

Saif Elden Mahmoud

Mechatronics Engineering Student – Embedded Systems

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Summary

Mechatronics engineering student specializing in embedded systems, hardware design, and automation. Hands-on experience with microcontrollers, PCB design, motor control, and industrial instrumentation. Strong foundation in C/C++ and embedded software development, with practical exposure to embedded Linux and Raspberry Pi interfacing. Seeking an embedded systems internship to apply solid technical skills in real-world engineering projects.

Education

Bachelor of Mechatronics Engineering

Oct 2022 – Oct 2027

Higher Technological Institute (HTI)

GPA: 3.05 / 4.0

Professional Experience

Embedded Systems R&D Engineer

Jul 2025 – Dec 2025

CHEMTECH Industries

- Developed and tested embedded hardware and firmware solutions for laboratory and chemical instruments including ovens, water checkers, kymographs, and organ bath systems.
- Integrated sensors, ADCs, timers, and communication interfaces for reliable data acquisition and control.
- Collaborated with cross-functional teams to debug and validate embedded systems in production environments.

Hardware and Maintenance Intern

Jan 2025 – Feb 2025

Tomatiki Smart Solutions

- Designed and routed 10 PCB boards for automation solutions including greenhouse management, irrigation systems, pump and valve control, keypads, refrigerator testers, and power supplies.
- Enhanced soldering, diagnostics, and hardware maintenance skills through hands-on work.

STEM & Coding Instructor

Jul 2025 – Dec 2025

ISchool | DEMI Project

- Delivered coding fundamentals to over 50 students across two groups.
- Conducted 40+ interactive sessions focused on logic development and problem-solving skills.

Volunteering Experience

RiseUp Summits (Team Leader & Member)

2025 – 2026

- **Mentorship Clinics TL (2026):** Facilitated smooth operations and coordinated the delivery of 15 clinics during the main summit.
- **B2B Matchmaking Member (2025):** Ensured seamless operation of the B2B matchmaking area throughout the 3-day event.
- **Sponsors & Partners TL (PropTech 2025):** Supported sponsors and partners, ensuring operational needs were met and assisting with booth installations.

Crowd Management Member

Feb 2026

ECS 09

- Assisted in crowd management, visitor guidance, and event flow control.

Projects

EV Embedded Control System

Oct 2024

- Developed an EV control system with APEX racing team for SEM using three STM32 Blue Pill microcontrollers.
- Configured PWM and Hall sensors for dual BLDC motor control.
- Implemented CAN bus communication with message filtering between MCUs.
- Displayed real-time data on a Nextion LCD via UART.
- Measured current and voltage using ADCs and computed speed and distance.

PC Control – Remote PC Command Server (C++)

2025

- Built a TCP server in C++ to receive and execute remote PC commands.
- Designed a modular architecture including Server, Command Parser, ActionHandler, Response Generator, and Logging System.

- Implemented socket-based communication to handle client requests and system-level actions such as launching applications.
- Added structured error handling and logging mechanisms to ensure reliability and traceability.
- Applied SOLID principles to achieve maintainable and scalable code design.

ServoRPI4 – Raspberry Pi Servo Control (C++ / Bash)

2025

GitHub: saifelden1/ServoRPI4

- Configured Device Tree Overlays (.dtbo) and edited config.txt to enable hardware PWM pins.
- Wrote Bash scripts to automate PWM activation and system initialization.
- Implemented a Makefile-based build system to compile modular C++ utilities.
- Designed C++ modules for servo angle mapping using linear interpolation and PWM signal control.
- Added error handling and logging mechanisms to ensure stable and reliable hardware interaction.

Manual-to-Automatic Valve and Pump Control System

Feb 2025

- Designed a distributed electronic system controlling 2 pumps and 6 valves using multiple boards.
- Implemented ESP32, LoRa modules, GLCD, and Nokia 5110 displays.
- Designed a 220V AC to 12V DC power adapter and a keypad using a single GPIO pin.

Landscape Irrigation Control System (Hardware Design)

Feb 2025

- Designed the complete hardware architecture for an irrigation control system supporting up to 8 pumps.
- Created schematics and PCB layouts with focus on power distribution, protection, and modular expansion.
- Integrated LoRa and ESP-NOW modules at the hardware level to enable scalable multi-board systems.

Skills

Programming: C, C++, Embedded C

Embedded Systems: STM32 (HAL/SDK), AVR, Arduino, ESP32, Raspberry Pi, CAN, UART, SPI, I2C

Hardware & PCB: KiCad, Altium, LTspice, Proteus, PCB Design, Soldering

Automation: PLC (TIA Portal), Factory IO

Tools: STM32CubeIDE, Arduino IDE, Eclipse, SolidWorks

Courses & Training

Embedded Linux Intensive Diploma (108 hours)

Jan 2025 – Feb 2025

AMIT

- Mastered Linux fundamentals, shell scripting, and system architecture.
- Implemented GPIO and PWM interfaces on Raspberry Pi using userspace tools.

Embedded Linux Diploma

Jun 2025 – Present

PNJunction

- Covering Bash scripting, C++, and object-oriented programming concepts.
- Studying C++ design patterns and modular software architecture.
- Mastering Linux administration fundamentals and system-level operations.
- Utilizing Raspberry Pi for GPIO interfacing and peripheral control.
- Implementing Python applications and C++ socket programming.
- Gaining foundational knowledge in IoT networking concepts.

Embedded Systems Diploma

2024

LearnInDepth

- Mastered the fundamentals of C and Embedded C programming.
- Studied ARM and AVR architectures with focus on memory organization and management.
- Implemented multiple embedded applications using STM32CubeIDE and Eclipse.
- Developed GPIO, PWM, and timer drivers and applied them across various projects.
- Utilized STM SDK motor control software to implement different motor control techniques.
- Gained practical exposure to embedded design patterns and motor control strategies.

Electronics and PCB Design Diploma

Apr 2024 – Oct 2024

AXIN

- Studied electronic fundamentals including MOSFETs, BJTs, diodes, and passive components.
- Designed and simulated circuits using KiCad, Altium, and LTspice.