

Chih-Hsien Chen

AI / Machine Learning Engineer

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Education

National Central University — M.S. in Remote Sensing Technology *Sep 2024 – Mar 2026*

- Thesis: Comparative Evaluation of Speckle Noise Reduction Techniques for Deep Learning–Based Ship Detection in Synthetic Aperture Radar Imagery
- Advisor: Dr. Hsuan Ren
- Research Focus: Deep learning object detection, SAR image processing, speckle noise reduction

Technical Skills

Category	Technologies
Languages	Python
Deep Learning / AI	Object detection models, SAR image preprocessing, Google Gemini API, Ollama (Qwen2.5), ChatTTS, RAG architecture
Computer Vision	OpenCV, MediaPipe (hand gesture recognition), Synthetic Aperture Radar image analysis
Web / API	Flask, Streamlit, REST API integration (LINE Bot SDK, Spotify API, TWSE API, FinMind API)
Data Processing	Google Sheets API (gsread), CSV data pipelines, multi-threaded parallel crawling
Deployment / Tools	Docker, Gunicorn, Git, Windows Task Scheduler

Projects

Automated Taiwan Stock Analysis Report System (Stock RAG Project)

Python / Ollama + Qwen2.5 / TWSE API / FinMind / Jina AI / LINE Notify

- Built a **RAG (Retrieval-Augmented Generation)** system that combines real-time market data with news content to generate professional investment analysis reports via a local LLM
- Integrated 7 TWSE official API endpoints and FinMind API to automatically retrieve institutional trading, margin data, technical indicators, and financial statements
- Implemented multi-threaded parallel crawling (3 news search workers + 4 article extraction workers) with keyword-based relevance filtering

- Auto-computed technical indicators (MA, RSI, bias ratio) and valuation analysis using historical PE percentile rankings
- Tracked 21 Taiwan-listed stocks with automatic daily/weekly mode switching; outputs Markdown reports with LINE push notifications
- Exported cumulative signal history to CSV (23 columns) for backtesting and quantitative analysis

Smart Refrigerator Management System (Chen Refrigerator)

Python / Flask / Google Gemini AI / LINE Bot SDK / Google Sheets API / Docker

- Developed a LINE Bot-based smart refrigerator system: users photograph food items for automatic recognition and inventory logging
- Integrated **Google Gemini Flash** vision model for food image recognition, outputting structured JSON (product name, category, expiry date)
- Designed intelligent categorization logic (ingredients / seasonings / beverages / other) combining AI inference with keyword-rule matching
- Used Google Sheets as the backend database with auto-routing to category-specific worksheets; implemented daily expiry checks and automated deletion of expired items
- Containerized with Docker; supports scheduled expiry notification push via LINE

Gesture-Controlled Media Player (NinjaPause)

Python / MediaPipe / OpenCV / Spotify API / PyAutoGUI

- Built a real-time hand gesture recognition system to control music playback, track navigation, and volume adjustment via webcam
- Used **MediaPipe Hands** to detect 21 hand landmarks; implemented finger extension counting and pinch gesture detection algorithms
- Designed dual-mode architecture: Spotify API direct control (precise volume percentage) and system media key control (universal player support)
- Implemented dynamic volume control mapped to thumb-index finger distance with cooldown mechanism to prevent false triggers
- Real-time visual feedback: hand skeleton overlay, finger count display, volume adjustment line indicator

Ebook-to-Audiobook Converter (Ebook Reader)

Python / Streamlit / Edge TTS / Google Cloud TTS / ChatTTS + PyTorch

- Developed a web application that converts EPUB e-books into audiobooks with chapter parsing and speech synthesis
 - Implemented three interchangeable TTS engines: Edge TTS (free/lightweight), Google Cloud WaveNet (high quality), ChatTTS (local GPU-accelerated)
 - Built an EPUB parsing module with TOC mapping, HTML cleaning (footnote/figure removal), and smart chapter title extraction
 - ChatTTS version leverages GPU-accelerated inference with intelligent text chunking (80-char limit) and audio segment concatenation
 - Supports multiple Traditional/Simplified Chinese voice options
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Research

Master's Thesis

Comparative Evaluation of Speckle Noise Reduction Techniques for Deep Learning–Based Ship Detection in Synthetic Aperture Radar Imagery

- Systematically compared the impact of various speckle noise reduction techniques on deep learning–based ship detection performance in SAR imagery
- Research spans SAR image preprocessing, deep learning object detection, and remote sensing image analysis