Chih-Ying Liu

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EDUCATION

Stanford University, California, United States
Master of Science, Electrical Engineering Expected Graduation: June 2024

- Cumulative GPA: 4.11/4.30
- Relative Courses: Natural Language Processing with Deep Learning, Natural Language Understanding, Computer Vision: From 3D Reconstruction to Recognition, Conversational Virtual Assistant, Reinforcement Learning

National Taiwan University (NTU), Taipei City, Taiwan
Bachelor of Science, Electrical Engineering Sep. 2018 – Jun. 2022

- Overall GPA: 4.25 / 4.30 (Three times presidential award (top 5%) in Fall 2018, Spring 2019, Spring 2020 semesters)
- Relative Courses: Machine Learning, Deep Learning for Computer Vision, Deep Learning for Human Language Processing, Digital Speech Processing, Algorithms, Data Structure, Operating System, Computer Architecture

EXPERIENCE

Deep Learning Engineer Intern
VIA Technologies, Taipei, Taiwan Jul. 2023 – Aug. 2023

- Developed **bird-eye view perception** models using **PyTorch**, achieving 30 percent mAP on the Nuscenes dataset.
- Utilized Gradio to create interactive and user-friendly demos for showcasing model performance and results.
- Converted PyTorch models to **ONNX** and **TensorRT** formats, resulting in a 40 percent reduction in inference time.
- Utilized Optuna for autonomous hyperparameter tuning, resulting in improved model performance.

Undergraduate Research Intern
National Taiwan University, Taipei, Taiwan Sep. 2021 – Jun. 2022

- Developed a Chinese **chatbot** that can induce its interlocutor to response with specific sentiments.
- Increased the diversity of the chatbot's response by 3% using advanced **reinforcement learning algorithms**.
- Collected and cleaned 12 million pairs of Chinese dialogue datasets for Chinese chatbot training.

PUBPLICATION

*Zih-Ching Chen, Allen Fu, **Chih-Ying Liu**, Hung-yi Lee, and Shang-Wen Li, "Exploring Efficient-tuning Methods in Self-supervised Speech Models", IEEE Spoken Language Technology Workshop, 2022 (https://arxiv.org/abs/2210.06175)*

RESEARCH EXPERIENCE

Pediatric CT Segmentation Sep. 2023 – Present
Stanford University AI for Healthcare Bootcamp, California, United States

- Develop a model that performs well on both pediatric and adult **CT segmentations** based on TotalSegmentator.
- Preprocess and match labels between adult and pediatric datasets.
- Explore **domain adaptation** and **efficient fine-tuning** techniques to improve performance.

Efficient-tuning Methods in Self-supervised Speech Models Jan. 2022 – Jul. 2022
National Taiwan University, Taipei, Taiwan

- Implemented prefix tuning on three **speech self-supervised learning models** and conducted experiments on six SUPERB downstream tasks to explore its effectiveness and generatability.
- Demonstrated six efficient tuning methods, including **prefix tuning**, **adapter**, and weight-sum, achieve comparable performance to finetuning with less than 1% trainable parameters of finetuning.
- Showed these efficient tuning methods have better stability and improved performance in low data regime.

PROJECT

Efficient Fine-tuning for Multi-Task Learning on BERT Feb. 2023 – Mar. 2023

- Designed a **BERT** multi-task classifier that could build robust embeddings and performed well across sentiment, paraphrase, and similarity tasks, while being parameter efficient.
- Increased performance in similarity task by 42.1% by modifying similarity head based on Sentence-BERT.
- Achieved comparable performance to full fine-tuning with less than 3% to 9% of trainable parameter by inserting adaptation modules **PAL**, **prefix-tuning**, and **adapters** into BERT layers.

Self-supervised Monocular Depth Estimation with Semantic Guidance Feb. 2023 – Mar. 2023

- Designed a framework that performed self-supervised monocular **depth estimation** with fused semantic information.
- Experimented with various depth-semantic attention mechanisms and introduced a new self-adaptive method.
- Utilized lightweight encoder VoVNet to achieved decent performance with much less inference time.

SKILLS

- Technical: Python, Pytorch, C++, Matlab, Deep Learning, Machine Learning, Natural Language Processing, Speech Processing, Computer Vision, Linux, Docker, AWS, GCP, MongoDB, GraphQL, JavaScript, React, Node.js, HTML, CSS, Verilog, Arduino, Raspberry Pi,
- Language: English, Mandarin