Omar Hassan

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Skills

- **ML/AI**: PyTorch, TensorFlow, scikit-learn, AutoML (H2O), geomloss, PEFT, SFT, RL, ONNX, CTranslate2
- **Languages & Tools**: Python, REST/FastAPI, Gradio, Pydantic, Git, DVC, LFS, Docker, Conda

Education

- **Alexandria university** — Alexandria, EG
  Bachelor of Engineering in Biomedical Engineering; GPA: 3.13 — *Aug. 2022 – Dec. 2027*

Experience

- **SmartCI center FOE** — Alexandria, EG
  TinyML research intern — *Oct 2025 - Present*
  - **Caption-LSTM**: Researching the use of Lstms in Vision tasks such as image captioning and deployment on resource constrained devices as a lightweight alternative to Vision transformers.
- **Made in Alexandria (M.I.A) Robotics** — Alexandria, EG
  AI Engineer — *Sep 2025 - Present*
  - **Benchmark Nllb200**: Added benchmarking support of ARZ Egyptian Arabic text translation to English and vice versa to (LM Evaluation Harness) with Meta's Nllb200 measuring BLEU, CHRF and BERT scores.
  - **Benchmark Whisper**: Expanded upon an already establish Speech to Text models evaluation and benchmarking framework (Pico-Voice) to benchmark OpenAI's Whisper capabilities in Transcribing ARZ Egyptian Arabic speech into Arabic and English text measuring RTF, WER and BLEU scores.
- **Scientific innovation dynamics (SID)** — Alexandria, EG
  Applied ML and AI researcher — *July 2024 - Sep 2025*
  - **Pytorch data pipeline**: Transferred a mainly Scipy signal processing pipeline applying various filters, preprocessing techniques and normalization to PCG signals to a Pytorch dataset class leveraging Gpu acceleration (P100) speeding up processing times from 5 hours on 8000 PCG's to 40 minutes .
  - **PCG Data collection**: Collected and Curated 8000 PCG audio recordings spanning multiple sources that later got fed to the Pytorch data pipeline.
  - **CNN MFCC baseline model**: Built a baseline CNN classifier for unhealthy heartsounds detection using MFCCS achieving an F1 score of 0.7.
  - **Microfluidic live cell separation**: Designed end to end a Microfluidic cell separator using live cell imagery detecting the target cell using Yollov11 replacing cell staining and tagging.
  - **Yolov11 baseline**: Pretrained Yolov11 on 1.8 mil+ phase contrast cell imagery, achieving mAP50 0.702, mAP50–95 0.436, Precision 0.813 and Recall 0.581. Considering the imbalanced dataset and high overlap of cells in most imagery.
- **ESRI North Africa** — Cairo, EG
  GIS Intern — *June 2025 - July 2025*
  - **Presto-GeoAI**: Fine tuned Presto a foundational GeoAI model for the task of Classifying 3 crop types across Africa as my internship project and as part of a global competition on Zindi, achieving position 37 on the leaderboard, finally I added an export layer that integrates the model's output into Esri's ArcGIS suite where you can view the results as a feature layer.
- **Faculty of Dentistry STDF Grant Proposal** — Alexandria, EG
  Research Intern — *May 2025 - June 2025*
  - **AI-Assisted Modeling and Optimization of 3D Bioprinted Grafts for Wound Healing**: Proposed a novel AI solution to model patient and task specific Bioink formulations and wound healing scaffolds ensuring maximum compatibility and potency.

Projects

- **Shato Robotic Assistant**: A voice controlled robotic assistant that can navigate it's enviroment. Built using microservices architecture and at it's core a Gemma 3 270 mil LLm fine tuned on a custom instruction dataset (SFT lora with unsloth).
- **XAI with CNNs**: Fine tuned pre-trained ResNet-34 and MobileNetV2 on Caltech 101 dataset. Implemented Adversarial Attacks, Systematically evaluated model robustness against Fast Gradient Sign Method (FGSM) attacks using torchattacks. applied Grad-CAM and vanilla gradient saliency mapping for explainabilty. Implemented and evaluated defensive strategies against adversarial attacks.
- **Virtual Cell challenge 2025 CAPE-model**: Cape is a virtual cell model aimed at accurately predicting cell state after Crispri gene perturbation. I was responsible for implementing multiple loss functions including wasserstien loss using geomloss.
- **ACE-Hallucinations**: Built hallucination-resistant LLM for Russian hallucination detection (codeforces) using Agentic Context Engineering (ACE) framework. Trained Gemma-3-270M as Generator with Gemini Flash 2.5 as Reflector/Curator on 380 SberQuAD-derived examples that were prepared/transformed with Gemini Flash 2.5 to learn 83 anti-hallucination strategies. Achieved 0% hallucination rate with conservative refusal behavior, deployed via llama.cpp BF16 GGUF for GPU inference.