

AHMED MOHAMMED

Machine Learning Engineer / Applied AI / Computer Vision

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PROFESSIONAL SUMMARY

ML Engineer and M.Sc. candidate in Artificial Intelligence at **JKU Linz** (advised by **Prof. Sepp Hochreiter**) with a proven track record of building and deploying ML models from research to production. Hands-on experience with **PyTorch, PyTorch Lightning, diffusion models, CNNs, and LLMs** across diverse data types: images (computer vision), text (NLP/LLMs), and time-series (EEG/BCI). As founder of **Faultrix**, architected end-to-end ML pipelines with production-grade reliability; conducted industrial ML validation at **PROFACTOR GmbH** funded by the Government of Upper Austria (project Zer0P). Strong fundamentals in **Python, Git, Docker, and Linux**.

CORE SKILLS

ML Frameworks	PyTorch · PyTorch Lightning · Scikit-learn · Diffusion Models (DDPM) · CNNs · UNet · Transformers · LLMs · Encoder-Decoder Architectures
Data & Pipelines	End-to-end ML pipelines · Data preprocessing · Augmentation · Structured & unstructured data (images, text, time-series) · Cross-validation · Experiment tracking (Hydra)
Model Engineering	Model training & optimization · Hyperparameter tuning · OOD detection · Image classification · Object detection (YOLOv8) · Inference orchestration · Structured output extraction
Evaluation & Monitoring	AUROC/FPR95 evaluation · Ablation studies · Model drift monitoring · Latency optimization · Reproducible benchmarking · Monte Carlo methods
Software & DevOps	Python (advanced) · Git · Docker · Linux · REST APIs · CI/CD concepts · Structured logging · TypeScript
Collaboration	Research-to-production handover · Technical documentation · Cross-functional teamwork · Academic writing · AI coding tools (Claude Code, Copilot)

PROFESSIONAL EXPERIENCE

Founder & ML Engineer

Jul 2025 – Present

Faultrix — Linz, Austria

Production ML system: image ingestion → model inference → structured extraction → automated reporting

- Designed and deployed an end-to-end ML pipeline handling image ingestion, model inference, structured output extraction, and automated PDF report generation — processing end-to-end in under 1 minute.
- Built fault-tolerant ML workflow with idempotent processing steps, retry logic, and iterative quality loops — achieving production-grade reliability for model inference from day one.
- Optimised LLM-powered inference components for latency and output consistency through systematic prompt engineering, structured output validation, and continuous model performance monitoring.
- Sole technical founder — owned the full ML product cycle: model selection, pipeline architecture, deployment, and iteration based on real-world performance data.

M.Sc. Thesis Researcher

Apr 2024 – Present

JKU Institute for Machine Learning & PROFACTOR GmbH — Linz / Steyr

Industrial research conducted on-site at PROFACTOR GmbH · Government of Upper Austria, project Zer0P

- Thesis: *Conditional Diffusion Models as Generative Classifiers for Out-of-Distribution Detection* — supervised by Prof. Sepp Hochreiter; assistant supervisor Claus Hofmann, MSc.
- Developed a **binary conditional diffusion model** with a novel class-conditional separation loss, boosting OOD detection AUROC from 80.25% to **99.03%** on CIFAR-10 (+18.8 pp gain).
- Achieved **98.98% AUROC** on within-CIFAR split and **90.50–96.97%** across five external OOD benchmarks (CIFAR-100, Places365, FashionMNIST, SVHN, Textures).
- Extended the framework to **industrial classification of inkjet experimental prints** at PROFACTOR GmbH (Government of Upper Austria, project Zer0P): designed a multi-head conditioning mechanism and conducted an 8-method comparison with 5-fold cross-validation.
- Built modular, reproducible experiment infrastructure using **PyTorch Lightning + Hydra** with configuration tracking, seed-controlled runs, and auditable raw-score artefacts.

AI Research Intern

Aug 2023 – Oct 2023

Karunya University — Coimbatore, India

- Developed deep learning models for **EEG-based motor imagery classification** in Brain-Computer Interface (BCI) systems; designed signal preprocessing and feature extraction pipelines for multi-class EEG data.
- Evaluated and compared CNN and RNN architectures for real-time BCI decoding; documented methods and findings for academic stakeholders.

SELECTED PROJECTS

OOD Detection with Conditional Diffusion Models (M.Sc. Thesis) | JKU Institute for Machine Learning — Prof. Sepp Hochreiter

Binary CDM achieving 99.03% AUROC on CIFAR-10 via novel separation loss. Extended to industrial inkjet quality control with multi-head conditioning (YOLOv8 + CDM two-stage pipeline). Modular implementation: PyTorch Lightning, Hydra, reproducible auditable artefacts.

Faultrix – AI-Powered Construction Report Automation | faultrix.com

Production ML SaaS: building photo → AI inference → structured damage analysis → ONORM-compliant report in <1 min. Stack: Python, Next.js, OpenAI API, Convex. Fault-tolerant pipeline with iterative quality loops.

EEG Motor Imagery Classification for Brain-Computer Interfaces | Karunya University, India

Deep learning models for multi-class EEG signal classification in BCI systems. Signal preprocessing, feature extraction pipelines, and CNN/RNN architecture comparison for real-time decoding.

EDUCATION

M.Sc. Artificial Intelligence

Johannes Kepler University (JKU), Linz — Oct 2020 – Present (Thesis submitted Mar 2026)

Thesis advisor: Prof. Sepp Hochreiter · Assistant: Claus Hofmann, MSc · Coursework: Advanced Deep Learning, Probabilistic ML, Computer Vision, Reinforcement Learning, Statistical Machine Learning

B.Sc. Mechatronics Engineering

Eastern Mediterranean University, Cyprus — Feb 2015 – Jan 2018

Graduation project: SCARA robotic system for dynamic object tracking — real-time control and sensor integration

LANGUAGES

Arabic Native

English B2 – Professional Working

German B1 – CEFR
(actively improving)