

HAFIS N S

Embedded Systems Developer

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Summary

Self-taught Embedded Systems Engineer with a strong passion for electronics and microcontrollers. Despite a non-engineering background, I built a solid foundation through hands-on projects. Proficient in C programming, RTOS, IoT automation, real-time system design, and PCB layout using KiCad. Actively seeking opportunities in skill-focused environments that value practical ability over formal background.

Educations & Diploma

Advanced Diploma in Embedded & Automotive Systems, <i>Quest Innovative Solutions Pvt Ltd</i>	2023 – 2024
BA, <i>KERALA UNIVERSITY</i>	2019 – 2022
PLUS TWO, <i>CALICUT University</i>	2017 – 2019
SSLC, <i>KERALA BOARD</i>	2017

Technical Skills

Programming Languages C, Embedded C, Python, C ++	Embedded Protocols SPI, I2C, UART, GPIO, PWM, ADC, DAC, ESP-NOW, CAN
Hardware Interfacing Sensors, Displays, Motor Drivers, Input Devices ,Output Devices, Power Management, Prototyping	Tools Debugging & Development Tools JTAG/SWD, Multimeter/Oscilloscope, Serial Monitor/Print Debugging, Logic Analyzer, Arduino IDE
System Design Concepts • Real-time system design • Power-efficient design • Interrupt handling • State machines • Manual & Auto mode logic • Fault detection • Timers & watchdogs	Microcontroller & Processor Programming PIC, ARM Cortex, AVR, STM, ESP32, Arduino, raspberry pi
Wireless Communication & IoT Protocols Wi-Fi, Bluetooth, LoRa, MQTT, Zigbee	PCB Design & Schematic Development KiCad, Altium Designer, EasyEDA, Gerber File Generation, Breadboard prototyping
RTOS (Real-Time Operating Systems) • FreeRTOS • Task creation, delays, priorities • Semaphores, queues	Version Control & Documentation • Git/GitHub • Basic documentation for hardware/software

Languages

- English
- Arabic
- Malayalam

Core Projects

Automatic Water Tank Control System (Dry Run Protection & ESP-NOW),

03/2025 – 05/2025

https://github.com/Hafis-23/WATER_TANK_ESP_NOW

- Built with ESP32 microcontrollers using ESP-NOW protocol for wireless, peer-to-peer communication.
- Integrated ultrasonic sensor for accurate, real-time water level detection inside the tank.
- Implemented dry run protection logic - turns off motor if water level does not rise within expected time.
- Added motor timeout feature to prevent overuse by shutting down after 10 minutes of continuous run.
- Designed voltage protection logic to prevent operation during abnormal AC voltage conditions.
- Supported manual and automatic modes using push-button control logic with status feedback.
- Displayed system status on OLED screen, including motor state, voltage, and water percentage.
- Reduced wiring complexity by separating sensor and motor units with wireless communication.
- Enabled deep sleep mode after full tank detection to save battery power and extend life span.
- Designed for low power consumption with battery charging support for off-grid or backup use.

Home Automation System using IoT,

11/2023 – 01/2024

https://github.com/Hafis-23/HOME_AUTOMATION_LPC2148_ESP8266_IoT

- Configured ESP8266 in Access Point mode using AT commands over UART communication.
- Developed firmware for LPC218 ARM7 MCU to interface with ESP8266 and control GPIOs.
- Implemented UART interrupt service routine (ISR) to handle incoming commands from ESP8266.
- Used embedded C programming for UART initialization, buffer handling, and LED control logic.
- Achieved real-time LED control through HTTP-based requests via mobile or browser.

Certifications And Training

- Data structures & Algorithms in Python

Embedded Systems Practice Projects

AC Voltage Monitoring using ZMPT101B and OLED

Measured real-time AC voltage and displayed RMS values on an OLED screen using analog signal processing.

Manual/Auto Mode Logic with Push Buttons

Implemented dual-mode motor control using push buttons with debouncing and state-based logic handling.

Buzzer Alert System with Multi-Pattern Output

Designed buzzer patterns for different system alerts such as dry run, motor timeout, and tank full detection.

Gas Detection Alarm System

Built a gas leak detection system using a gas sensor and buzzer. Triggered alarms when gas exceeded threshold level.

Motor Speed Control using PWM

Controlled the speed of a DC motor using PWM signals from a microcontroller. Adjusted speed via a potentiometer.

LCD Character Display via Bluetooth

Sent text strings from a smartphone via Bluetooth (HC-05) and displayed them on an LCD using UART communication.

Relay Driver Circuit PCB (Designed in KiCad)

Created schematic and PCB layout for a relay driver circuit.
Generated Gerber files and tested on perfboard prototype.

LED Blink with Timer Interrupt

Programmed a microcontroller to blink an LED using internal timer interrupts instead of delay loops, improving timing accuracy.

ADC-Based Temperature Sensor Reading

Read analog values from a temperature sensor (e.g., LM35) using ADC and converted them to Celsius for display or control.

UART Communication Test Between Two MCUs

Configured UART communication between two microcontrollers to send and receive data for synchronization and control testing.

FreeRTOS Task Switching Demo with Delay

Created multiple FreeRTOS tasks with different delays and priorities to demonstrate multitasking and context switching in real time.