

Mohamed Ahmed Galal Mohamed

Cairo, Egypt | (+20) 102-254-6004 | mohamed@mgalal.dev | [linkedin.com/in/galalbytes](https://www.linkedin.com/in/galalbytes) | mgalal.dev
github.com/galalbytes

Education

Bachelor's in Electronics and Communications Engineering

Faculty of Engineering, Beni Suef University | Sep 2021 – Jul 2026 | GPA: 3.194

Relevant Coursework: Embedded Systems, IoT Applications, Automation, MATLAB & Simulink

GRADUATION PROJECT (Siemens Mentorship Program)

SIL Kit Integration Module for Enhanced In-Vehicle Network Connectivity | Siemens Mentorship Program — 2025

Case Study & Validation Team — Beni-Suef University | Cross-University Collaboration with Ain-Shams & Cairo Universities

Project Goal: Integrate Vector's open-source SIL Kit (Software-in-the-Loop Kit) with Siemens' In-Vehicle Network (IVN) framework to create a unified Digital Twin simulation ecosystem for automotive systems, enabling seamless communication between SystemC-based virtual platforms and SIL Kit participants.

Auto Emergency Braking (AEB) System — Case Study & Validation:

- Designed and validated an **Auto Emergency Braking (AEB) system** end-to-end using CARLA autonomous driving simulator, integrating LiDAR perception, Time-to-Collision (TTC) computation, and lane-change decision logic.
- Implemented full **AUTOSAR architecture** (ARXML) with three Software Components; generated RTE using ARunit tool; translated C++ AEB algorithm to C; mapped Runnables via RTE API calls.
- Established **cross-platform SIL Kit ↔ CANoe integration** — C++ code and SIL Kit running on Linux communicating with CANoe on Windows via Vector SIL Kit middleware over Publisher/Subscriber architecture.
- Built a **CANoe in-vehicle network simulation** with a 4-ECU CAN database, individual CAPL test scripts per ECU, and a real-time dashboard monitoring Speed, RPM, and Warning Status.
- Implemented **Socket Programming bridge** to transfer real-time vehicle data from Python (CARLA) to the C++ AUTOSAR-based algorithm, enabling language-independent, real-time communication.
- Prototyped and tested AEB logic on a **physical 4WD hardware prototype**; tuned steering angles and validated that control commands correctly actuate in real hardware.
- Conducted **end-to-end Digital Twin validation scenarios** including Emergency Braking System validation and Adaptive Cruise Control in highway traffic.
- Contributed to **cross-team integration** alongside UI/Frontend (**Ain-Shams**) and Backend (**Cairo University**) teams; validated API specifications, configuration schemas, and shared test data produced by the system.

Tools & Technologies: CARLA Simulator, SIL Kit (Vector), CANoe, AUTOSAR (ARXML, RTE, CAPL), C, C++, Python, Socket Programming, LiDAR, SystemC, CANoe, Linux/Windows cross-platform

Projects

CoolCycle – Solar-Powered Vaccine Cold Storage | Schneider Electric Battery Challenge (Team Project)

- Designed and built an off-grid solar refrigeration system with modular Li-ion battery packs, IoT-enabled BMS, mobile monitoring, and community training to preserve vaccines in remote areas.
- Achieved measurable impact including 15–25% higher vaccination coverage, 80–90% energy savings, and 10 tons of CO₂ emissions avoided per unit annually through sustainable cold chain deployment.

AI-Controlled Smart Car with Embedded Systems & OTA | [GitHub](#) (Team Project)

- Built a smart vehicle system using STM32F401RCT6, ESP32, and Arduino to enable AI-based traffic sign recognition and mobile app control via MQTT.
- Integrated real-time decision-making using PC-based AI models, Bluetooth communication, and obstacle detection; system also supports Firmware Over-The-Air (FOTA) updates
- **Tech:** STM32, ESP32, Arduino, MQTT, AI/ML, C/C++, Python

E-commerce Platform Testing | [GitHub](#)

- Led comprehensive testing for an e-commerce platform, ensuring functionality, performance, security, and usability.
- Conducted functional, API, performance, and security testing.
- Managed test planning, execution, defect tracking, and UAT sign-off using Jira.
- **Tools:** Maven, Selenium, Postman, JMeter, TestNG, Jira, Java.

POSIX Shell for Windows | [GitHub](#)

- Developed a Windows shell that mimics POSIX system calls using C programming and replicates core Unix shell functionalities.
Implemented command parsing, piping, background execution, and environment variable management to simulate a terminal interface.

Smart Home System | [GitHub](#)

- Designed and implemented a home automation system using Arduino UNO and ESP8266 microcontrollers for wireless control of household devices.
- Integrated various sensors and actuators with mobile app control for real-time environmental monitoring and device management.

Merklerex Trading Simulator | [GitHub](#)

- Created a desktop simulator that emulates cryptocurrency market trading for risk-free strategy testing using synthetic order book generation.
- Designed core trading engine logic, command interface, and price fluctuation emulation to mimic real-time market conditions.

