



Chew Tzi Hwee

[[Website](#)] [[Linkedin](#)] [[GitHub](#)]

- I grew up in Penang, Malaysia – where I started my maker path since 13.
- I'm expecting a B.Sc. in Electrical Engineering and Computer Science (Hsinchu, Taiwan) in 2026.
- During my Undergraduate:
 - Hardware Product Sprint @ Google
 - ML Researcher & Engineer Internship @ BioPro Scientific
 - Software Engineering Internship @ Elliance Malaysia
 - Software and Operations Internship @ Mini Circuits
 - Process Engineering Internship @ ACX Corp

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NTHUMods - Student Life Planner

Year: 2023~2025, Undergraduate Thesis Project [[Github](#)]

Context: National Tsing Hua University (NTHU) lacked a centralized, student-friendly platform for essential information. Students struggled to find scattered data for courses, grades, and bus schedules.

My Contribution: As the **Founder and Lead Developer**, I architected and built the platform from the ground up as an open-source, non-profit initiative. I now lead a team of 20+ contributors, manage the product roadmap, and steer the project's long-term technical and organizational strategy for sustainable continuity.

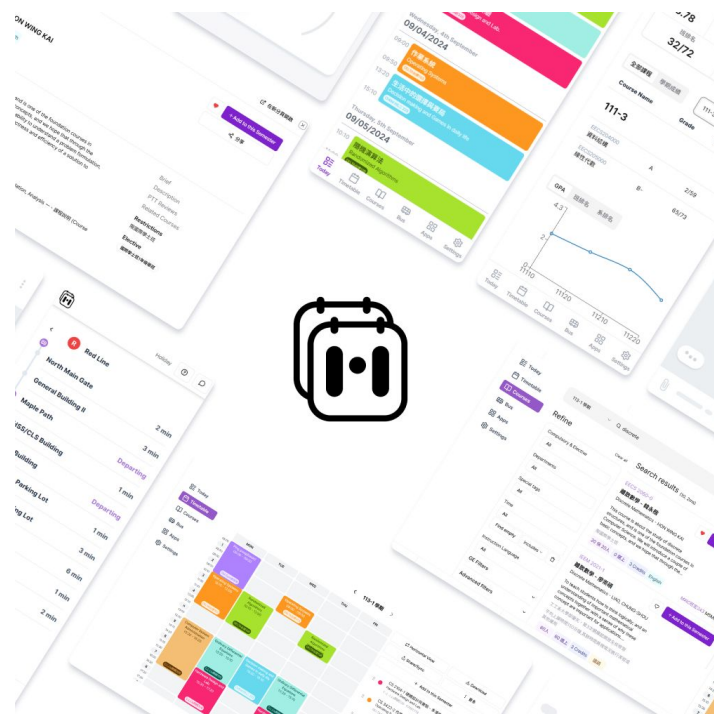
Outcome: NTHUMods is now the de facto student platform at the university.

Scale: Grew to **10,000+ users** (8,800 peak MAU), around 60% of student body.
Recognition: Officially recognized in NTHU newsletters and fully sponsored by local tech companies.

Future: We are currently in official talks with the university administration to integrate NTHUMods into the school's core IT systems.

Development Tools:

Software: Git, React, PostgreSQL, Cloud VMs, Docker, CF Workers



Autonomous Omnidirectional Rover

Year: 2024, Design and Manufacture for Robot Competition Project Course

Context: The challenge was to build a rover to autonomously navigate a complex obstacle course, avoid walls, and retrieve target blocks, all within a strict time limit.

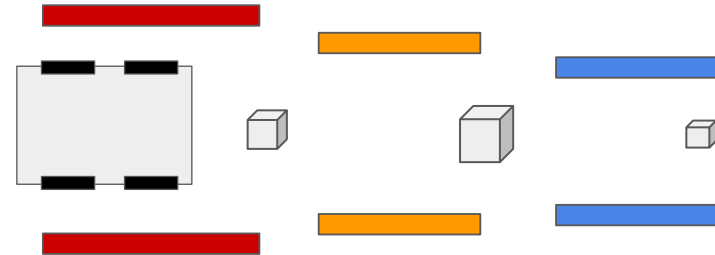
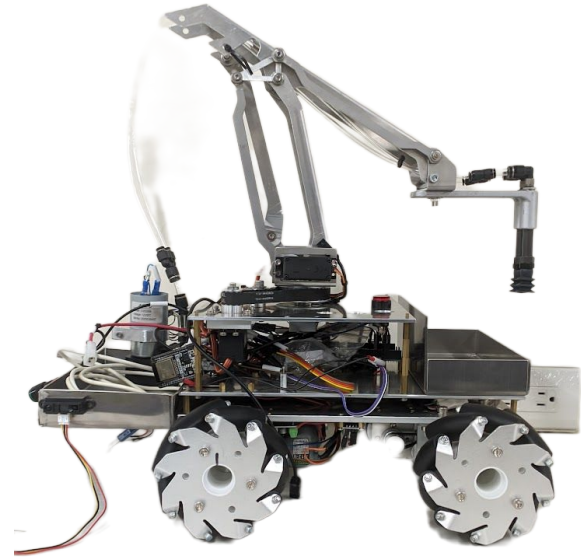
My Contribution: I was responsible for the core perception and control stack. I architected the system, using a Jetson Nano for vision-based pathfinding and object recognition. I also developed the firmware for the ESP32, implementing a PID controller to translate the Jetson's commands into precise, real-time omnidirectional movement.

