Mohamed Hamdy

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Portfolio: **https://mhamdyk.github.io/**

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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 (Student Transcript Link)

- **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**)

- **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).

- **RealtyEcho – Autonomous Cold-Calling Agent MVP (2025).**
  - **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 $16 \rightarrow 32$ (1.6 × throughput); WER slashed from pre-trained 63.5 % $\rightarrow$ 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

- **AI Model Development for En2ly (Startup Application)**
  - Integrated a multi head AI model (**Classification** and **Regression** heads) into the back-end of a startup application to classify and estimate the dimensions of house furniture. Trained on the **Bonn Furniture Styles Dataset** (90k images) and optimized locally on a RTX 3060 GPU.
  - Converted the model to **ONNX** and **TFLite** for efficient real-time integration on mobile App, streamlining furniture categorization and dimension estimation.

Courses & Certificates

- **Dr Mostafa Saad CSkilled Python DSA course**　　　　　　　　　**APR. 2025 - Present**
- **DEPI** (Digital Egypt Pioneers Initiative) - Google Data Analyst Specialist　　**OCT. 2024 - Present**
- **Embedded Systems Engineer –** AMIT Embedded Systems Course　　**SEP. 2024**
  (Scholarship by Orange) Certificate Link
- **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, LangChain, Git, Github, Linux, OpenAI API, Vector Database, Data structure, Algorithms, Tableau, Power BI, Microcontrollers, QGIS.