Mohamed Hamdy

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

Competitions & Achievements

- **MTC-AIC: Egypt National Artificial Intelligence Competition (**Phase II Finalist, **Top 15/500+)** | *Phase II On-going*
  - **Brain-Computer Interface (BCI) Signal Processing & Classification:** Currently developing and evaluating models for two core **EEG-based** BCI tasks: Steady-State Visual Evoked Potentials (**SSVEP**) and Motor Imagery (**MI**).
  - **Generalization & Efficiency:** Focused on model generalization to new, private datasets and computational efficiency, measured by the Real-Time Factor (**RTF**).
  - **Live Simulation:** Preparing for a live **MI-Simulator** challenge to test model accuracy, speed, and robustness under pressure.
- **Fawry AI Rising Gen Competition (Top 8/150+)** [Project Hub]
  - **Face Re-Identification:** Fine-tuned Inception-ResNet-V1 with an ArcMarginProduct layer to build a face identification system for Fawry's staff, achieving 92% validation accuracy.
  - **Pedestrian Multi-Object Tracking (MOT):** Delivered a real-time tracking pipeline using YOLOv8 for detection and ByteTrack for data association, achieving 63% HOTA on the MOT20/17 dataset.

Education

Arab Academy for Science and Technology - Faculty of Engineering   **SEP. 2020 – JUN 2025**

Bachelor in Computer Engineering – **GPA:** 3.6/4.0 (Student Transcript Link)
- **Related Coursework:** Introduction To AI (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**)

- **End-to-End Egyptian ↔ English Speech Translator** [Web UI (Netlify) | Live Demo (HF Space)]
  - **Real-time web app:** fine-tuned **Whisper-small ASR** (WER 63.5 → 36.1 %, –43 %), fine-tuned **MarianMT** EN ↔ AR (37.5 BLEU), and **trained a char-level Transformer TTS from scratch** (3.7 MOS).
  - Curated 138 h dialectal audio + 63 k parallel sentences; **mixed-precision A100** training, **zero-OOV tokenizer.**
  - Productionised with **FastAPI** + **Uvicorn** backend and **React/TypeScript (Vite + Tailwind)** front-end; **Hugging Face Spaces** + **Netlify** deployment, < 4 s end-to-end latency on GPU.

- **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 API** for planning, analysis, and summarization, delivering a complete **end-to-end solution.**

- **SadaCall – Autonomous Cold-Calling Agent MVP (2025).** Whisper private Notebook *(please do not share)*
  - **Egyptian Arabic ASR Fine-Tuning:** Slashed WER from 63.5% to 36.2% by adapting Whisper-small on an 80h private dataset, using bfloat16+TF32 for a 1.6x throughput increase on an A100 GPU
  - **End-to-End Voice Agent:** Engineered a fully automated cold-calling agent using a Whisper STT -> CRAG (LangChain + ChromaDB) -> FishSpeech TTS -> Twilio dialer pipeline.
  - **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

- **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   **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, TFlite, ONNX, LangChain, LangSmith, CrewAI, Vector Database, HuggingFace, LLMs, Git, FastAPI, Github, Linux, OpenAI API, Data structure, Algorithms, Tableau, Power BI, Microcontrollers, QGIS, EEG, SQL, TCP/IP, Wireshark.