YASSIEN TAWFIK

BIOMEDICAL AI ENGINEER

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PROFILE

Biomedical engineer with strong expertise in AI-driven healthcare applications, specializing in medical imaging, neuroimaging, and physiological signal analysis. Experienced in developing robust deep learning pipelines for segmentation, classification, and explainable decision support, with a focus on translational research that bridges engineering solutions and clinical diagnostics.

EDUCATION

Bachelor of Science in Biomedical Engineering — Cairo University **Sep 2021 - Present**

Expected Graduation: June 2026 | GPA: 3.4

GRADUATION PROJECT

Automated Lesion Segmentation for Pre-Surgical Evaluation in Epilepsy **Sep 2025 - Present**

Epilepsy FCD lesion delineation; MRI-based lesion analysis; nnU-Net, SynthSeg, Learn2Synth; multimodal preprocessing; architecture benchmarking; cross-sequence generalization; data augmentation; uncertainty quantification; clinical decision support.

PROFESSIONAL EXPERIENCE

Part-time Product Specialist | Optoscient **Aug 2025 - Present**

Leading Egyptian distributor; digital pathology solutions; AI-integrated software platforms; technical support for pathology systems and diagnostic software; clinical team assistance; imaging hardware implementation and integration; cloud-based analysis tools; workflow efficiency; diagnostic accuracy enhancement.

INTERNSHIPS

AI Developer Intern — Elevvo.tech | 2025 **Clinical Engineer** — BAHEYA Foundation | 2024

TECHNICAL SKILLS

- **AI & Deep Learning** — Neural network design; medical image segmentation (U-Net, nnU-Net); EfficientNet encoders; explainability (SHAP, Grad-CAM)
- **Computer Vision & Imaging** — MRI/CT preprocessing; multi-modal image segmentation; feature extraction; dimensionality reduction
- **ML Frameworks & Tools** — PyTorch; TensorFlow; MONAI; Scikit-learn; OpenCV; Pandas; SciPy
- **Software Engineering** — Python; C/C++; Java; HTML/CSS/JS; GUI application development
- **Biomedical Signal Processing** — ECG filtering & feature extraction; real-time data analysis
- **Bioinformatics & Data Mining** — Genomic/microbiome profiling; statistical data integration; biological pattern discovery
- **Embedded Systems** — STM32 MCU; low-level interfacing; modular driver development
- **Medical Devices** — CT/MRI hardware fundamentals; device calibration; clinical workflows

PROJECTS

- **Brain MRI Tumor Analysis Platform**
  - AI-powered web platform; Brain tumor classification; automated reporting; API integration; Xception model; web deployment; AI integration; clinical workflow. *[GitHub Link]*
- ***Explainable Breast Cancer Classification***
  - *XAI, SHAP; SMOTE balancing; binary tumor classification; ROC-AUC ~99%; explainability; imbalanced data handling; clinical metrics. [GitHub Link]*
- ***MRI K-Space Reconstruction and Frequency Analysis Tool***
  - *K-space manipulations using FFT-based filtering; demonstrates undersampling and artifact formation; evaluates reconstruction quality via quantitative metrics. [GitHub Link]*
- ***Advanced Fourier Image Analysis Platform***
  - *FFT-based imaging; frequency-domain filtering; region masking; Gaussian smoothing; multi-image Fourier mixing; real-time image reconstruction workflows. [GitHub Link]*
- **Python Imaging and Vision Toolkit**
  - Image processing & CV; edge detection; segmentation; feature extraction; modular Python toolkit; software architecture; reusable CV modules. *[GitHub Link]*
- **Real-Time ECG Arrhythmia Detection**
  - Deep learning (CNN); ECG visualization; arrhythmia detection; TensorFlow; real-time signal processing; CNN for biomedical data; GUI integration. *[GitHub Link]*
- **ECG-Guided Automated Defibrillation**
  - Hardware/software integration; real-time ECG monitoring; tachycardia detection; GUI visualization; embedded systems + biomedical signal workflow. *[GitHub Link]*
- **Oral Cancer Risk Prediction**
  - Random Forest; microbiome analysis; TCMA dataset; feature selection & SHAP explainability; accuracy 92.89%, AUROC 0.97; ML; non-invasive diagnostics. *[GitHub Link]*
- **Patient Segmentation Using K-Means & PCA**
  - K-Means clustering; PCA visualization; medical data preprocessing; feature weighting; unsupervised patient grouping; clinical analytics pipeline. *[GitHub Link]*
- **Real-Time Health Monitoring & Emergency Response Ecosystem**
  - Real-time heart-rate monitoring; ESP32 wearable integration; SOS emergency workflow; live location tracking; Flutter + Firebase ecosystem; secure data sync. *[GitHub Link]*

LANGUAGE PROFICIENCY

English: IELTS Academic - Overall Band 7
Arabic: Native

CERTIFICATES

MRI & CMR Basics | Siemens Healthineers
CT Essentials | Siemens Healthineers
Frontend Web Development | Udacity

RESEARCH INTEREST

- **AI for medical and neuroimaging** — Developing deep learning models for segmentation, classification, and multimodal image analysis, with attention to clinical workflow integration.
- **Translational biomedical signal analysis** — Physiological signals analysis (EEG/ECG) using hybrid AI and signal-processing approaches to supporting diagnostic decision-making.
- **Explainable computational pathology** — AI-driven feature extraction and interpretable models to enhance disease detection and support precision diagnostics.
- **End-to-end AI pipelines for clinical applications** — Building reproducible, high-performance frameworks that bridge data acquisition, modeling, and actionable clinical insights.