Outcome: Our team **successfully passed the obstacle course with zero errors**. My integrated system of vision (Jetson) and control (ESP32) proved 100% reliable under competition conditions, allowing us to complete all tasks within the specified timeframe.

Development Tools:

Software: Robot Operating System(ROS), OpenCV, Autodesk Inventor

Hardware: ESP32, Jetson Nano



Obstacle Course: Side walls require high maneuvering precision. Robot arm to Pickup blocks on the way

Project 'Fresh' - AI-Powered Food Inventory

Year: 2024, Google Hardware Product Sprint,
highlighted for 'Best-in-Class' Innovation

Context: Our team was challenged to prototype a "moonshot" device to combat domestic food waste. We designed a smart inventory system to autonomously track food items and their expiry dates targeting refrigerated items, preventing spoilage.

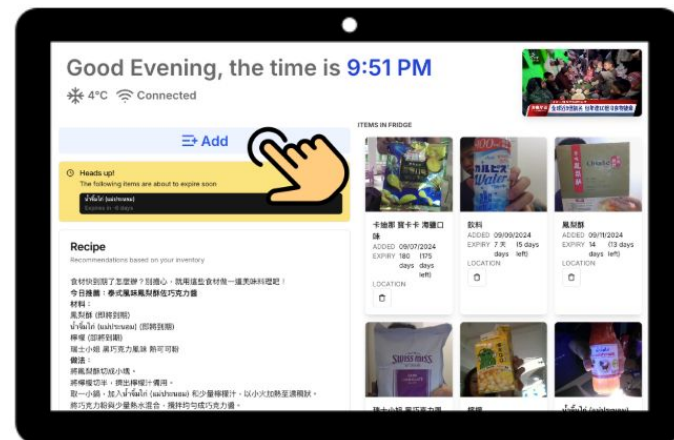
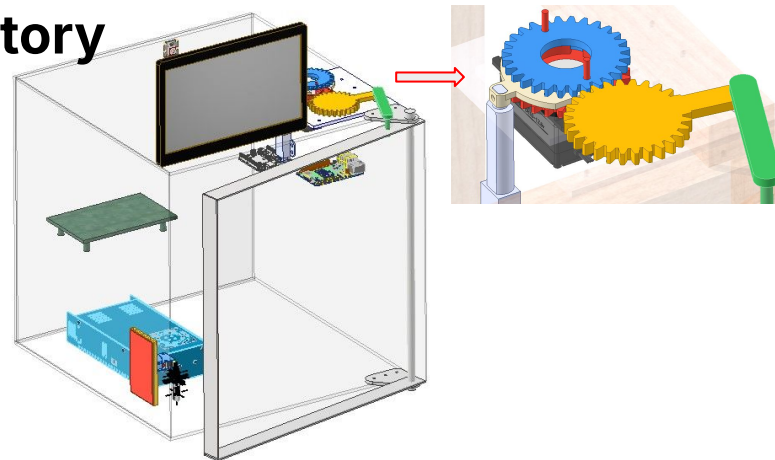
My Contribution: I led the development of the core **perception and inference software stack**. I used the Gemini API to generate daily recipes by automatically prompting it with a list of soon-to-expire items. Then, we consolidated our data and synced with a Google Assistant backend, enabling proactive alerts ("Your milk expires tomorrow") and generating recipes based on soon-to-expire items.

Outcome: Our prototype was highlighted by a board of Googlers for 'Best-in-Class' Innovation. We successfully demonstrated a closed-loop system that could identify, track, and provide actionable alerts, proving a viable path to reducing food waste through ambient AI.

