Tzu-Tsen Hsieh

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EDUCATION

Electrical Engineering

National Taiwan University, Taiwan, Master — Sep. 2022—Present

National Central University, Taiwan, Bachelor — Sep. 2019—Jun 2022

Faculty of Science and Engineering

Linköping University, Sweden, Exchange student — Jan. 2022—Jun. 2022

RESEARCH EXPERIENCE

Vision Transformer Pruning — Sep. 2024—Present

(Python, Pytorch)

- Improved vision transformer inference speed based on token pruning.

Adaptive Sampling on Diffusion Model for Low-Level Vision Tasks — Nov. 2024—May. 2025

(Python, Pytorch)

- Accelerated diffusion model denoising process with reinforcement learning method for low-level image task.

Low Frequency Vascular Analysis of Dual-mode Transcranial Brain Stimulation — Sep. 2023—Jun. 2024

(Matlab, Ultrasound)

- Utilized low-frequency transcranial plane-wave ultrasound to capture blood flow information with Doppler analysis.
- Selected as the oral presenter in 2024 IEEE UFFC

Brain-Computer Interface for Mirror Learning and Virtual Rehabilitation — Jan. 2021—Jun. 2021

(Python, EEG)

- Aimed at helping paralyzed patients by analyzing imagery electroencephalogram signals to control the virtual character.
- Analyzed signals with common spatial patterns and linear discriminant analysis in Riemann space.

Reversible Data Hiding in Encrypted Image via Secret Sharing Based on GF(2^8) — Mar. 2021—Jun. 2023

(Python, Cryptography)

- Implemented Shamir's secret sharing integrated with zigzag algorithm for encrypting image.
- Improved PSNR of the decrypted image from 0.5 to infinity and enhances SSIM from 0.98 to 1.

Robust Consistent Video Based on Monodepth Estimation from Single Image — Sep. 2021—Dec. 2021

(Python, Computer Vision)

- Implemented Monodepth Estimation with the combination of Robust Consistent Video Depth Estimation and Adelai Depth Estimation.
- Enhanced depth estimation accuracy from 0.5138 to 0.9121 in Sintel dataset.

Analyzing infrastructure of known phishing domains *(Python, Networking)* — Jan. 2022—Jun. 2022

- Analyzed the probability of being a phishing site based on its infrastructure with Shodan and WhoIs.
- Utilized web crawler in Python to monitor reported phishing domains on Phishtank and executed shell script on Linux server.

PROJECT EXPERIENCE

Feastforward: Leftover Service and Management Platform — Nov. 2023—Dec. 2023

(JavaScript, Web Application)

- Developed a digital platform to address food wastage, using React.js for frontend, Spring Boot for backend, and MySQL for database.
- Executed the project following Scrum methodology and implemented DevOps practices, covering design, coding, testing, and deployment.

Memohub: Capture, Connect, Contemplate — Nov. 2023—Dec. 2023

(JavaScript, Web Application)

- Designed a platform for tracking thoughts and assisting personal introspection, using frontend with React.js and backend with Node.js.
- Integrated the platform with OpenAI API to generate questions using prompting design.

Yozicare: 2023 GDSC (Google Developer Student Clubs) solution challenge Jan. 2022—Jun. 2023
(Flutter, Mobile App)

- Provided assistance to people with chronic kidney disease (CKD) with CKD map, CKD statistics, chatbot, food composition analysis.
- Achieved the shortlist of the **Global Top 100** teams (Only team in Taiwan).

WORK EXPERIENCE

Research Intern @ *Polytechnique Montreal* Jun. 2025—Present

- Focused on Osteoarthritis (OA) classification by leveraging model attention maps to enhance interpretability.

AI Software Engineer Intern @ *ASUS* Apr. 2024—Present

- Led a device monitoring project for resource tracking across multiple servers, deploying to each server via Kubernetes.
- Conducted research on model compression for Vision Transformers.

TEACHING ASSISTANT EXPERIENCE

Special Topics on Medical Ultrasound Teaching Assistant (C#, Matlab) Feb. 2024—Jun. 2024
@ NTU Electrical Engineering

- Utilized a FPGA development board for ultrasound tutorials, and employed C# (.Net Framework) as the development interface.

Microcontroller Unit Teaching Assistant (C) Jul. 2019—Aug. 2020
@ NCU Mechanical Engineering

- Taught undergraduates to design simple electric circuits of microcontroller unit with C language.

SKILLS

- Programming Language: Python, Matlab, C++, C, C#, JavaScript (React.js, Node.js)
- Tool: Git, Docker, CICD (Jenkins)
- Machine Learning: Pytorch

LANGUAGE

- Native Speaker of **Mandarin Chinese**
- Advanced in **English** (TOEIC 815)
- Intermediate in **French (DELF B1)**

ACTIVITIES

Google Development Student Club member Oct. 2022—Sep. 2023

- Developed an app using Google tech to address SDGs through self-learning and group study.

NTU Public Access Club member Sep. 2022—Jun. 2024

- Prepared microphones, amplifiers, and speaker systems to deliver clear sound quality for on-campus performances.
- Operated mixing console, managing equalization, compression, and reverb effects for optimal audio output.

First Prize of the Video Competition of NCU May. 2020

- Served as the starring, executive producer, supervising editor, and screenwriter for a film.

Executive of NCU Guitar Club Jul. 2019—Jan. 2020

- Organized Guitar Performance Showcases for 10+ performances.