Elsherif Adel Abdelhamid

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Education

Helwan University — Cairo, Egypt
Computer Engineering, Grade: ***Very Good*** — *Expected Jul 2025*
Relevant Coursework: Data Structures, OS, Software Engineering, AI, Computer Vision, Microprocessors, OOP, Database

Technical Skills

Programming: Python, C/C++, JavaScript, Java, VHDL

AI/ML: TensorFlow, Keras, PyTorch, OpenAI Gym, Neural Networks, CNNs, RNNs, NLP, Computer Vision, RL

Embedded: STM32, ESP32, AVR, STM32Cube, RTOS, I²C, SPI, UART, CAN, MQTT, IPv6, RFID, NFC, Bluetooth

Tools: Git, VirusTotal API, OpenCV, SQL, Node.js, TinyML

Courses & Certifications

Deep Learning Specialization – Coursera (Andrew Ng) — Jan. 2025
5-course specialization: neural networks, optimization, deep learning

Supervised ML: Regression & Classification – Coursera — Oct. 2024
3-course series by Andrew Ng covering fundamental ML concepts

Eloquent JavaScript (3rd ed.) – Marijn Haverbeke — Apr. 2025
Comprehensive JavaScript programming (online book)

Advanced Embedded Systems (ARM, STM32, RTOS) — Sep 2024
4-month intensive program by Engineer Amgad Samir

Basic Embedded Systems (AVR) — Sep 2023
4-month program by Engineer Mohamed Tarek, and 162 hours by ITI

Featured Projects

GRADUATION PROJECT

Nefra: AI-Powered Wearable Museum Tour Guide — ESP32, TensorFlow Lite, BLE, LLM

Designed wearable device with ESP32, KWS for voice activation, BLE for proximity detection
Built multilingual AI guide using RAG with LLMs and Seamless M4T for real-time translation
Created museum staff web interface for content and exhibit management
Handled Arabic vocalization with CATT transformer and custom TTS, achieved 84% wake-word accuracy

AI & MACHINE LEARNING

NSL-KDD Network Security ML Model — Python, TensorFlow

Applied feature selection using GA, ACO, PSO; compared ML (SVM, RF, KNN) with DL (LSTM, GRU, CNN)

Static Malware Analysis Tool — Python, YARA

Extracted macros from malicious documents, identified patterns using YARA rules, integrated VirusTotal API

Keyword Spotting Using TinyML — C++, TensorFlow Lite

Developed voice command recognition with ESP32, SPH0645 microphone, edge AI using TF Lite Micro

Lunar Lander Deep Q-Learning Agent — Python, OpenAI Gym

Trained DQN agent using experience replay, target networks, Bellman optimization for safe landing

K-Means Image Compression — Python, NumPy

Applied K-means clustering to compress images (16 clusters), achieved 83% storage reduction (393K to 66K bits)

Movie Recommender System — Python, Keras

Built content-based recommendation engine using neural networks with user/movie features, genre, and ratings

SOFTWARE DEVELOPMENT

Skill-Sharing Platform — Node.js, JavaScript

Built full-stack web app with HTTP server, JSON persistence, user auth, skill posting, real-time communication

Pixel Art Editor — HTML5 Canvas, JavaScript

Built dynamic pixel art drawing tool as Eloquent JavaScript final project with modern JS features

Hospital Management System — Python, SQL

Developed comprehensive system with patient/staff/admin workflows, role-based access, CRUD operations

32-bit MIPS CPU — VHDL

Designed complete MIPS processor architecture in HDL, synthesized and tested instruction pipeline

EMBEDDED SYSTEMS & IOT

Alarm Clock System using STM32 STM32 Bluepill, C

Implemented DS1307 RTC via I2C with DMA, interrupt-driven SPI/EXTI for LCD/LEDs/buzzer
Built UART polling, PC menu interface for time/date/multi-alarm config, authored low-level drivers

Smart Room Door Lock with IoT STM32F401cc, C

Created RFID-based smart lock with web control, multi-sensor integration, custom drivers for all peripherals

IoT Mesh Network ESP32, MQTT

Built mesh network using painlessMesh for distributed sensor monitoring with web visualization/control

Door Locker Security System AVR, C

Developed password-protected door lock with AVR, integrated DIO, Keypad, LCD, Timer, UART, I2C, EEPROM drivers

ARM Cortex M4 RTOS Scheduler ARM Cortex M4, C

Implemented Round Robin RTOS scheduler using PendSV and SVC mechanisms
Designed task management API: task creation, delays, scheduler start, and SVC execution
Built modular kernel functions: `OS_Init`, `OS_CreateTask`, `OS_TaskDelay`, `OS_StartScheduler`