, and passionate in solving real-world problems with open source cutting edge research contributions in machine learning and deep learning for computer vision, and computer graphics applications, particularly for the task of optimization, self-supervised learning, calibration, few-shot / zero-shot learning and life-long learning."

### RESEARCH INTERESTS

Optimization

Video Understanding

Self-Supervised Learning

Computer Vision

Machine Learning

### EXPERIENCE

#### Computer Vision Lab – Mohamed bin Zayed University of Artificial Intelligence

**Research Assistant**, Computer Vision | Advisor: *Dr. Muhammad Haris Khan*

Abu Dhabi, UAE

November 2023 – Present

Acceptance rate is 4.8%

Internship

- Working as a research assistant for the computer vision department.
- Research on self-supervised representation learning for video understanding and video-based down-stream tasks, such as action recognition.

#### Machine Vision Research Group – University of Moratuwa, Sri Lanka

Katubedda, Sri Lanka

**Undergraduate Thesis Research Student**, Computer Vision

April 2024 – Present

Advisors: Main Supervisor: *Dr. Ranga Rodrigo*; Co-Supervisor: *Dr. Muhammad Haris Khan*

Internship

- Self-supervised representation learning for 3D point cloud understanding and point-cloud-based down-stream tasks.

### EDUCATION

#### Mohamed bin Zayed University of Artificial Intelligence

April 2025 – Present

**Master of Science (by Research Thesis Based) – M.S., Computer Vision** | Advisor: *Dr. Muhammad Haris Khan*

Abu Dhabi, UAE

Acceptance rate is 4.8%; Fully Funded MBZUAI Scholarship Recipient – **UAE Government**

- GPA: 4.0/4.0 (*summa cum laude* with First-Class Honors)

#### University of Moratuwa, Sri Lanka

June 2021 – Present

**Bachelor of Science (Honors) in Engineering – B.S., Electronics and Telecommunication Engineering & Minor in Mathematics**

May 2022 – Present

Studies Fully Funded by **Ministry of Higher Education, Sri Lanka**

Katubedda, Sri Lanka

- Cumulative GPA: 3.52/4.0 (*cum laude* Latin Honor, with Second-Class Upper Division Honors)
- Pathway: [Computer Vision and Pattern Recognition](#)
- Current Semester: 5<sup>th</sup> Semester

#### Zahira College, Kalmunai, Sri Lanka

January 2017 – August 2019

**General Certified Examination (G.C.E) Advanced Level & Ordinary Level, Physical Sciences**

Z-Score: 2.5593

Studies Fully Funded by **Ministry of Education, Sri Lanka**

Kalmunai, Sri Lanka

- Studied Grades 6-9 at the Bilingual Education Unit (BEU), an educational unit of Zahira College, Kalmunai provides education in both English and Tamil mediums for students up to Ordinary Level (O/L) Examination.
- High Distinctions for Physics, Chemistry & Combined Mathematics (Physical Science Stream)
- District Rank: 2, Island Rank: 152 (out of ~ 35,000 candidates)

### MOOCs

- EPFL Optimization: Principles and Algorithms - EdX [Linear Optimization](#)<sup>†</sup> Network and Discrete Optimization\* Unconstrained Nonlinear Optimization\*
- Machine Learning Specialization - Coursera [1](#)<sup>†</sup> [2](#)<sup>†</sup> [3](#)<sup>\*</sup>
- [Data Science and Machine Learning Bootcamp](#)<sup>†</sup> - Udemy
- Deep Learning Specialization - Coursera [1](#)<sup>†</sup> [2](#)<sup>†</sup> [3](#)<sup>†</sup> [4](#)<sup>†</sup> [5](#)<sup>\*</sup>
- [PyTorch for Deep Learning with Python Bootcamp](#) - Udemy
- Mathematics for Machine Learning and Data Science Specialization - Coursera [1](#)<sup>†</sup> [2](#)<sup>\*</sup> [3](#)<sup>\*</sup>
- DeepLearning.AI TensorFlow Developer Professional Certificate - Coursera [1](#)<sup>†</sup> [2](#)<sup>†</sup> [3](#)<sup>\*</sup> [4](#)<sup>\*</sup>

### PROJECTS

#### MACHINE LEARNING PROJECTS

**RetailVision: Densely Packed Product Detection from CVPR 2020 Challenge** | [SSD](#) [SKU-110K\\_fixed](#) [Tensorflow](#) November 2023

- Developed and implemented a SSD: Single Shot MultiBox Detector based on the object detection paper: "SSD - Single Shot MultiBox Detector" using TensorFlow.
- Enhanced retail vision by replacing the existing VGG backbone with DenseNet, to achieve better performance.
- Calibrated the default anchors to better suit and trained the model on the SKU-110K dataset, collects 11,762 densely packed shelf images, each containing an average of 200 objects, often similar or identical and positioned in close proximity from supermarkets around the world.

