Mohamed Hamed

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Summary

AI Software Engineer with a strong foundation in machine learning, reinforcement learning, and intelligent system design. Experienced in building real-time AI-driven systems, including decision-making agents, neural network controllers, and AI-powered applications. Proficient in Python, FastAPI, and TensorFlow, with hands-on experience developing scalable backend services and integrating AI models into production-like environments. Passionate about Generative AI, LLM-based systems, and building intelligent copilots that enhance user interaction and automation.

Education

B.Sc. in Healthcare Engineering and Management
Cairo University, Egypt
Graduated June 2025
GPA: 2.74

- Relevant coursework: Data Structures and Algorithms, Database Systems, Software Engineering, Embedded Systems, Data Analytics, Modeling & Simulation

Publications

DVCon Europe 2025
Co-authored a paper on a digital twin–based artificial pancreas system architecture, presented at DVCon Europe 2025.

Advanced AI Development

- Deepened expertise in **Reinforcement Learning** (A2C, policy-gradient methods) for real-time decision systems.
- Developed LSTM-based models for sequence prediction and control.
- Built and validated AI systems through simulation and real-world inspired scenarios.

Work Experience

Hardware Assisted Verification Intern
Siemens DISW, Cairo — Jul 2024 to Sep 2024

- Designed a virtual patient model in **Simcenter Amesim** simulating glucose-insulin dynamics using the Hovorka model.
- Ensured modularity and FMI compatibility for integration into Siemens' VSI platform.
- Debugged and stress-tested system performance under dynamic physiological conditions.
- Collaborated within a cross-functional engineering team contributing to integration and validation workflows.

Clinical Engineer Intern
Al-Assema Hospital, Giza — Aug 2022 to Sep 2022

- Assisted in maintenance and calibration of ICU and OR medical equipment.
- Conducted safety checks and documented performance logs.

Graduation Project

Artificial Pancreas System – AI-Driven Digital Twin
Sponsored by Siemens DISW — Grade: A+
Developed a real-time AI-driven decision system for automated insulin delivery using a digital twin framework.

- Designed intelligent control agents using **Reinforcement Learning (A2C)** and **LSTM models**.
- Built neural-network–tuned PID controllers using **TensorFlow**.
- Developed backend APIs using **FastAPI** for real-time system interaction.
- Created a Flutter-based mobile app integrated with **Supabase** backend.
- Validated system performance on **NVIDIA Jetson** using hardware-in-the-loop simulation.

Projects

Sukkari – AI-Powered T1D Companion & Digital Twin System
Developed a full-stack intelligent healthcare system combining Digital Twin simulation, real-time monitoring, and LLM-powered assistance for Type-1 Diabetes management.

- Built a real-time mobile platform (**Flutter**) integrated with CGM data via Juggluco for continuous glucose monitoring and analytics.
- Developed a **RAG-based AI assistant** using **LangChain**, **FAISS**, and LLM APIs (Gemini/OpenAI) for context-aware patient guidance.
- Engineered a **Digital Twin system** using a neural-network–enhanced PID controller (PID-NN) for glucose prediction and insulin optimization.
- Designed backend services with **FastAPI** and **Supabase** for real-time data synchronization and user management.
- Implemented conversational memory and bilingual (Arabic/English) support for long-term user interaction.

AI-Powered Wellness Assistant (Sanctuary)
Developed a full-stack Generative AI application focused on burnout recovery and adaptive productivity.

- Integrated **Google Gemma Local Model** to build a conversational AI system that transforms unstructured input into structured tasks.
- Designed an **agent-like system** for dynamic task decomposition based on user energy levels.
- Built scalable backend services using **FastAPI** and **Supabase**.
- Implemented gamification (XP, streaks) to improve user engagement and retention.

Reinforcement Learning Controller
Developed an A2C agent in TensorFlow for adaptive control of dynamic systems.

EEG Brain-Computer Interface
Applied machine learning to classify eye states from EEG signals.

Face Recognition (PCA Eigenfaces)
Implemented facial recognition system in Python using PCA and eigenfaces.

Skills

- AI/ML: Deep Learning, Reinforcement Learning, LSTM, Generative AI, LLM Integration
- AI Systems: Intelligent Agents, Decision Systems, Real-Time Inference
- Backend: FastAPI, REST APIs, Supabase, MySQL
- Programming: Python, C, C++, Dart
- Tools: TensorFlow, NumPy, Git
- Concepts: System Design, Debugging, Scalability

Certificates

Embedded Systems Diploma — Edges Training (2024)

Languages

Arabic (Native), English (Fluent)