



Muhammad Emmad Siddiqui

Website: <https://muhammademmadsiddiqui.github.io/> | LinkedIn: <https://www.linkedin.com/in/muhammad-emmad-siddiqui/>

● ABOUT ME

AI researcher specializing in Trustworthy and Explainable AI.

● WORK EXPERIENCE

FAST NATIONAL UNIVERSITY – KARACHI, PAKISTAN

TEACHING ASSISTANT (ADVANCED COMPUTER VISION) – CURRENT

- Assist the course instructor in developing and organizing coursework at the graduate level.
- Research emerging topics and recent advancements in computer vision to recommend updates and enhancements for lecture materials and slides.
- Design and prepare quizzes, assignments, and assessments in alignment with the course outcomes.
- Evaluate and grade student submissions with fairness, consistency, and adherence to academic standards.
- Conduct supplementary lectures and tutorial sessions to strengthen core concepts, along with special lectures on topics such as Uncertainty Quantification and Trustworthy AI Systems to further support student learning.

GLAXOSMITHKLINE (GSK) – KARACHI, PAKISTAN

DATA SCIENTIST – 07/2023 – 12/2024

- Reduced the on-site safety incidents by **20%** by developing a PPE compliance monitoring system using YOLOv8, OpenCV, and Python to detect safety gear in warehouse footage with **98%** accuracy
- Worked closely with the engineering team to build a drone-based solar panel inspection solution using YOLOv5, OpenCV, and Raspberry Pi to identify unclean panels, cutting inspection time by **90%**.
- Built an ML-driven analytics toolkit for Emerging Markets, improving on-time delivery rates by **12%** via outlier filtering and order-success prediction.
- Achieved a **40%** reduction in manual document-search time by developing a RAG-based LLM chatbot for Material Scheduling teams using LangChain and Hugging Face and increasing self-service resolution by **30%**.
- Worked closely with the **c3.ai** engineers to build and evaluate the time-series sequential models for vaccine demand forecasting, improving MAP by **20%**.
- Delivered a scenario-based demand-planning digital twin with Global Demand Forecasting Managers of GSK using ensemble models (gradient-boosted trees, neural networks) with real-time market data, improving forecast accuracy by **15%** and saving **£30K** annually.

Technologies Used: PyTorch, TensorFlow, OpenCV, YOLOv8, Hugging Face, LangChain.

GLAXOSMITHKLINE (GSK) – KARACHI, PAKISTAN

PROJECT TRAINEE – 03/2023 – 06/2023

- Optimize the Transport Management System (**TMS**) using Power BI with a Python-based linear programming engine to improve the load factor by 18%, reduce empty miles by 22%, and save £ 50k **annually**.
- Reduced material shortages using a Power BI dashboard integrating SAP ERP, VBA macros, and an ML model to monitor; achieved **85%** forecast accuracy, cutting downtime by **25%**.
- Reduced safety incidents using **YOLOv5** and the **TensorFlow Lite** app for real-time forklift detection in a pilot run.

Technologies Used: TensorFlow Lite, Android SDK, Power BI, Python, SAP ERP, Excel VBA, Linear Programming

● EDUCATION AND TRAINING

06/2023 – CURRENT Karachi, Pakistan

DATA SCIENCE (MASTERS) FAST NUCES

Computer Vision, Deep Learning, GenAI

Website <https://khi.nu.edu.pk/>

Industry 4.0, Optimization, Linear Programming, Data Bases, Supply Chain

Website <https://www.neduet.edu.pk/> | Final grade A-1 (CGPA: 3.699/4)

06/2021 – 12/2021

VOCATIONAL COURSE IN INTERNET OF THINGS (IOT) NAVTTC

Python, C++, Robotics, Micro Controllers

Final grade A+

● RESEARCH INTEREST

Trustworthy and Risk-Aware Artificial Intelligence

My primary research goal is to develop reliable and efficient machine learning models that can effectively address real-world challenges. Guided by this vision, my work focuses on **uncertainty quantification for risk-aware decision-making in computer vision** and **natural language** domains.

