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 months**):**
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, Saudia 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.