ĐẶNG NHƯ PHƯỚC

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ASPIRING EMBEDDED ENGINEER

OVERVIEW

Github | Linkedin | E-Portfolio

I'm a Third-year Electrical & Electronic Engineering student at HCMUT specializing in embedded systems. Skilled in firmware, software, RTOS, Embedded Linux, sensor drivers, Thread networking, Edge AI, & embedded-oriented data processing. Experienced in end-to-end AIoT development from hardware & firmware to edge inference & cloud.

AREA OF EXPERTISE

- **Programming Languages**: C, C+ + , Python, Assembly, HTML, CSS, Javascript, SQL
- **Technical Tools**: Altium Designer, EasyEDA, Proteus, Sketchup, Github, Git, Cmake, Docker
- **Hardware Skills**: Soldering PCBA & PCB Design, Electrical & Electronic Circuit Design,
- **Software & Backend Engineering:** PostgreSQL, Redis, Celery, Flask, FastAPI, Next.js , REST API design, Dockerized services, Scheduler/ETL pipelines
- **Serial & Industrial Communication**: UART, SPI, I^2C, CAN
- **Wireless protocols**: Thread, BLE
- **Real-time & Embedded OS**: RTOS (FreeRTOS, MicriumOS), ROS, Embedded Linux

CERTIFICATE & ACHIEVEMENTS

- **Certifications:**
  - **IELTS 6.5**
  - Udemy Advanced Python / C / C+ + Course
  - UEHG Charitable journeys to middle region schools
- **Awards and Achievements:**
  - Top **2** / 140 - FPT IoT Challenge 2025 (Nationwide)
  - Top **3** / 165 - HumanLog 2025 (Nationwide)
  - Top **10** / 132 - RMIT Hackathon 2025 (City level)

PROJECTS *(Please review my e-portfolio for more details)*

Fsoft / SILABS IoT Challenge 2025 | Leader of Edgelectronix | 1st Runner-up Prize — **05/2025 - 09/2025**

S.C.E.N.T (Smart Customer Experience & Edge AIoT for iNventory & Threats) - Internship Certification from FPT Software

- **System Design & Integration:** Architected an end-to-end 24/7 AIoT system (hardware, firmware, edge apps, backend services) with robust dataflows over Thread, BLE, UART, I^2C, and MQTT.
- **MCU Firmware (EFR32 series):**
  - Developed HX711 driver for load-cell ADC (5 ns sampling) and interrupt callbacks for IR sensors.
  - Implemented 3 MicriumOS tasks:
    - Glass-break detection via I2S mic (200 ms loop)
    - Temp/humidity sensing (SI7021, every 5s)
    - OpenThread networking task (continuous).
- **Edge Gateway (Raspberry Pi 4):**
  - Configured as OpenThread Border Router using MG21 RCP + Spinel.
  - Wrote Python scripts for Thread payload parsing, UART comms, and I^2C LCD1602 display.
  - Built MQTT gateway for LAN subscribers and PostgreSQL schema + ETL scripts for data integration.
  - Designed and operated a normalized PostgreSQL database with direct SQL DDL/DML, UPSERT (INSERT...ON CONFLICT), and Thread-sync logic for reliable offline-first data operations
- **Software & Data Platform:**
  - Built full-stack Flask app (APIs, logic, templates, admin panel).
  - Designed Smart Screen UI/UX (HTML, CSS, JS) for questionnaires & personalized suggestions.
  - Orchestrated backend with Redis queue + PostgreSQL; wrote Python workers for data ingestion & sync.
  - Collected & preprocessed >5,000 real-world interactions (pickup frequency, feedback, dwell time) for analytics & model retraining.
- **Hardware Engineering:**
  - Integrated sensors (load cell, camera, mic) with MCUs & Pi; PCB soldering & wiring validation.
  - Designed shelf-mounting for reliable electrical/mechanical performance.
- **AI:**
  - Built Python pipelines for dataset generation & labeling.
  - Implemented NLP pipeline (BERT + spaCy NER) for keyword extraction from customer voice/text inputs.

DENSO Hackathon 2025 | Current Top 10 Finalist

10/2025 - Ongoing

Project: End-to-End Supply & Demand Forecaster Software System

- Designed a production-grade data architecture (dim/fact/feature/mart) and engineered PostgreSQL schemas, constraints, and migrations, including full data models for 10 DENSO demo SKUs (spark plugs, inverters, sensors, HVAC parts), producing ETL-ready dataframes for Prophet, LangGraph, and GPT analytics
- Built automated Python scheduler services (cron-style) to ingest 5+ public APIs (macroeconomics, logistics, climate, FX), normalize raw data, and maintain high-freshness ingestion cycles
- Implemented a robust backend data layer with optimized SQL execution (parameter binding, transaction control) and exposed REST endpoints bridging database ↔ dashboards ↔ forecasting engine
- Architected the full web stack with a Next.js frontend (routing, server components, API routes) integrated with Flask/FastAPI backend services, ensuring stable data flow, caching, and real-time forecast/insight rendering
- Developed visualization layers including Chart.js dashboards on the main UI & a Streamlit diagnostic console for rapid workflow validation, backtesting, and feature debugging
- Containerized PostgreSQL (Docker) with schema/seed runners, and maintained feature store + KPI marts - covering all 10 SKUs (forecast outputs, SHAP explainability, drift metrics, alert logs) - powering the full forecasting and market-intelligence pipeline.

