

Ahmed Hassan Abdelhalim

ahmedlabib.eng@gmail.com | linkedin.com/in/ahmed-h-abdelhalim | github.com/a7med57

+20-155-453-8458 | Cairo, Egypt

EDUCATION

Cairo University

Cairo, Egypt

Bachelor of Engineering, Electronics and Electrical Communication Engineering Department

Oct. 2023 – Present

- Junior Engineer.
- CGPA: 3.79.
- Expected Graduation: January 2028.

EXPERIENCE

Undergraduate Researcher

Jul. 2024 – Dec. 2024

Undergraduate Researchers Initiative (URI Program)

Remote

- Conducted scientific research training with focus on problem-solving methodologies.
- Developed academic writing skills through research documentation.
- Contributed to initial phases of engineering research projects.

ALX AICE Cohort 7 Graduate

Sep. 2024 – Nov. 2024

ALX Africa

Remote

- Conducted many useful AI Models and generated Content using AI Tools.
- Learned how to build strong workplace relationships and manage my well-being.
- Developed my Leadership Skills such as strategic thinking, decision-making and inspiring others.

PROJECTS

RISC-V Single-Cycle Processor | 32-bit Harvard Architecture Implementation in Verilog HDL

Jun. 2025

- Designed complete 7-stage datapath (fetch to writeback) executing RV32I instruction set.
- Developed core components: ALU (7 operations), 32-register file, and dynamic control unit.
- Prototyped on Cyclone® IV FPGA with successful Fibonacci sequence verification.
- Achieved 1.8x speed improvement over baseline design through pipeline optimization Skills: Digital Electronics, Verilog, Computer Architecture, FPGA Prototyping, RISC-V ISA, SystemVerilog, Quartus Prime.

Physics-Informed Neural Networks for Vehicle Control | Python, Matlab, Kaggle

Apr. 2025 – May. 2025

- Participated in the 13th Undergraduate Mathematics Research Forum with a project titled “Physics-Informed Neural Networks: A Quantum Leap in Robust Control.”
- Investigated the use of PINNs to enhance the performance of Model Predictive Control (MPC) in autonomous vehicle systems.
- Demonstrated improved control stability and reduced tracking error using hybrid PINN-MPC architecture.
- Achieved 4th place overall in the EECE28 research cohort, Developed a deep understanding of neural networks, control theory, and system modeling.

Autonomous Eco-Racing Car | STM32 Microcontroller-Based System, C

Mar. 2025

- Designed an STM32-based autonomous vehicle for eco-racing competitions.
- Integrated ultrasonic, IR, and LiDAR sensors for obstacle detection and path planning.
- Implemented motor control algorithms and communication protocols (UART, I2C, SPI).
- Tuned system for minimal energy consumption and optimized autonomous performance. Strengthened skills in embedded systems, microcontrollers, and sustainable design.

H-Bridge Motor Driver Circuit | Proteus

Feb. 2025 – May. 2025

- Designed and implemented an H-Bridge circuit to control the direction and speed of a DC motor.
- Used transistors and diodes to enable forward and reverse motion through pulse-width modulation (PWM).
- Simulated the circuit using Proteus and tested on a breadboard before physical implementation.
- Gained hands-on experience in power electronics, motor control, and safety precautions in hardware design.

Digital Multimeter Design | *Arduino, Altium*

Sep. 2024 – Dec. 2024

- Designed multilayer PCB in Altium Designer with optimized trace routing for noise-sensitive analog signals ($\leq 10\text{mV}$ ripple).
- Built multimeter measuring voltage (0-20V), current (0-200mA), and resistance (10Ω – $1\text{M}\Omega$) with high accuracy.
- Designed signal conditioning circuits using op-amps (LM358) for precision measurements.
- Calibrated ADC (ADS1115) and implemented auto-ranging functionality.

Compare Stellar Spectra | *MATLAB*

Jul. 2024

- Used MATLAB to compare stellar spectral data and analyze differences in star temperatures and compositions.
- Applied matrix manipulation and data visualization techniques.
- Gained experience in scientific computing and astrophysics.

Stellar Motion Analysis | *MATLAB*

Jul. 2024

- Analyzed star movement using observational data.
- Calculated velocity/displacement and visualized results in MATLAB.
- Enhanced data analysis and astrophysics modeling skills.

SKILLS

Programming Languages: C, C++, Python, Java, Arduino C, MATLAB

Microcontrollers and Embedded Systems: STM32, Arduino

Hardware Design: PCB Design, Circuit Debugging, Sensors & Actuators Integration

Hands-on skills: Circuit analysis, Motherboard troubleshooting, Soldering techniques

Tools: Visual Studio, Matlab, Notion, Proteus, Altium, ModelSim, Vivado

Soft Skills: Strong Problem Solving & Critical Thinking, Scientific Writing & Research Methodology, Time Management & Task Prioritization

LANGUAGES

Arabic: Native

English: Proficient

French: Intermediate

ACTIVITIES

Public Relations Member

Sep. 2024 – Present

IEEE CUSB - Cairo University

Cairo, Egypt

- Promoted events and workshops via social media, graphics, and on-ground outreach.
- Coordinated with committees for content planning and audience engagement.
- Gained communication, branding, and teamwork skills.

Scientific Research trainee

Jul. 2024

URI/URS

Cairo, Egypt

- Participated in academic research training on methodology and problem-solving.
- Collaborated with peers on research topics, literature review, and data analysis.
- Strengthened scientific writing and research presentation capabilities.

Digital Electronics Design Workshop

Feb. 2025

IEEE CUSB - Cairo University

Cairo, Egypt

- Participated in an intensive workshop covering the fundamentals of digital logic design.
- Gained hands-on experience with combinational and sequential circuits using simulation tools.
- Worked on small-scale projects involving logic gates, multiplexers, counters, and flip-flops.
- Strengthened understanding of digital systems and Verilog basics.

COMPETITIONS & AWARDS

13th Undergraduate Mathematics Research Forum

Feb. 2025 – May 2025

Cairo University

4th Place – Awarded top honors for research on robust vehicle control systems using Physics-Informed Neural Networks (PINNs). Developed a hybrid control framework integrating PINNs with Model Predictive Control (MPC) to optimize tracking performance and enhance stability in autonomous driving applications.

Best PR Member Award

May. 2025

IEEE CUSB - Cairo University

Recognized as the top-performing member in the Public Relations team for outstanding commitment, creativity, and impact.