

Curriculum Vitae

Maged Badawi

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PROFESSIONAL & TECHNICAL EXPERIENCE (~3 years 4 months):

Biomedical Engineer (Part-Time, ~2 years 7 months):

Siemens Healthineers - Erlangen, Germany

May 2023 - Present

- Contributed to the development of AR/VR-based digital education content for medical equipment, enhancing interactive learning experiences.
- Contributed to product and hardware lifecycle management, including strategic planning, backlog tracking, and close coordination with multidisciplinary teams.
- Authored detailed technical documentation, designed Power BI dashboards for product insights, and led live demonstrations to showcase key features and training workflows to stakeholders.

AI & Medical Imaging Project Experience:

Fully Local RAG Assistant

FastAPI, Uvicorn, Pydantic, LangChain, FAISS, Ollama (phi3:mini), Streamlit, Docker, Git (CI/CD)

Jan 2026

- Developed an end-to-end local PDF question-answering system with automated ingestion, embeddings generation, FAISS similarity search, and Ollama-based LLM responses.
- Containerized the full stack with Docker Compose and implemented GitHub Actions CI/CD to build and validate the application on every push for reliable deployment and reproducibility.

Chest X-Ray Synthetic Image Generator using VAE (Docker Environment)

Python, PyTorch, CNN, Docker, HDF5

Oct 2025

- Developed a Variational Autoencoder (VAE) model to generate synthetic chest X-ray images for pneumonia analysis.
- Set up containerized environment using Docker and HDF5 dataset system for scalable training and reproducibility.
- Applied deep learning techniques to expand dataset variability and support model generalization for medical imaging AI.

Transformer-based Large Language Model (LLM) Development

PyTorch, NLP, YouTube Spam Dataset

Sept. 2025

- Built a text classification model using transformer architecture to detect spam comments.
- Implemented tokenization, dataset preprocessing, attention mechanism, and model evaluation.
- Demonstrated LLM adaptation for domain-specific text classification.

Artificial Neural Network-Based Volume Conductor Solver for Electrical Spinal Cord Stimulation Applications

Master Thesis - Sim4Life, Python, DeepXDE, GNN, 3DCNN, PDE Modeling

Aug. 2025

- Built an automatic 3D voxel-based data generation pipeline using Sim4Life, creating a custom spinal cord dataset with tissue conductivity mapping, anatomical segmentation, and stimulation electrode placements using Dirichlet/Neumann boundary conditions.
- Implemented and trained neural network models to solve Laplace's equation for electric potential propagation in biological tissues.
- Performed benchmarking against Finite Element Method (FEM) simulations from Sim4Life, comparing voltage distribution and boundary conformity and reducing computational cost & inference time.

Deep Learning Classification of X-Ray Images (Normal, Pneumonia, Tuberculosis)

Python, CNN, PyTorch, ImageNet Transfer Learning

2024

- Trained CNN models to classify X-ray medical images across multi-label disease categories.
- Applied data preprocessing, augmentation, and model fine-tuning to enhance classification accuracy.

Field Service Engineer (Full-Time, ~6 month):

AXA Medical - Cairo, Egypt

Sept. 2021 - Mar. 2022

- Performed precise installation and configuration of medical devices in compliance with manufacturer protocols and clinical standards.
- Diagnosed and resolved hardware and software issues through systematic troubleshooting, minimizing downtime and ensuring operational efficiency.
- Conducted regular preventive and corrective maintenance on ICU and OR equipment, ensuring reliability and adherence to hospital safety regulations.
- Provided comprehensive training to medical staff on the safe and effective use of medical technologies, improving clinical workflow and device utilization.

Service & Clinical Engineering Intern (~3.5 Months)

Cairo & Mansoura, Egypt | Jeddah, Saudi Arabia

2018 - 2021

- Cumulative hands-on experience across service and clinical engineering roles in hospital and medical-device companies.
- Installation, inspection, preventive maintenance, and troubleshooting of biomedical and medical equipment.
- Support of equipment calibration, safety testing, and technical documentation in clinical settings.