**Meta Learning for Omniglot Character Few Shot Classification using MANN** | [FSL](#) [Omniglot Character](#) [Tensorflow](#) **October 2023**

- 5 way 1-shot classification was implemented using Meta Learning Approach.
- MANN: Memory Augmented Neural Network was implemented from the scratch using tensorflow and keras and it is used to classify the Omniglot Handwritten Character Recognition, a dataset with 1623 characters from 50 different languages. Each character has 20, 28x28 images
- Accuracy of 99.48% was achieved around 1000 epochs by using 128 units LSTM layer as the controller network.
- Published a detailed Medium article: [Medium Article](#)

**ML Parameters Optimization:** | [Grid Search](#) [Randomized Search](#) [Bayesian Search Optimization Techniques](#) **June 2023**

- Implemented GridSearch, Randomized Search, and Bayesian Optimization to enhance model performance.
- Evaluated regression models using diverse Key Performance Indicators (KPIs) for accurate assessment.
- Demonstrated expertise in Scikit-Learn, showcasing understanding of hyperparameter optimization strategies.

**NLP: Twitter Sentiment Analysis** | [Python](#) [NLTK](#) [TextBlob](#) [Naïve Bayes Classifier](#) [Jupyter Notebook](#) **June 2023**

- Developed a supervised learning model to predict sentiment from thousands of user tweets.
- NLP libraries - NLTK and TextBlob - Tokenization used for text preprocessing and scikit-learn for ML modeling.
- Accuracy of 94% was obtained using naïve bayes classifier model.

**Telecom Customer Churn Prediction** | [Scikit-Learn](#) [Logistic Regression](#) [SVM](#) [K-NN](#) [Random Forest Classifier](#) **May 2023**

- Trained classifiers to predict telecom customer churn using Logistic Regression, SVM, K-NNs and Random Forest Classifier algorithms.
- Evaluated models with AUC score and ROC curve analysis, Amongst all the trained models, Random Forest Classifier achieving the highest performance.
- Random Forest Classifier model: Achieved ~96% accuracy, ~96% precision for retained customers, and ~94% precision for churned customers; recall rate of ~99% for retained customers and ~76% for churned customers.

**University Admission Classification** | [Scikit-Learn](#) [NN](#) [Regression Models - Multiple LR](#) [Jupyter Notebook](#) **July 2023**

- Built regression models for university admission predictions from student profiles, Utilized Linear Regression, ANN, and Decision Trees for accurate predictions.
- Achieved highest performance through Artificial Neural Networks, Random Forest, and Decision Trees.

**NLP: Resume Selector** | [Python](#) [Scikit-Learn](#) [NLP - NLTK](#) [TextBlob - Tokenization](#) **August 2023**

- Developed Naïve Bayes model for model to predict flagged resumes from a dataset of 125 resumes (33 - flagged, 92 - not flagged); using Python, Scikit-Learn, and NLP - NLTK, TextBlob - Tokenization.
- Cleaned and preprocessed resume text by removing punctuation and stop words.

**Applied Convolutional Neural Networks** | [Python](#) [Jupyter Notebook](#) **May 2023**

- Built a model to detect cars in an image using YOLO(You Only Look Once) algorithm.
- Implemented Neural Style Transfer using Deep Convolutional Networks to generate artwork given style and content images.

## SELECTED UNDERGRADUATE - ELECTRONIC PROJECTS

**Solar Wifi Router** | [Altium Designer](#) [Proteus](#) [Solidworks](#) **May 2022 - October 2022**

- Developed WiFi and LED UPS with 12V rechargeable battery for reliable power during outages, supporting AC and solar charging.
- Used smart relay technology for transitions between power sources (AC, solar), ensuring uninterrupted WiFi and LED performance, facilitating real-time battery charging.
- Created a user-friendly PCB design and enclosure, enhancing usability through intuitive switches, resulting in a dependable solution for power backup requirements.

