YASSIEN TAWFIK

BIOMEDICAL AI ENGINEER

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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.

INTERNSHIPS

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

- **Brain MRI Tumor Analysis Platform (Developing)**
  - AI-powered web platform; MRI classification & segmentation; automated reporting; API integration; clinical decision support; PyTorch; Flask; 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

English: IELTS Academic - Overall Band 7.5
Arabic: Native

CERTIFICATES

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

RESEARCH INTEREST

- **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.