

Professional Summary

Final-year Computer Engineering undergraduate with an immense passion for AI. I enjoy the idea of connecting theoretical foundations to real-world applications and have many "aha" moments as I learn about new technologies and innovative solutions.

Education

Arab Academy for Science and Technology - Faculty of Engineering

SEP. 2020 – JUN

Bachelor in Computer Engineering – GPA: 3.6/4.0

- **Related Coursework:** Introduction To Artificial Intelligence (A+), Neural Networks(A+), Image Processing and Pattern Recognition(A+)

Projects

(These are some of the projects not all of them. You can find the rest on my Github: [MHamdyK](#))

• ContribNavigator - AI Open-Source Onboarding Agent | MCP Hackathon [[GitHub](#)/[HF Space](#)]

- Developed a full-stack AI agent application using **Python** and **Gradio** to simplify the onboarding process for new open-source contributors.
- Engineered an agentic workflow where an **LLM** dynamically plans and generates an onboarding kit, featuring AI-summarized contribution guidelines and sandboxed repository analysis via **Modal**.
- Integrated multiple services including the **GitHub API** for issue discovery, **Modal** for serverless git operations, and **OpenAI** for planning, analysis, and summarization, delivering a complete end-to-end solution.

• Fawry Competition (On-going) | 2 Month Duration | Phase 1 | Qualified | [Repos: [MOT](#), [ReID](#)]

- **Face Re-ID:** Fine-tuned **Inception-ResNet-V1** (VGGFace2) with an **ArcMarginProduct** layer inspired by ArcFace to build an internal face-identification system for Fawry's staff, reaching **92 % validation accuracy**; **cosine-similarity** search on an augmented embedding gallery.
- **Pedestrian MOT:** Delivered a real-time tracking pipeline on **MOT20/17** using **YOLOv8** for detection and **ByteTrack** (Implemented MOT by Associating Every Detection Box 2022 paper) for data association, achieving **53 % HOTA** in crowded test footage after targeted hyper-parameter tuning (**SGD + cosine LR decay**).

• SadaCall – Autonomous Cold-Calling Agent MVP (2025). [Whisper private Notebook](#) (please do not share)

- **Egyptian Arabic ASR fine-tune:** Adapted Whisper-small on 80 h Egyptian Private Dataset + [CV-Arabic](#) (81 k train / 10 k val / 10 k test) using a single Colab Pro A100 (20 h, ≈ \$30). bfloat16 + TF32 optimizations allows to increase batch-size from 16 → 32 (1.6 × throughput); WER slashed from pre-trained **63.5 %** → **36.2 %** (-27 pp, -43 % rel.).
- **Training:** AdamW 1 e-5 (learning rate 40x smaller than the pre-training learning rate as suggested in the official Whisper paper), 10 k steps, 500-step warm-up, linear decay.
- **End-to-end voice agent:** **Whisper STT** → **CRAG** (Contextual Retrieval-Augmented Generation via LangChain + ChromaDB) for long-term real-estate context → **FishSpeech TTS** (voice-cloning) → **Twilio dialer**, enabling fully automated, natural cold-calls.
- **Delivery:** Private **Gradio** demo Space with record/upload interface for instant call playback and transcript review.

• End-to-End Egyptian Arabic ASR with Wav2Vec2 XLS-R [[GitHub](#)]

- **Pretrained & fine-tuned** on **80K+** Arabic audio samples (30K synthetic + 50K real) for dialect adaption.
- **Built a full pipeline:** 16kHz resampling, diacritic free normalization, custom CTC vocab & dynamic padding.
- **Optimized Wav2Vec2:** froze feature extractor, resized CTC head, trained in **FP16** on P100 GPU, achieving **49% WER** and saved reusable checkpoints.

Courses & Certificates

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| • Dr Mostafa Saad CSkilled Python DSA course | APR. 2025 - Present |
| • DEPI (Digital Egypt Pioneers Initiative) - Google Data Analyst Specialist | OCT. 2024 – March 2025 |
| • Embedded Systems Engineer – AMIT Embedded Systems Course
(Scholarship by Orange) Certificate Link | SEP. 2024 |
| • Machine Learning Specialization (Coursera) | MAY. 2024 |
| • Zero to Mastery Learn PyTorch for Deep Learning , (Udemy) | JAN. 2024 |
| • Internet of Things IoT – Information Technology Institute(ITI) IOT Certificate Link | SEP. 2022 |

Technologies

Languages: Python, C++, Java, SQL.

Skills: PyTorch, TensorFlow, TFLight, LangChain, LangSmith, CrewAI, HuggingFace, Git, FastAPI, ONNX, Github, Linux, OpenAI API, Vector Database, Data structure, Algorithms, Tableau, Power BI, Microcontrollers, QGIS.