Trustworthy AI: Safety, Uncertainty, and Risk-aware Decision-Making

Alignment of Foundation Models: Robust and Safe Learning in LLMs and VLMs

● SKILLS

Computer Vision | Uncertainty Quantification | TrustworthyAI | LANGCHAIN | GenAI | Pytorch, Tensorflow

● PUBLICATIONS

2023

[Mango Farm Optimization with AI: Boosting Cultivation Efficiency](#)

- Presented a novel "Mango Leaf Health Detection Dataset" to identify disease-affected areas in orchards using YOLO v5s, v7, and v8s models.
- Enabled precise pesticide targeting to restore low-yield orchards, improving cultivation efficiency and addressing market demand gaps.
- Leveraged CNN-based pipelines for grid-based image analysis, bounding box construction, and health classification, reducing manual inspection time.

3rd International Conference on Computing and Technology (ICCT-2023) IEEE

Link <https://www.youtube.com/watch?v=GexYv6L6rac>

● PROJECTS

01/2025 – CURRENT

MS Thesis (Risk-Controlled Facial Image Retrieval using Uncertainty Quantification and Conformal Prediction)

- Designed a **state-of-the-art facial image retrieval system** integrating *Uncertainty Quantification* with *Conformal Prediction* to ensure statistically guaranteed and interpretable retrieval outcomes.
- Implemented a **risk-controlled retrieval mechanism** allowing dynamic adjustment of parameters such as *risk level* and *error rate*, ensuring the inclusion of at least one true nearest neighbor in the prediction set.
- Utilized the **Vision Transformer (ViT)** architecture with an **adaptive pooling operation** to optimize feature embeddings and enhance retrieval efficiency.
- Conducted extensive experiments on **real-world datasets** such as *SCface*, characterized by distributional variations, to validate system robustness under domain shifts.
- Achieved **high retrieval accuracy** and **reliable uncertainty calibration** in challenging, risk-sensitive scenarios.

07/2024 – 12/2024

CBAM: Convolutional Block Attention Module

- [Worked](#) on developing a modular framework for dynamic feature recalibration across architectures, while preserving computational efficiency.
- Integrated lightweight attention modules into pre-trained CNNs (e.g., **ResNet-50**, **MobileNet**) to amplify discriminative spatial/channel features, optimizing performance in classification and detection tasks.

08/2024 – CURRENT

AI-Driven Talent Match for Recruitment

- [Engineered](#) an **NLP**-based tool to extract key resume details and align them with job requirements, streamlining recruiter workflows for efficient candidate shortlisting.
- Developed a **FastAPI**-powered backend API to automate data processing, enhancing hiring efficiency for a pharmaceutical client.

● HONOURS AND AWARDS

Global Recognition Silver Award – GSK

[Recognized](#) for developing and deploying an AI-driven forecasting tool for the Vx portfolio, boosting baseline accuracy and streamlining processes.

02/11/2023

Global Recognition Award – GSK

[Honored](#) for automating and deploying data science solutions that markedly improved end-to-end project efficiency across key growth markets.

Best Final Year Project 2022 – NED University of Engineering & Technology

[Received](#) the best **FYP** and funding on novelty for developing an advanced catheter control system integrating a microcontroller to enhance precision in cerebrospinal fluid (**CSF**) drainage from the third ventricle. Demonstrated expertise in microcontroller programming and system integration to enable real-time catheter manipulation during procedures, offering unprecedented accuracy and user control. Additionally, a mobile-based application was developed using MIT App Inventor connected with Firebase for catheter control.

Technologies Used: Microcontrollers, Python, Firebase, Embedded Systems

● CERTIFICATIONS

Machine Learning Specialization - Stanford University (Coursera)

[Skills:](#) Recommender Systems, Supervised & Unsupervised Learning, Anomaly Detection, RL

Developing LLM Applications with LangChain

[Skills:](#) LangChain, Chains, Agents, RAG, PromptTemplates

MLOps

[Skills:](#) CI/CD, CM/CT, FeatureStores, ExperimentTracking, ModelMonitoring

Sequences, Time Series and Prediction

[Skills:](#) RNNs, LSTMs, GRUs, Hyperparameter Tuning (window size, learning rate)