# Arby Mohamed Mahmoud

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## PROFILE

Enthusiastic electronics engineering graduate student specializing in embedded systems, intelligent information systems, and hardware-software co-design. Experienced in MCU programming, PCB design, embedded UI development, and building complete end-to-end electronic devices. Strong hands-on project background with a focus on STM32, ESP32, LVGL, IoT, and power-efficient system design.

## RESEARCH / LAB EXPERIENCE

**Beijing Institute of Technology: under supervision of professor**
Graduate Project & Research Work

- Worked on multiple embedded system projects (notably the LVGL Touchscreen Air Quality Device).
- Assisted with MCU programming, hardware prototyping, and embedded UI development.
- Focus on IoT devices, intelligent systems, and low-power embedded design.

## EDUCATION

**Master's Degree in Electronics Science and Technology**
Beijing Institute of Technology
Specialization: Intelligent Information Systems (3rd Semester Expected Graduation: June 2026)

**Bachelor's Degree in Electronics Science and Technology**
Beijing Institute of Technology

## KEY SKILLS

**Embedded Systems**
STM32 (F4/H7), ESP32, RP2040, ARM Cortex-M MCUs - C/C++, LVGL, FreeRTOS, peripheral drivers, IoT development

**Hardware & PCB**
KiCad, EasyEDA - PCB routing, sensor integration, power management circuits - 3D design with FreeCAD, 3D printing for enclosures

**Software & Tools**
STM32CubeIDE, ESP-IDF/ Arduino, basic web development (HTML/CSS/JS for ESP32 dashboards) - Serial debugging tools, oscilloscopes

**Other**
LVGL UI design, HTTP servers on ESP32, Low-power design, supercapacitor energy storage, IoT protocols (Wi-Fi, BLE basics)

## LANGUAGES

**Chinese**
HSK 5

**English**
Fluent

**French**
Fluent

## PROJECT EXPERIENCE

**Self-Balancing Robot (Bachelor's Capstone Project)**

- Designed and built a fully functional self-balancing two-wheel robot.
- Completed 3D mechanical design, custom PCB, motor driver circuits, and firmware.

- Implemented PID control, IMU sensor fusion, and real-time balancing algorithms.

**ESP32 Air Quality Monitoring Device (with LVGL Touchscreen UI)**
- Created a complete IoT device with touchscreen, Wi-Fi, LVGL UI, and web interface.
- Features: real-time air quality, clock/settings page, image display from phone via webpage.
- Wrote all firmware including web server and UI logic.

**Solar-Powered Supercapacitor Device**
- Designed a battery-less device powered by solar panel + supercapacitor.
- Built power management circuits and charging system.
- Designed PCB and embedded firmware to manage power usage efficiently.
- Demonstrated long-term operation without traditional batteries.

**STM32H7 Guitar Effects Pedal**
- Designed a digital multi-effects pedal using STM32H7, SDRAM, and an audio codec.
- Implemented audio processing, effects chaining, loop recording, and real-time UI.
- Built LVGL-based touchscreen interface for effect controls.
- Performed hardware design, PCB layout, and full firmware development.
- 3D printed enclosure to house all the components