- Collaboration with service engineers and clinical staff during equipment operation and servicing.
- Exposure to medical imaging systems OR, ICU, radiology and laboratory equipment.
- Familiarity with hospital workflows, clinical engineering standards, and healthcare safety procedures

EDUCATION:

Master's degree in Medical Engineering (Medical Image and Data Processing):

University of Erlangen-Nuremberg (FAU) - Erlangen, Germany

2022 - 2025

- Dissertation: Artificial Neural Network-based Volume Conductor Solver for Electrical Spinal Cord Stimulation Applications.

Bachelor's degree in Systems and Biomedical Engineering (5-year degree):

The higher Institute of Engineering in Al-Shorouk City (SH.A.) - Cairo, Egypt

2016 - 2021

- Dissertation: A medical mobile application for addressing the educational challenges by stimulating human memories using augmented reality technology developed by Unity engine in an interactive way.

Ideal Student Title:

The higher Institute of Engineering in Al-Shorouk City (SH.A.) - Cairo Egypt

2021

CERTIFICATIONS:

Medical Device Regulation.

Sept. 2024

Applications of Nanotechnology in Cardiovascular Diseases.

Jan. 2023

Python and Raspberry Pi Workshop.

Jun. 2019 - Jul. 2019

Analog and Digital Workshop.

Jun. 2018 - Jul. 2018

MATLAB.

Jul. 2018

Arduino Workshop.

Oct. 2017 - Feb. 2018

TECHNICAL SKILLS & SCIENTIFIC KNOWLEDGE:

Programming & Software Development: Python (intermediate-advanced), MATLAB & Simulink (intermediate-advanced), C, C++, C# (intermediate), HTML, CSS.

AI & Automation: Strong background in Artificial Intelligence, Machine Learning, and Deep Learning (AI/ML/DL); initial experience with AI Agents, Large Language Models (LLMs) and RAG. PyTorch, TensorFlow, and SciPy.

Data Analysis & Visualization: Power BI, Power Automate, SQL, Numpy, Pandas, SciPy, Matplotlib, Seaborn, Pyvista

DevOps, Cloud & CI/CD: Git, GitHub, GitHub Actions (CI/CD), Docker (containerization), Microsoft Azure Fundamentals (AZ-900).

Embedded Systems & Electronics: Embedded systems programming using C with PIC microcontrollers and Python with Raspberry Pi; electronic and electrical engineering fundamentals; Analog and digital circuits; Proteus for electrical and electronic circuit design and simulation.

Medical & Biomedical Engineering Knowledge: Bioinformatics; human anatomy and physiology; medical imaging systems including X-ray, CT, and MRI principles and core components.

Engineering Fundamentals & IT: Machine design basics; fluid mechanics and thermodynamics fundamentals; computer networks and IT fundamentals; data structures and databases (SQL).

PUBLICATIONS & RESEARCH PROJECTS:

Rehabilitative Game-based System for Enhancing Physical and Cognitive Abilities of Neurological Disorders.

Mar. 2025

Review of Zero-Shot and Few-Shot AI Algorithms in The Medical Domain.

Jun. 2024

Flat-panel CT reconstruction.

Jul. 2023

Deep learning fully connected layers model.

Oct. 2022

Embedded System circuits using PIC and C programming.

Apr. 2021

ECG signal processing tool(Filtration, Heart rate, FR and histogram) using MATLAB.

Apr. 2021

Prototype Mini Automatic Garage using Raspberry pi and python.

Dec. 2020

Bioinformatic tool for the DNA Cancer sequences classification using Python.

Dec. 2020

Fingerprint Classification model using MATLAB.

Nov. 2020

ECG Filtration Circuit (Hardware.)

Apr. 2020

Infusion Pump (Hardware and Software) using raspberry pi and Python.

Jul. 2019

Feasibility Study of a Hospital (Hospital design and medical planning.)

May 2019

LANGUAGES:

Arabic: Native.

English: Professional Proficiency.

French: Elementary Proficiency.

German: Elementary Proficiency.