SALAH-ELDIN HASSEN

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EDUCATION

Cairo University Faculty of Engineering (CUFE) *2021 - 2026*

- Bachelor of Electronics and Communications (EECE) With Cumulative Grade: (Very Good).

WORK EXPERIENCE

Autonomous Embedded Member | Cairo University Eco Racing Team | Part-time *Apr 2025 - Current*

- Mainly debugging and handling CAN protocol, GPS Module and motor driver.

Robotics & Embedded Instructor | Beta Academy | Seasonal *Jan 2023 - Jan 2025*

- Taught Programming and Arduino to over 600 students with consistently excellent feedback.

Coding AI Trainer | Outlier | Freelancing *Sep 2024 - Dec 2024*

- Trained and optimized AI models for coding in C++ and Python tasks to enhance code generation accuracy.

SKILLS

Software: C/C++ - Python - MATLAB - OOP - Automation - Scripting - AI tools - Qt - Git & GitHub - LaTeX.

Embedded: STM32 - ARM Cortex-M - AVR - PIC - FreeRTOS - I2C - USART - SPI - CAN - SOMEIP.

Digital: HDL languages (VHDL, Verilog, System Verilog) - TCL - FPGA Xilinx - Linting.

Web: HTML5 - CSS3 - JavaScript - Bootstrap - jQuery - Laravel - SQL - JSON.

OS: Linux (Fedora(main), Kali Nethunter, Ubuntu) - Windows.

PROJECTS

FreeRTOS-Based Dual Microcontroller Door Security System | Link *Summer 2024*

- Implemented password authentication, EEPROM storage via I2C, and automated door control mechanisms.
- ATMega32 - I2C - USART - EEPROM - FreeRTOS.

Advanced Digital Multimeter on PCB | Link *Spring 2024*

- Measuring voltage (-200V to 200V), current (0.5mA to 2A), and resistance (0ohm to 5Mohm).
- Designed the circuit from scratch and implemented it on a custom PCB.
- ATMega32 - PCB - GPIO - LCD - Keypad - ADC - Relays - MUX - DEMUX.

I2C-Integrated Control Unit | Link *Summer 2024*

- Developed a control unit for temperature monitoring and motor control using I2C devices with MCC firmware.
- PIC18F46K20 - MCC - I2C - USART - RTC - EEPROM.

Simulation & Linting Scripts | Link *Winter 2024*

- Developed Python and Shell scripts for creating do files, running ModelSim, waveform viewing (GTKWave).
- Created Python script that creates TCL files for linting designs using Qverify.
- Python - Shell - TCL - GTKWave - Qverify.

Advanced Tic Tac Toe Game | Link *Spring 2024*

- Created the game with AI (minimax), user authentication, game history, and a Qt-based GUI.
- Automated testing via Qt Test and GitHub Actions.
- C++ - Minimax Algorithm - Secure Hashing - Qt - Qt Test - SQLite - Git - GitHub Actions.

Multi-CV Generator Script | Link *Spring 2025*

- Developed a Python script to generate ATS-friendly LaTeX CVs from JSON data (used to generate this CV).
- Python - LaTeX - JSON.

Concurrent Rust TCP Server | Link *Winter 2024*

- Developed a multithreaded Rust TCP server, resolving port conflicts and optimizing client handling.
- Rust - Multithreading.

Advanced Image Editor with Qt and OpenCV | Link *Summer 2023*

- Featuring cropping, resizing, filters, and a dark mode UI with real-time editing.
- C++ - OpenCV - Qt.

SPI Slave Interface | Link *Spring 2025*

- Designed a modular SPI Slave Interface with RAM modules and validated using self-checking testbenches.
- Vivado - Questasim - Verilog - SPI - Single-Port RAM - Constraints - Linting.

Spartan-6 DSP48A1 | Link *Spring 2025*

- Designed and tested a DSP48A1 block in Verilog with C++ golden model and Verilog test benches.
- Verilog - DSP48A1 - C++ Simulation - Test Benches - Linting.

Laravel Workshops System | Link *Fall 2024*

- Built a system for managing workshops with scheduling, registration, attendance, and a responsive UI.
- Laravel - PHP - MySQL - Bootstrap - Git.

OTHER PROJECTS

- Analog IC Design Projects on Cadence (Virtuoso) | Link
- MATLAB Signal Processing and Simulink Control System Projects
- Reverse Tic Tac Toe Game 3x3 and 4x4 using web | Link | Game
- Self Driving Robots - Path Planning & Obstacle Avoidance (MATLAB, FMM2, A*) | Link
- Maze-Solving Line-Follower Robot Car - Arduino-based pathfinding robot | Link
- SFML Chess Game - C++ chess game with an interactive GUI | Link

COURSES

Advanced Embedded Diploma | Eng: Ahmed Abdel-Gafar *Dec 2024 - Current*

- ARM Cortex-M4 architecture, debugging, memory systems, and the compilation process.
- Linker script, startup code, and device driver development for GPIO, RCC, SysTick Timer, and NVIC.
- Flash Memory Interface, bootloader design, implementation, and testing.
- LIN and CAN communication protocols, AUTOSAR architecture, and MISRA C compliance.

Embedded PIC Diploma | Eng: Ahmed Abdel-Gafar *Jul 2024 - Sep 2024*

- Embedded systems fundamentals, C programming, and PIC microcontroller driver development.
- Implemented USART, SPI, and I2C communication protocols using Embedded C.

Embedded AVR Diploma | Eng: Mohammed Tarek *Jun 2024 - Oct 2024*

- Embedded systems fundamentals, C programming, RTOS, and data structures (linked lists, stacks, queues).
- AVR microcontroller interfacing with driver implementation using Embedded C and hands-on hardware labs.

Linux Fundamentals | IEEE ASU *Aug 2024 - Sep 2024*

- Learned Linux file management, shell scripting, and user permissions.
- Gained skills in process control, package handling, and SSH.

SOME/IP Workshop | BULLET - Eng/Hazem *Oct 2024*

- Practical SOME/IP protocol workshop with client-server communication for automotive/IoT.

Digital Design Diploma | Eng: Kareem Waseem *Jan 2025 - Mar 2025*

- Studied digital and RTL design using Verilog for synthesis and simulation, FPGA design flow, and static timing analysis (STA).
- Worked with Vivado, IP catalog, clock domain crossing, low-power design, and Questa Lint for verification.

Digital Verification Course | IEEE CUSB *Mar 2025 - Current*

- Studied formal verification, UVM, sequences, configuration, and SystemVerilog assertions.
- Used QuestaSim for simulation, verification planning, and functional coverage.

EXTRACURRICULAR ACTIVITY

- First place in Robotics Competition (2022).
- ECPC Contestant (2022, 2023).
- NASA Hackathon participant.