


# YASSIEN TAWFIK

## BIOMEDICAL AI ENGINEER

 Cairo, Egypt

 yassien.m.m.tawfik@gmail.com

 yassien-tawfik-linkhub.vercel.app

### PROFILE

Biomedical Engineer specializing in AI-driven healthcare, with expertise in medical imaging, neuroimaging, and biomedical signal processing. Experienced in developing end-to-end machine learning pipelines that integrate clinical relevance with advanced deep learning for clinical decision support and diagnostic innovation.

### EDUCATION

**B.Sc. in Biomedical Engineering — Cairo University, Faculty of Engineering** Sep 2021 - Present  
Expected Graduation: June 2026 | GPA: 3.4

### GRADUATION PROJECT

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

Under the supervision of

- Dr. Aya Fawzy Khalaf (Yale University, Blumenfeld Lab)
- Eng. Mahmoud Salman (Western University)
- Dr. Tamer Basha (Harvard Medical School)

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.

### INTERSHIPS

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

### TECHNICAL SKILLS

- **AI & Deep Learning** — Neural network design; segmentation architectures (U-Net, nnU-Net); efficient encoder (EfficientNet); explainability (Grad-CAM, SHAP)
- **Computer Vision** — MRI & CT image segmentation; feature extraction; dimensionality reduction
- **ML Frameworks & Tools** — PyTorch; TensorFlow; Scikit-learn; MONAI; OpenCV; Pandas; SciPy
- **Software Development & Web** — Python; C++; C; Java; HTML/CSS/JS; GUI development
- **Biomedical Signal Processing** — Filtering; ECG analysis; physiological data interpretation
- **Bioinformatics** — Genomic and microbiome data analysis; omics integration; data mining
- **Embedded Systems** — STM32; MCU interfacing; real-time control; modular driver development
- **Medical Device Engineering** — CT & MR fundamentals; device calibration; clinical engineering

## 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. [\[GitHub Link\]](#)

- **Real-Time ECG Arrhythmia Detection**

- Deep learning (CNN); ECG visualization; arrhythmia detection; TensorFlow; real-time signal processing; CNN for biomedical data; GUI integration. [\[GitHub Link\]](#)

- **Oral Cancer Risk Prediction**

- Random Forest; microbiome analysis; TCMA dataset; feature selection & SHAP explainability; accuracy 92.89%, AUROC 0.97; ML; non-invasive diagnostics. [\[GitHub Link\]](#)

- **Explainable Breast Cancer Classification**

- XAI, SHAP; SMOTE balancing; binary tumor classification; ROC-AUC ~99%; explainability; imbalanced data handling; clinical metrics. [\[GitHub Link\]](#)

- **Patient Risk Segmentation**

- K-Means clustering; PCA; patient data visualization; risk group stratification; unsupervised learning, patient analytics. [\[GitHub Link\]](#)

- **Python Imaging and Vision Toolkit**

- Image processing & CV; edge detection; segmentation; feature extraction; modular Python toolkit; software architecture; reusable CV modules. [\[GitHub Link\]](#)

- **ECG-Guided Automated Defibrillation**

- Hardware/software integration; real-time ECG monitoring; tachycardia detection; GUI visualization; embedded systems + biomedical signal workflow. [\[GitHub Link\]](#)

- **Phased Array Beam-forming Simulator**

- Simulation & visualization; beam steering; live plotting; Python & GUI; signal processing, simulation, interactive visualization. [\[GitHub Link\]](#)

- **STM32 Smart Embedded Interfaces**

- Embedded systems; MCU interfacing; driver development; modular simulation; hardware-software integration; embedded AI. [\[GitHub Link\]](#)

- **Interactive Audio Equalizer & Visualizer**

- Audio processing; real-time visualization; spectrogram analysis; GUI interface; DSP; interactive signal manipulation. [\[GitHub Link\]](#)

## LANGUAGE PROFICIENCY

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**English:** IELTS Academic - Overall Band 7.5

**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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- **Deep learning for biomedical imaging** — CNNs, U-Nets, Vision Transformers, multimodal fusion networks; advanced architectures for medical diagnostics.
- **Biomedical signal processing** — Real-time physiological monitoring; arrhythmia detection; EEG/ECG-based neurological disorder analysis; deep and hybrid models.
- **AI-driven digital pathology and neuroimaging** — Self-supervised learning; weakly supervised segmentation; foundation models; precision diagnostics; automated disease characterization.