

# Muhammad Rayyan

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## PROFESSIONAL SUMMARY

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Backend and AI engineer with hands-on experience shipping production-grade systems — from a multi-service computer vision platform (FastAPI + NestJS + Next.js, Docker, PostgreSQL) to a cloud-based ML dataset pipeline integrating Stable Diffusion and Grounding DINO. Proven ability to design RESTful APIs, async job queues, and cloud-integrated backends through real internship and project work. Driven by the challenge of turning AI/ML research into scalable, deployable systems — exactly the kind of work required in Data+AI engineering roles.

## TECHNICAL SKILLS

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**Languages:** Python, TypeScript, JavaScript, SQL, Kotlin

**AI/ML & Data:** Scikit-learn, TensorFlow, PyTorch, Keras, OpenCV, Pandas, NumPy, SciPy, Matplotlib, Plotly, Streamlit, Computer Vision, Image Classification

**Backend & APIs:** FastAPI, NestJS, Django, Flask, RESTful API Design, JWT Authentication, BullMQ, Microservices, SQLAlchemy, Prisma ORM

**Databases:** PostgreSQL, MongoDB, Redis, Firebase Firestore, SQL Server, MinIO (S3)

**Cloud & DevOps:** Docker, Docker Compose, Turborepo, Google Vertex AI, Firebase, Vercel, Render, Git, GitHub Actions

**Concepts:** OOP, DSA, LLM Applications, RAG Pipelines, Embeddings, ETL/ELT, Async Job Processing, CI/CD, Agile

## EXPERIENCE

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### **Voliom**

Rawalpindi, Pakistan

#### *AI/ML Intern*

*Jun 2025 – Sep 2025*

- Developed a production-grade Computer Vision Platform backend API using **FastAPI** and **PostgreSQL**, collaborating closely with senior engineers under an Agile workflow with regular code reviews.
- Architected a complete authentication and user management system integrating **Firebase Auth**, email verification, and **JWT-based security**, ensuring secure and stateless API access.
- Implemented project and dataset management features enabling users to create computer vision datasets, upload and organize images via **Firebase Storage**, and manage multi-user workspaces.
- Integrated **Google Vertex AI** to deliver AI-powered capabilities including text-to-image generation and image-to-text analysis within the platform's RESTful API surface.
- Containerized the full application stack using **Docker**, and modeled relational database schemas with **SQLAlchemy**, applying best practices in RESTful API design and database normalization.
- Technologies: *Python, FastAPI, PostgreSQL, SQLAlchemy, Firebase, Google Vertex AI, Docker, JWT*

## PROJECTS

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### **Brain Tumor Classification – Medical Imaging AI** | *Python, TensorFlow, PyTorch, OpenCV, Scikit-learn*

- Designed and trained a deep learning CNN classification model for MRI-based brain tumor detection, building end-to-end data pipelines covering ingestion, augmentation, preprocessing, training, and evaluation.
- Applied transfer learning and **OpenCV**-based preprocessing to improve model generalization on medical imaging datasets, demonstrating practical skills in supervised learning and model optimization.
- Structured the project with modular, OOP-based Python code, enabling reproducible experimentation and clean separation of data, model, and evaluation layers.

### **Imagenix – AI-Powered CV Dataset Platform** | *Next.js, NestJS, FastAPI, PyTorch, PostgreSQL, Redis, Docker*

- Architected a production-grade, full-stack monorepo platform (Turborepo) with three distinct services: a **Next.js 14** frontend, a **NestJS** REST API backend with **Prisma** ORM and **JWT/Passport** auth, and a **FastAPI + PyTorch** ML microservice for generative augmentation.
- Integrated **Grounding DINO** for AI-powered auto-annotation and **Stable Diffusion v1.5 + ControlNet** for generative dataset augmentation, enabling export to **COCO JSON**, **YOLO TXT**, and **Pascal VOC XML** formats ready for model training pipelines.
- Implemented async job processing with **BullMQ + Redis**, S3-compatible image storage via **MinIO** with presigned URLs, and full **Docker Compose** orchestration across all services.

### **CV Platform Backend API – Voliom Internship** | *Python, FastAPI, PostgreSQL, SQLAlchemy, Firebase, Vertex AI, Docker*

- Engineered the complete backend API for a production computer vision platform, implementing versioned RESTful endpoints covering user auth, project management, dataset image CRUD, and AI generation workflows.
- Designed a dual-token auth system combining **Firebase Auth** (email verification, credential validation) with **JWT** bearer tokens for stateless, role-aware access control across all protected routes.
- Integrated **Google Vertex AI** as background tasks for text-to-image generation and image-to-text analysis; managed structured image metadata in **PostgreSQL** with storage via **Firebase Storage**.
- Containerized the full service with **Docker** and **Docker Compose**; applied layered service architecture with **SQLAlchemy** ORM to cleanly separate routing, business logic, and persistence.

## EDUCATION

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**Khwaja Fareed University of Engineering & Information Technology (KFUEIT)**

Rahim Yar Khan, Pakistan

*Bachelor of Science in Data Science*

*2022 – 2026*

## CERTIFICATIONS

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**Google AI Essentials** – Google | **Data Science Methodology** – IBM / Coursera | **Tools for Data Science** – IBM / Coursera | **What is Data Science?** – IBM / Coursera