Development Tools:

Software: React, Tensorflow, Gemini API

Hardware: 3D Printing, Arduino, Raspberry Pi, LCD Display



Restaurant Seat Tracker with Fiducial Markers

Year: 2022, Meichu Hackathon (Top Hackathon in Taiwan), **1st Runner Up**

Context: Fast-food chains need low-cost, accurate table tracking for kiosk-to-table service, but existing Bluetooth beacon solutions are expensive to install and maintain.

My Contribution: As **Team Leader**, I proposed the core solution: using low-cost fiducial markers (printed on receipts) and a central PXI imaging sensor for tracking. I defined the system architecture and, beyond managing the team, I was hands-on with debugging.

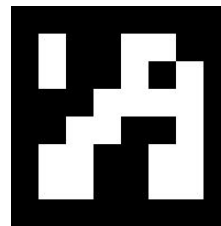
Action: I personally proposed ways to improve our algorithm to match markers with table locations, improving our prediction efficiency and simplifying computation.

Outcome: Our low-cost, high-accuracy solution won **1st Runner Up** at Taiwan's top hackathon. We successfully demonstrated a viable alternative to expensive beacon systems.

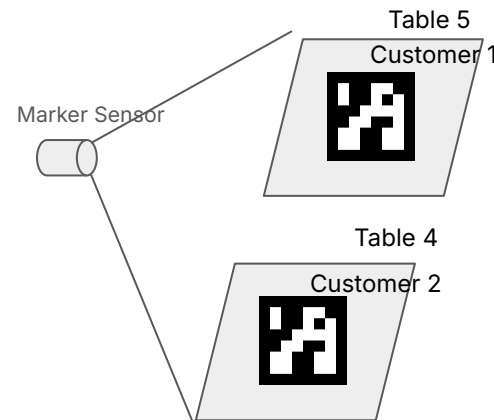
Development Tools:

Software: OpenCV, Python

Hardware: PixArt Object Tracking Sensor, Raspberry PI



Fiducial Marker



Concept

3-bit Histogram Adder Chip

Year: 2024, VLSI (Very Large Scale Integration) Final Project, **Top 10%**

Context: This final project required the design, layout, and verification of a 3-bit histogram adder chip using the 0.18 um CMOS node. The chip had to support three distinct operation modes (clear, calculate, read) in real-time.

My Contribution: I was responsible for the end-to-end digital design flow.

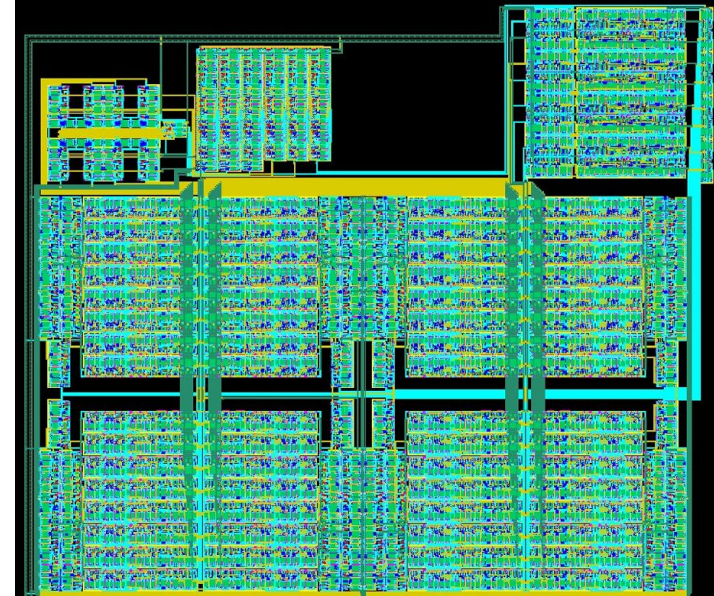
Design: I translated the functional specification into a complete circuit design, starting from basic logic gates and building up to complex modules like multiplexers, decoders, and flip-flops.

Verification: I performed the final assembly, connecting all modules, and ran all HSpice, Laker, and Calibre simulations (DRC/LVS) to verify timing and functionality.

Outcome: I was in the **top 10% of the class** to successfully complete a fully functional design that met all performance and area specifications.

Development Tools:

Software: HSpice, Laker, Virtuoso & Calibre



IoT Classroom Clock

Year: 2021, Mass Produced IoT Project, **Live at Chung Ling Private High School**

Context: The school needed to deploy time-synchronized clocks across **56 classrooms** to solve time-drift issues, while also gathering environmental data (humidity, temperature).

My Contribution: As the lead engineer, I designed and built the entire software and firmware backbone for this large-scale IoT deployment. **Backend:** Built the central dashboard for live data visualization and device management. **Infrastructure:** Implemented an **Over-The-Air (OTA) update system** to manage the entire 56-device fleet and a messaging system to push announcements to all clocks.

