SHIH-WEN LIU (CASPER)

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Research Interests

My core interests are **efficient and adaptive AI.** I particularly focus on designing parameter-efficient fine-tuning, adaptive mechanisms for multi-task learning vision model, large multimodal model and histopathology report generation. My research goal is to make AI models learn and adapt with maximum efficiency.

Education

- **National Cheng Kung University** *Sep. 2024 – Present*
  Master of Science in Artificial Intelligence Tainan, Taiwan
  ◦ Overall GPA: 4.00/4.00, Advisor: Prof. Wei-Ta Chu
- **National Sun Yat-sen University** *Sep. 2020 – Jun. 2024*
  Bachelor of Science in Computer Science Engineering Kaohsiung, Taiwan
  ◦ Last 60 GPA: 3.88/4.00
  ◦ Academic Excellence Award (2020)

Publications

[C.1] **Shih-Wen Liu**, Hsuan-Yu Fan, Wei-Ta Chu, Fu-En Yang, Yu-Chiang Frank Wang "**Histopathology Image Report Generation by Vision Language Models with Multimodal In-Context Learning**." In *the Conference of Medical Imaging with Deep Learning (**MIDL**) 2025*.

Projects

- **Split Conv: Efficient Convolution Layer Design** *Aug. 2024*
  Tools: Pytorch
  ◦ Designed memory-efficient convolution and pooling layers for large-resolution training
  ◦ Optimized implementations to reduce VRAM usage by 50 times
- **Jetson Nano Real-Time AR Teaching System** *Jun. 2024*
  Tools: Python, OpenCV, Jetson [Demo Video]
  ◦ Developed AR overlay pipeline on Jetson Nano for live video processing
  ◦ Achieved 30 FPS on 720p streams with real-time object detection
- **Desiary - A Novel Diary-Dating App** *May 2024*
  Tools: Flask, React Native, Stable Diffusion, LoRA, MongoDB, Docker [Demo Video]
  ◦ Created diary-to-image generation using Stable Diffusion with LoRA fine-tuning
  ◦ Built full-stack mobile app with user authentication and image gallery
  ◦ Deployed backend in Docker with CI/CD pipelines for reliability
- **Newsbie - Your Little News Reporter** *May 2024*
  Tools: Python, Flask, React Native, MongoDB, Docker [Demo Video]
  ◦ Implemented web-scraping modules to aggregate news from 10+ sources
  ◦ Integrated LLM API for concise, on-demand article summarization and podcast generation pipeline
- **Let the Particles Have Babies! - PSO + GA + NN Mapping** *Feb. 2024 - Jun. 2024*
  Tools: Python [Project]
  ◦ Combined Particle Swarm Optimization and Genetic Algorithms with neural networks for search-space reconstruction
- **Real-Time Multi-Filter App** *Nov. 2022 - Dec. 2023*
  Tools: Python, NumPy [Project]
  ◦ Developed 20+ stackable image filters (emboss, oil paint, pencil sketch) in pure NumPy
  ◦ Optimized vectorized operations to maintain 60+ FPS on 1080p frames
- **Glomerular Detection & Disease Classification** *Nov. 2022 - Dec. 2023*
  Tools: Python, PyTorch [Report Video]
  ◦ Accelerated segmentation pipeline from 364 to 29 days via entropy-based filtering
- **Taiwanese Language Learning App Based on LLMs** *Sep. 2022 - Mar. 2024*
  Tools: Unity, Python, SpeechRecognition, TTS [Project]
  ◦ Integrated Unity-based AR with an LLM-driven agent for immersive language-learning scenarios
  ◦ Leveraged vision-language action commands to control interactive virtual agent
  ◦ Developed real-time speech recognition and synthesis pipelines for pronunciation feedback

Experience

- **NCKU CSIE-Linear Algebra [🌐]** *Spring 2025*
  Teaching Assistant Tainan, Taiwan
  ◦ Assisted in courses and graded assignments.
- **NXP Semiconductors [🌐]** *Feb. 2023 – Aug. 2023*
  Industry Intern Kaohsiung, Taiwan
  ◦ Developed automated data preprocessing tools, algorithms, and logic validation scripts for large-scale data.
  ◦ Enhanced existing pipelines to improve performance and maintainability.
- **Scratch Programming Instructor** *Summer 2021 & 2022*
  Instructor Hsinchu, Taiwan
  ◦ Taught introductory Scratch programming to elementary students, boosting communication and teaching skills.

Honors and Awards

- **Best Team Award** *2024*
  Critical Care Data Science Conference & Taiwan Datathon
  ◦ Recognized for outstanding team collaboration and high-performance ICU data analysis with senior clinicians.

Skills

- **Programming Languages:** Python, C/C++, JavaScript, HTML, CSS
- **Data Science & Machine Learning:** NumPy, Pandas, PyTorch, TensorFlow, scikit-learn, Matplotlib
- **Developer Tools:** Docker, ROS2, Unity, React Native, Git, Bash
- **Specialized Areas:** Parameter-Efficient Fine-Tuning (LoRA), Adaptive Multi-Task Vision Models, Large Multi-Modal Model, App development