# Muhammad Bilal

AI/ML Engineer — Data Analyst

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## SUMMARY

Computer Science graduate with hands-on experience building AI/ML pipelines and data-driven applications, including transfer-learning image classifiers, semantic embedding-based matching systems, and end-to-end data analysis workflows using Python. Skilled in translating raw data into structured, actionable insights through preprocessing, statistical evaluation, and visualization. Eager to apply strong analytical thinking and machine learning fundamentals to an AI/ML Engineering or Data Analyst role.

## SKILLS

**Programming & Query Languages:** Python, SQL, C++, JavaScript

**ML/DL Frameworks:** TensorFlow, Keras, Scikit-learn, YOLOv8, YOLOv26 Nano, OpenCV, EasyOCR

**Data Analysis & Visualization:** Pandas, NumPy, Matplotlib, Statistical Analysis, Exploratory Data Analysis (EDA)

**ML Concepts:** Transfer Learning, Image Classification, Semantic Embeddings, CNNs, OCR, Model Evaluation (F1-score, Confusion Matrix)

**Tools & Platforms:** Git, GitHub, MySQL, Gemini API, Prompt Engineering, Linux, Raspberry Pi, Jupyter, REST APIs

**Core CS Concepts:** Data Structures & Algorithms, Object-Oriented Programming, Database Systems

## EXPERIENCE

**AI/ML Engineer** 2026 – Present
*SyntekAi*

- Spearheaded the core machine learning development for 'NeuroBin', a government-backed smart waste segregation system, building a real-time classifier utilizing OpenCV and YOLOv26 Nano.
- Executed the end-to-end model pipeline, encompassing extensive dataset collection, data preprocessing, augmentation, training, testing, and statistical evaluation.
- Successfully deployed the optimized classifier on edge hardware (Raspberry Pi 4) and a centralized Linux server to enable automated, large-scale waste sorting.
- Collaborated closely with cross-functional teams to strategize system improvements, preparing the product for a pilot deployment at the University of Sargodha and a subsequent large-scale government integration.

**Shopify Store Developer & Manager** 2024 – 2025

- Evaluated store performance and user drop-off metrics to optimize landing page layouts, boosting search rankings and conversion rates for international clients.
- Configured third-party REST APIs and secure payment gateways, streamlining checkout workflows and maintaining reliable system data flow.

## PROJECTS

**HAWALAY — AI-Driven Lost & Found Platform (Final Year Project)** **2025–2026**
*Python, TensorFlow, Gemini API, YOLOv8, MongoDB*

- Developed a FastAPI microservice integrating Gemini API for structured feature extraction from lost-and-found reports.
- Built a document OCR pipeline using YOLOv8 and EasyOCR, generating 512-dimensional semantic embeddings for item descriptions.

- Designed a two-stage matching algorithm leveraging MongoDB geospatial/date filters and cosine similarity scoring.
- Trained an InceptionResNetV2 classifier across 13 categories, achieving 94.5% test accuracy.

**Flower Classification Model — Image Classification & Model Benchmarking** **2024**
*Python, TensorFlow/Keras, Scikit-learn, OpenCV, VGG16*

- Built an end-to-end classification pipeline using the Kaggle Flowers Recognition dataset.
- Benchmarked CNN, MLP, and Linear SVM models leveraging VGG16 transfer learning features.
- Preprocessed and augmented images with OpenCV and Keras, applying an 80/20 train-validation split.
- Evaluated architectures using macro F1-score, confusion matrices, and detailed classification reports.

**Library Management System — Data Structures & File-Based Persistence** **2023**
*C++, AVL Tree, File I/O*

- Implemented a self-balancing AVL tree to provide efficient $O(\log n)$ search, insertion, and deletion for catalog records.
- Designed modular, file-based data persistence for structured catalog and user datasets using OOP principles.

## EDUCATION

**Bachelor of Science in Computer Science (BSCS)** 2022 – 2026
*University of Management and Technology (UMT), Lahore* **CGPA: 3.20**

- Relevant Coursework: Machine Learning, Data Structures & Algorithms, Database Systems, Statistics for Data Science, Software Engineering Methodologies.

**Intermediate in Computer Science (ICS)** 2020 – 2022
*Punjab College*