Intel® AI Global Impact 2025

08/2024 - 08/2024

Project: AIMING - AIoT Infravision for Monitoring, Inspection & Grading in Agriculture

- Designed an AIoT machine for agricultural input–output grading using an Intel® industrial PC (CPU / GPU).
- Optimized AI inference with Intel® software stack: converted Keras (.h5) and ONNX models to OpenVINO™ IR (.bin/.xml), achieving up to ~3× faster performance on Intel® hardware.
- Developed NIR sensor I^2C driver (GY-7263, 6 wavelengths) on ESP32, transmitting data 6-dim vectors via MQTT to the desktop gateway.
- Built real-time monitoring dashboard (frontend + backend) with Redis and MQTT to visualize fruit quality and grading results.

HumanLog 2025 | SAVINA team | 2nd Runner-up Prize

04/2025 - 04/2025

Project: ESP32Cam and RFID AIoT Solution in Warehouse Distribution

- Designed a Circuit Sketch | PCB & PCBA with Esp32cam Module in Supply Goods Classification & Human Detection
- Designed a Circuit Sketch | PCB & PCBA with Esp32- S3, DHT22, RFID Reader RC522 Module in Warehouses & Transportations' Cabin Management
- Install, soldered, and assembled circuits into a functional MVP hardware product within a 15-hour hackathon day.
- Designed and developed the frontend & backend using Flask protocol to retrieve IoT and SQL data for a Landing page and a Management website for the Logistics manager.
- Evaluated the system and responded to judges' questions: ease of installation, maintenance, Current and Voltage consumption, and offline (non-Wi-Fi) Operation during Apocalyse

RMIT Hackathon 2025 | Leader of TechBiz team | Top 10/132

11/2024 - 01/2025

Project: Iot, AI & Blockchain Solutions for Industrial enterprises in Warehouse & Transportation management

- Design & System architecture of a B2B logistics solution for Enterprises integrating IoT, AI, and Blockchain technologies.
- Design a circuit using ESP32- S3, load cell, HX711, and DHT22 to simulate a cold-chain cabin or Warehouse Environment
- Developed a chatbot assistant within the management website using the Ollama model to support users
- Developed a frontend & backend for a Customer Landing Website and a Manager Warehouse & Transportation Manager

Stars Academy Company **06/2024 - 02/2024**

Collaborator IoT / STEM Design & Teache

- 7 months of experience as a part-time instructor, leading classes of 40+ students across 20+ public elementary schools in Ho Chi Minh City, Vietnam, teaching Electronics, STEM, and Robotics
- Contributing to curriculum development in Robotics, Lego and STEM projects at Stars Academy Company
- Design & Building IoT Project for Company Education Events: Code C+ + into Education Car, The smart home IoT system
- detects rain and the IR Led detection, IoT system detects water levels, Magical Wand Model, ...

UEH Guitar Club **11/2023 - Present**

Event Logistics Staff

- Connect LED lights, soldering and set up electrical wiring for the stage on-site
- Prepare a budget estimate, Execution plan, Logistics checklist, and professional sheets and documents for 8+ music show university level with > 1000 viewers

RESEARCH EXPERIENCE

Automotive Control Algorithms Research (PID / LQR / MPC) **11/2025 - Ongoing**

Mentored by MEng Nguyen Khanh Loi and developed in collaboration with Nhat Tan at MLIoT Lab, HCMUT

- Researched hierarchical control stack (outer MPC + inner LQR/LQI + PID) for autonomous 1:10 EVs, focusing on high-accuracy trajectory tracking under actuator limits and latency constraints
- Derived discrete bicycle & Frenet-frame models and implemented constrained MPC (QP-based) with curvature κ(k), jerk, and steering-rate limits; integrated Gaussian noise models for measurement N(0,σ2) and process disturbances
- Built a full simulation suite with 2D/3D visuals (Chart.js, Three.js) and real-time metrics: max $|e_y|$, RMS e_y, max $|e\psi|$, δ-smoothness, solver-time (p50/p90/p99) & residual diagnostics
- Logged simulation traces, noise sweeps, and parameter tuning results into PostgreSQL for benchmarking and data-driven controller optimization
- Evaluated embedded feasibility (STM32 + Raspberry Pi): timing jitter, servo deadband, noise robustness, and Monte-Carlo performance across disturbance scenarios

EDUCATION

Ho Chi Minh City University of Technology **08/2023 - Present**

Bachelor of Electrical and Electronic Engineering in Electrical Engineering