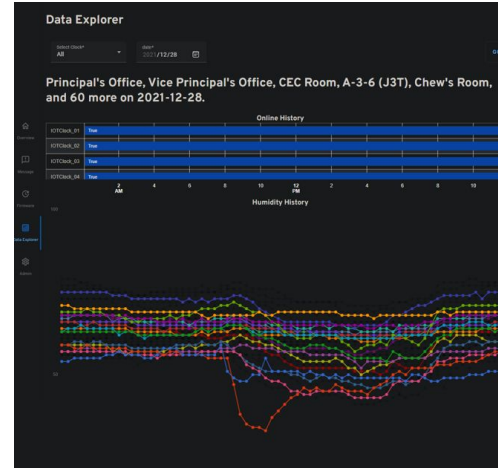
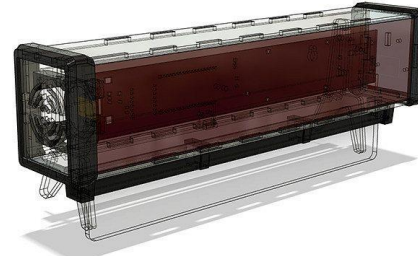
Outcome: Successfully deployed 56 synchronized, sensor-equipped clocks, which are still in operation today. The system provides the school administration with live classroom environmental data and a campus-wide messaging network.

Development Tools:

Software: Firebase, MQTT

Hardware: ESP32

Fabrication: Laser Cutting, 3D Printing



Early Work

Smart Home Controller

Year: 2018, Makerspace Control Hub, **Deployed in Makerspace**

Context: Our high school makerspace lacked a centralized, user-friendly system for controlling basic devices like lights and fans, relying instead on manual switches.

My Contribution: As a self-directed hobby project, I took the initiative to design, build, and deploy a full-stack IoT hub. I integrated a Raspberry Pi 3B (hosting Home Assistant) with a microcontroller to manage high-voltage relays. I also developed a custom web interface for a shared kiosk and laser-cut a transparent enclosure to make the technology visible and inspiring to others.

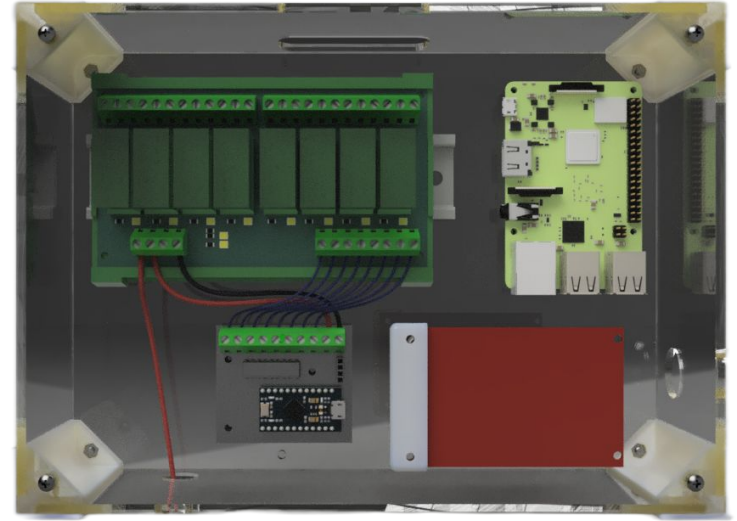
Outcome: The system provided a unified, accessible control hub for the makerspace, enabling device control via Google Home or the local kiosk. The transparent design successfully served as an educational piece, demystifying IoT for other students.

Development Tools:

Software: Home Assistant, MQTT

Hardware: ESP32, Raspberry Pi 3B

Fabrication: Laser Cutting, 3D Printing



Rendered Prototype

Wearable Traffic Message Display

Year: 2021, Award-Winning Safety Device, TKK **Inventor's Award**

Context: We identified a safety and clarity issue: traffic police relied on ambiguous hand gestures to direct traffic. Our team set out to invent a wearable display to broadcast clearer, richer information.

My Contribution: I was responsible for the core hardware design and fabrication. I personally fabricated the custom LED matrix panel using surface-mount LEDs , designed the controller with an Arduino Pro Mini , and etched the circuit boards. I also wrote the firmware that mapped preset buttons to specific, multi-color signages.

Outcome: We produced a functional, wearable prototype that allowed an operator to display clear, high-contrast messages. Our invention was recognized for its practical solution to a real-world safety problem, winning the **TKK Inventor's Award**.

Development Tools:

Hardware: Arduino Pro Mini, Surface Mount LEDs

Fabrication: Sewing, Circuit board etching