Hack Assembler | [GitHub](#)

- Built an assembler for the Hack computer architecture that converts symbolic instructions into binary machine code.
Reinforced low-level programming skills and deepened understanding of the hardware-software interface in CPU design.

Technical Skills

Embedded & Automotive

- Microcontrollers: STM32 (ARM Cortex-M), AVR, ESP8266/ESP32
- Automotive Protocols: CAN, CAN-FD, LIN, Automotive Ethernet, FlexRay (conceptual), AUTOSAR
- RTOS & Concepts: FreeRTOS, RTOS fundamentals
- Simulation Tools: CARLA, Vector SIL Kit, CANoe, SystemC, MATLAB/Simulink
- Hardware Interfaces: SWD debugging, UART, SPI, I2C, FIFO management

Programming Languages

- Proficient: C, C++, Python
- Familiar: Java, JavaScript, Dart, Bash/Shell scripting

Software Testing & QA

- **Frameworks:** Selenium, TestNG, JMeter, Rest Assured, Maven
- **Tools:** Postman, Jira, TestRail
- **Concepts:** SDLC, STLC, TDD, CI/CD, UAT, performance & security testing, API testing

Development Tools & Platforms

- **IDEs:** STM32CubeIDE, STM32CubeMX, Keil uVision, VSCode, MPLAB IDE, Atmel Studio, Android Studio, IntelliJ IDEA
- **Version Control & DevOps:** Git, GitHub, CI/CD pipelines
- **Other:** Node-RED, Firebase, GCP, QtSpim, MATLAB, Socket Programming

Concepts & Methodologies

- AUTOSAR (ARXML, RTE, SWC architecture), Digital Twin simulation, OOP, OS internals, compiler design, MQTT, ISO 26262 (functional safety awareness)

AWARDS & ACHIEVEMENTS

1st Place — Schneider Electric Battery Innovation Challenge (Egypt Edition) | Jul 2025

- Organized by Schneider Electric, Enactus Egypt, and Enactus Fayoum University
- Project: CoolCycle — Solar-powered vaccine cold storage system

COURSES & CERTIFICATIONS

Classic AUTOSAR Diploma – Learn In Depth

(Ongoing)

- Covered full AUTOSAR stack: Architecture (ARXML), Software Layer (SWCs, RTE), AUTOSAR OS (OSEK/VDX), MCAL, COM, NVM, Diagnostics, and V2X
- Applied learning through practical labs and industry-mirroring projects

Embedded Systems Diploma – Supervised by Eng. Ahmed Abdelghafar

(Ongoing)

- Applied AUTOSAR architecture and CAN/LIN protocols; used SWD tools for debugging
- Gained hands-on experience with debugging using SWD and understanding full embedded software life cycle

AVR Embedded Systems Diploma – Supervised by Eng. Mohamed Zaghoul

- Developed drivers for AVR microcontrollers (DIO, Timers, UART, SPI, I2C, EXTI, GIE, ADC, ICU, WDT)

Software Testing Course – DEPI (Digital Egypt Pioneers Initiative)

- Studied SDLC, STLC, and QA fundamentals
- Practiced test case design, TDD, and bug tracking with Jira
- Gained hands-on experience with Selenium and Postman for test automation

OOP Specialization – University of London (Coursera)

- Learned object-oriented programming concepts using C++
- Applied modular design principles in real-world scenarios
- Built a simplified cryptocurrency system as a capstone project

Nand2Tetris – Hebrew University of Jerusalem (Coursera)

- Built a computer from the ground up starting with logic gates
- Developed an assembler

Operating Systems and You – Google (Coursera)
Database Fundamentals – MaharaTech
Data Analysis Track – Udacity
Technical Support Fundamentals – Google (Coursera)
Computer Networking – Google (Coursera)

Work Experience

Data Entry Specialist - Humat Al Watan Party | May 2023 – Oct 2023

- Accurately entered and maintained sensitive political data with 100% confidentiality.
- Streamlined data entry processes, reducing errors by 15%.
- Enhanced report accuracy through timely and precise updates.

Founder of Shadow Store | Jun 2018 - Oct 2020

- Managed an online business, gaining expertise in customer service support and social media management.
 - Monitored the brand's online presence and analyzed marketing campaign results to drive engagement.
-

Extracurricular Activities

Central IT Dept. Head – Life Makers Universities Club

Sep 2023 – Nov 2024

- Managed IT systems for 6000 volunteers across 36 universities
- Built databases, search engines, and created 40+ tutorial videos

IT Dept. Head – Life Makers Beni Suf University Club

Sep 2022 – Jun 2023

Trainer – Youth Fostering for Community Leaders

May 2023

- Facilitated 5-day training for 10 volunteers on leadership and project management

Participant – Youth Voice Training by British Council

Mar 2024

- Used advocacy and strategic tools like PESTEL to identify community challenges

HR Member – Qodwa Project

Sep 2022 – Oct 2023

LANGUAGES

- **Arabic:** Native
- **English:** Professional working proficiency