# Nguyen Hoang Minh Quoc

# **Embedded Firmware Intern**



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## **CAREER OBJECTIVE**

As a third-year Electronics and Telecommunications student at HCMUS, I am seeking an Embedded Firmware Internship position to gain hands-on experience in microcontroller-based system development. I aim to strengthen my skills in firmware design, peripheral driver programming (UART, SPI, I2C, GPIO), and embedded system optimization while contributing to real-world IoT/embedded projects.

#### **EXPERIENCE**

#### Robotics & Iot Lab ( VNU-University of ScienceSience (HCMUS))

12/2023 - 08/2025

#### **STEM Tutor (Contract)**

· Instructed STEM courses for high school and middle school students, covering Arduino/ESP32 programming, peripheral communication, and hardware integration on the weekends. Inspire young people to explore science, technology, and the field of embedded programming.

#### **EDUCATION**

**University of Science - VNUHCM (HCMUS)** 

2023 - 2027

#### **Bachelor of Science - BS: Electronics and Telecommunications**

- GPA: 3.73
- · Co-author and presenter of the paper: "VQASEP: Applying AI Technologies to develop a Vietnamese Q&A System on an Embedded Platform," successfully accepted and presented at the prestigious 14th Scientific Conference (VNUHCM-US Conf 2024). The project involved building a standalone voice assistant using a Raspberry Pi and Google Gemini API to deliver an intuitive, hands-free Q&A experience in Vietnamese. (Git: https://github.com/MinhQuocNguyenHoang/PeeDee\_assistant).

# **SKILLS**

English	VSTEP B2 (Overall: 6.5/10)
Embedded Programming	C/C++, Embedded C
RTOS	FreeRTOS
Microcontrollers, Mini pc & Architecture	ARM Cortex-M, STM32, ESP32, ESP8266, Raspberry Pi, Arduino
Interfaces & Peripherals	SPI, I2C, UART, ADC, Timers, GPIO, Interrupts,
Hardware & PCB Design	PCB Design: Altium, Proteus Prototyping: Proficient in soldering SMD (QFN, TQFP, 0603) and through-hole components
Tools & Environments	Git, Github, STM32CubelDE, Keil C, VS Code, ESP-IDF,

# **MY PROJECTS**

IoT Attendance System (RFID & Google Sheets)

08/2025 - Present

# Role: Firmware Developer and Hardware Engineering

# **Description:**

· Developed an ESP32-based IoT attendance device focusing on real-time task scheduling, peripheral interfacing, and reliable IoT connectivity with Google Sheets as the cloud client.

# **Responsibilities & Achievements:**

- Designed and assembled a custom PCB (ESP32 + RC522 RFID + LCD 16x2 + power supply) using Altium.
- Integrated RC522 RFID reader via SPI protocol to read card data, and displayed attendance status on a 16x2 LCD through I2C interface.
- Implemented FreeRTOS tasks and inter-task queues for RFID scanning, Wi-Fi communication, and HTTPS data transmission to Google Sheets.
- · Developed a Wi-Fi provisioning feature (BLE) allowing users to configure network credentials via mobile app.

Technologies & Skills: ESP32 (ESP-IDF, FreeRTOS), UART (debug logging), HTTPS (Google Sheets API), Altium PCB, Embedded C Git: https://github.com/MinhQuocNguyenHoang/attendance\_SYS

Calculator with Keypad and LCD

06/2025 - 19/08/2025

# Role: Firmware Developer and Hardware Engineering

# **Description:**

Built a handheld calculator on STM32, applying FreeRTOS for task scheduling and peripheral interfacing to handle keypad inputs, perform calculations, and display results on an LCD.

# **Responsibilities & Achievements:**

- Designed and assembled a custom PCB (STM32 + Keypad(created from buttons) + LCD) using Altium.
- Implemented keypad (created from buttons) input handling with debouncing to ensure reliable multi-step operations.
- Developed a custom driver for 16x2 character LCD using direct GPIO control (4-bit parallel interface), without relying on external I2C modules, to display real-time results.
- · Applied FreeRTOS tasks to process (input polling, calculation, display update).

• Extended functionality to support first- and second-degree equations in addition to basic arithmetic.

**Technologies & Skills:** STM32, FreeRTOS, GPIO, LCD 16x2, Altium PCB, Embedded C

Git: https://github.com/MinhQuocNguyenHoang/Caculator

# LiteHouse - Smart Home System (1 hardware + 1 firmware + 1 APP (MIT APP))

03/2025 - 05/2025

#### **Role: Firmware Developer**

#### Description

• Built a small-scale smart home prototype using STM32, enabling control of devices (servo, relay) via a Bluetooth mobile application and an automated fire-safety feature with MQ2 gas sensor to trigger alarms, send alerts, and open doors for evacuation.

# Responsibilities & Achievements:

- Developed firmware drivers on STM32, including GPIO driver for LED control and ADC interrupt-based driver for gas detection.
- Implemented UART communication between STM32 and HC-06 Bluetooth module for mobile app connectivity.
- Integrated automated door-opening feature triggered by MQ2 sensor via ADC interrupt handling.
- Debugged and tested firmware using SWD interface and STM32CubeIDE.

Technologies & Skills: C/C++ Embedded, STM32 HAL/LL, UART, ADC, Interrupts, Bluetooth HC-06, Sensor Integration, SWD Debugging.

Git: https://github.com/MinhQuocNguyenHoang/LiteHouse

Video project: https://drive.google.com/drive/folders/1lyHeAX215S69uxc0pfSo29VWZflstxH-?usp=sharing

#### **ACTIVITIES**

#### Robotics & IoT Lab (HCMUS) & American Center

# **Technical Supporter**

• Provided technical support and troubleshooting (C/C++, Arduino) for teams in ROBOCUS Competition (2024, 2025) and assisted with workshops for STEM outreach programs across the Mekong Delta.

# Ngo Quyen High School

# **Technical Advisor**

• Provided optimization solutions for remote-controlled vehicles (Arduino) communicating via **Bluetooth (HC-05, UART)** and an **MIT App Inventor** mobile app.

#### FRACE (2024)

#### Competitors

Finalist of the FRACE Competition 2025 about line following car

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