**Analog Linear Power Supply** | [Altium Designer](#) [NI Multisim](#) [Solidworks](#) **October 2022 - February 2023**

- Designed a 10V linear power supply with 10A max current, incorporating step-down transformer, bridge rectifier, and Sziklai pair regulation, featuring current limit and short circuit protection.
- Implemented efficient thermal management using heat sinks, finalized in a single-layer PCB enclosed with a 3D-printed case and 12V DC fan for optimal heat dissipation.
- Developed a robust power supply system, utilizing Zener diode, smoothing capacitor, and advanced transistor configuration to achieve stable performance under varying load conditions.

**Robot Design and Competition** | [Webots R2021b](#) [C++](#) [Arduino](#) [Solidworks](#) **October 2022 - February 2023**

- Designed virtual robot for tasks: Line Following, Dotted Line Following, Segmented Wall Following, Chess Board Arena and physical robot for tasks: Line Maze, Curved wall, Blind box, Line following
- Mastered diverse Problem Solving approaches, Time Management and Effective Teamwork.

**Simple Solar Battery Charger** | [Altium Designer](#) [NI Multisim](#) [Solidworks](#) **March 2023 - June 2023**

- Designed Simple Solar Battery Charger, utilizing LM338/LM317T solar controllers to ensure reliable and safe charging of rechargeable batteries with solar energy.
- Implemented LED indicators for real-time monitoring of battery charge levels, enhancing user accessibility and maintenance efficiency.
- Created a cost-effective and lightweight, making the Simple Solar Battery Charger ideal for diverse outdoor activities.

## RELEVANT COURSEWORK

**Computer Vision and Pattern Recognition:** [EN3160](#) Image Processing and Machine Vision\*, [EN3150](#) Pattern Recognition (A+)

**Mathematics:** [MA1014](#) Mathematics (A), [MA2024](#) Methods of Mathematics (A+), MA2014 Differential Equations (A), MA2024 Calculus (A-), [MA2034](#) Linear Algebra (A), [MA3014](#) Applied Statistics (A), [MA3024](#) Numerical Methods (A-)

**Miscellaneous:** [EN1020](#) Signals and Systems (A), [EN2063](#) Signals and Systems, [CS2024](#) Data Structures and Algorithms (A)

## TECHNICAL SKILLS

**Languages:** C, C++, Matlab, Overleaf  $\text{\LaTeX}$ , Python

**Developer Tools:** Google Colab, Jupyter Notebook, PyCharm, VS Code

**Version Control:** Git, GitHub, GitHub Copilot

**Technologies/Frameworks:** PyTorch, Tensorflow, Keras

**Mathematics:** Optimization, Calculus, Linear Algebra, Probability and Statistics, Principal Component Analysis(PCA)

## HONORS AND AWARDS

### Jinnah Scholarship

October 2020

*The High Commission of Pakistan*

*Colombo, Sri Lanka*

- I've been granted the Jinnah Scholarship for outstanding performance in Advanced Level Examination. This scholarship is awarded on a merit basis. Under this program, each successful student receives a stipend of SL Rs. 50,000 as assistance for one year to pursue their studies.

### Best Results Award: G.C.E Advanced Level Examination 2019, Physical Sciences

December 2019

*Zahira College Kalmunai, Srilanka*

*Kalmunai, Sri Lanka*

- I received the honor of being awarded for achieving the best results in the G.C.E. A/L examination 2019 in the physical science stream, where I obtained 3 A grades in Physics, Chemistry and Combined Mathematics.

**Dec. 2019** Ranked 152nd in **National University Entrance Examination** out of approximately 35,000 candidates

## REFERENCES

**Dr. Ranga Rodrigo**, B.Sc.Eng.Hons. (Moratuwa, Sri Lanka), M.E.Sc. (Western, Canada), Ph.D. (Western, Canada), SMIEEE

Head of Department

**Senior Lecturer**, Department of Electronic and Telecommunication Engineering

University of Moratuwa, Sri Lanka.

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*References available upon request.*

**Dr. Muhammad Haris Khan**, Bachelor's (COMSATS, Pakistan), Master's (Sussex, United Kingdom), Ph.D. (Nottingham, United Kingdom)

**Assistant Professor**, Department of Computer Vision

Mohamed bin Zayed University of Artificial Intelligence (MBZUAI).

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