

Abdallah Besem Zain

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Summary

Innovative AI and Computer Science student with a solid foundation in machine learning and software development. Adept at leading technical teams to deliver award-winning, production-grade systems utilizing Python, Java, and modern cloud infrastructures. Passionate about translating complex theoretical AI concepts into robust, real-world tech solutions

Education

Alamin International University (AIU) | Bachelor of Computer Science

Sep. 2022–Jun. 2026

Major: Artificial Intelligence Science

Skills

- **Programming Languages:** Python, Java, JavaScript, C++, R, TypeScript, SQL, NOSQL.
- **AI Domains & Core ML:** Machine Learning, Neural Networks, Deep Learning, Computer Vision, NLP, Generative AI, Data Preprocessing and Augmentation, Feature Extraction, Transfer Learning, Optimization Algorithms, Distillation.
- **Computer Vision:** OpenCV, ROS2, Facial Expression Recognition, Object Detection (YOLO, Faster R-CNN), Image Processing.
- **AI Frameworks & Libraries:** PyTorch, TensorFlow/Keras, Scikit-learn, Pandas, NumPy.
- **Development Tools:** Docker, Streamlit, Flask/FastAPI, Git, GitHub, Linux, Bash, Jupyter.
- **Soft Skills:** Leadership, Teamwork, Time Management, Problem-Solving, Adaptability and Communication.
- **Languages:** English (Very Good) | Arabic (Native).

Experience

Undergraduate Teaching Assistant | Alamein International University

Mar. 2026 – Present

- Assisted in Structure Programming and Object-Oriented Programming (OOP) classes.

AI and Data Science Trainee (Microsoft ML Engineer Track) | DEPI

Dec. 2025 – Present

- Engineered end-to-end data pipelines and trained machine learning models using Python, applying advanced preprocessing and visualization techniques.
- Designed deep learning solutions focusing on Natural Language Processing with attention models and Computer Vision.
- Streamlined model deployment and tracking utilizing Azure AI, Hugging Face, and MLflow as part of a comprehensive capstone project.

Game Development and Reinforcement Learning Trainee | SARTA

Jul. 2025 – Sep. 2025

- Designed immersive game environments with 3D modeling and gameplay mechanics.
- Integrated RL agents within custom simulations, optimizing agent performance via Python workflows.
- Analyzed agent behavior using reward curves and policy metrics to drive improvements

Object-Oriented Programming (OOP) Trainee | ITI

Jul. 2024 – Sep. 2024

- Completed advanced Java training, enhancing programming proficiency.
- Developed Grand Egyptian Museum (GEM) management system with a chat room, demonstrating practical application of OOP concepts.

Most Notable Projects

SkyVision | Graduation Project (Ongoing) | Collaboration with James Madison University (JMU)

- Spearheading research in autonomous UAV swarm coordination. Architected with a robust control system integrated with Multi-Agent Reinforcement Learning (MARL) and Federated Learning. The system leverages Vision-Language Models (VLMs) and optimizes vision pipelines for real-time target detection and analysis. Validated and benchmarked policies across diverse simulation environments, including NVIDIA Isaac Sim, Omnidrones, AirSim, and Gazebo.

Nomeda Therapist | Real-Time Multimodal AI Platform:

- Architected a real-time AI therapy platform using a low-latency STT-LLM-TTS loop for fluid interaction.
- Developed a multimodal emotion pipeline integrating FER and SER for context-aware, empathetic responses.

Deepfake Detection and Localization System

- Engineered a two-stage deepfake detection framework in PyTorch, combining a Vision Transformer (ViT) for fast screening and an Xception-U-Net for pixel-precise localization. By integrating multi-modal features (ELA, SRM) and a conditional inference pipeline, the system achieved 91.75% accuracy and reduced computational costs by 60% across multiple public datasets.

Cloud-Based AI Learning Platform

- Engineered a secure, event-driven AI learning platform on AWS, utilizing Apache Kafka and containerized microservices. The system architecture adheres to enterprise best practices, featuring API Gateway orchestration, isolated data storage, and automated CI/CD pipelines to ensure highly scalable and reliable deployments.

Interactive Egyptian Museum Application | Belmasry Tech Hackathon (3rd place)

- Designed and developed an award-winning museum application featuring an interactive AI chatbot and a real-time chatroom using advanced Java and OOP concepts.

Publications & Research

- Under review.** Toutou, A., Fathy, B., Zain, A., Kamel, Y., Islam, A., Shalaby, A. Phantom Neurons: Why Magnitude Pruning Fails in Gated FFNs. Submitted to **NeurIPS 2026** (The 40th Annual Conference on Neural Information Processing Systems).
- Under review.** Fathy, B., Islam, A., Zain, A., Elredeny, M., Abdou, M. et al. Adaptive WavLM-HuBERT Fusion Mechanism for Cross-Lingual Speech Emotion Recognition: English-to-Arabic Transfer Learning. Submitted to **IEEE Transactions on Affective Computing 2026**.
- HiGAT: Hierarchical Graph Attention with Battery-Aware Adaptive Attention for Multi-UAV Cooperative Task Offloading in Mobile Edge Computing.** Proposed HiGAT-F4, a hierarchical GAT with HAPPO updates utilizing battery-aware edges, zone pooling, and FedPer to jointly optimize UAV trajectory, computation, and offloading under non-IID conditions; manuscript in preparation.
- Comprehensive Survey of Multi-UAV MARL Systems.** Characterized MARL algorithm families for decentralized cooperative control in aerial robotics, evaluating federated and privacy-preserving mechanisms under strict deployment constraints; manuscript in preparation.

Courses

Successfully completed over **30+ professional courses** in AI, software engineering, and related fields
details available on my [LinkedIn](#) profile or upon request.

Extracurricular Activities

IEEE Club Member - AI Committee

Dec. 2024 - Present

- Actively engaged in IEEE events, workshops, and research communities, contributing to discussions on AI, machine learning, and software engineering

ICPC Club Member

Nov. 2023 – Sep. 2025

- Solving algorithmic and data structure challenges in a competitive programming environment, demonstrating strong problem-solving and coding skills under pressure.