

# YASSIEN TAWFIK

## BIOMEDICAL AI ENGINEER

 Cairo, Egypt

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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

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- **Brain MRI Tumor Analysis Platform**
  - AI-powered web platform; Brain tumor classification; automated reporting; API integration; Xception model; web deployment; AI integration; clinical workflow. [\[GitHub Link\]](#)
- **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. [\[GitHub Link\]](#)
- **Physics-Based Doppler Ultrasound Simulator**
  - Medical-grade physics engine; real-time STFT spectral analysis; laminar flow modeling; hemodynamic simulation; signal processing workflow. [\[GitHub Link\]](#)
- **Advanced Fourier Image Analysis Platform**
  - FFT-based imaging; frequency-domain filtering; region masking; Gaussian smoothing; multi-image Fourier mixing; real-time image reconstruction workflows. [\[GitHub Link\]](#)
- **Patient Segmentation Using K-Means & PCA**
  - K-Means clustering; PCA visualization; medical data preprocessing; feature weighting; unsupervised patient grouping; clinical analytics pipeline. [\[GitHub Link\]](#)
- **Explainable Breast Cancer Classification**
  - XAI, SHAP; SMOTE balancing; binary tumor classification; ROC-AUC ~99%; explainability; imbalanced data handling; clinical metrics. [\[GitHub Link\]](#)
- **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. [\[GitHub Link\]](#)
- **Python Imaging and Vision Toolkit**
  - Image processing & CV; edge detection; segmentation; feature extraction; modular Python toolkit; software architecture; reusable CV modules. [\[GitHub Link\]](#)
- **Oral Cancer Risk Prediction**
  - Random Forest; microbiome analysis; TCMA dataset; feature selection & SHAP explainability; accuracy 92.89%, AUROC 0.97; ML; non-invasive diagnostics. [\[GitHub Link\]](#)

## LANGUAGE PROFICIENCY

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**English:** IELTS Academic - Overall Band 7

**Arabic:** Native

## CERTIFICATES

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MRI & CMR Basics | Siemens Healthineers 

CT Essentials | Siemens Healthineers 

Frontend Web Development | Udacity 

## RESEARCH INTEREST

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- **AI for Medical Imaging & Neuroimaging** — Developing deep learning models for segmentation, reconstruction, and multimodal analysis, with a focus on clinical workflow integration.
- **Translational Biomedical Signal Processing** — Analyzing physiological signals (e.g., EEG/ECG) and temporal dynamics using hybrid AI approaches to support diagnostic decision-making.
- **Explainable Computational Diagnostics** — AI-driven feature extraction and interpretable models to enhance disease detection and support precision medicine.
- **End-to-End Clinical AI Pipelines** — Building reproducible, high-performance frameworks that bridge raw data acquisition, robust modeling, and actionable clinical insights.