

I-Chun (Ethan) Chern

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Education

Carnegie Mellon University (CMU)

Pittsburgh, PA

SCHOOL OF COMPUTER SCIENCE, LANGUAGE TECHNOLOGIES INSTITUTE

Aug. 2021 - May 2023

MS IN ARTIFICIAL INTELLIGENCE AND INNOVATION

- Courses: Advanced DL (10-707) (A+), Advanced NLP (11-711) (A+), Theoretical and Empirical Foundations of Modern ML (15-884) (A+), ML with Large Datasets (10-605) (A+), Convex Optimization (10-725) (A+), ML Production (11-695) (A+), AI Innovation (11-654) (A+), Advanced ML (10-716) (A), Intro. to ML (10-601) (A), AI & Future Markets (11-651) (A), Intro. to Computer Systems (15-513) (A)

National Yang Ming Chiao Tung University (NYCU)







Hsinchu, Taiwan

BS IN ELECTRICAL AND COMPUTER ENGINEERING

Sept. 2017 - June 2021

- Academic Excellence Award (top 5%), 2020

Publication

- **I-Chun Chern**, Steffi Chern, Shiqi Chen, Weizhe Yuan, Kehua Feng, Chunting Zhou, Junxian He, Graham Neubig, Pengfei Liu. “**Factool: Factuality Detection in Generative AI – A Tool Augmented Framework for Multi-Task and Multi-Domain Scenarios.**” *arXiv preprint*.   .
- **I-Chun Chern**, Zhiruo Wang, Sanjan Das, Bhavuk Sharma, Pengfei Liu, Graham Neubig. “**Improving Factuality of Abstractive Summarization via Contrastive Reward Learning.**” *Third Workshop on Trustworthy Natural Language Processing at ACL 2023*. .
- **I-Chun Chern**, Kuo-Hsuan Hung, Yi-Ting Chen, Tassadaq Hussain, Mandar Gogate, Amir Hussain, Yu Tsao, Jen-Cheng Hou. “**Audio-Visual Speech Enhancement and Separation by Leveraging Multi-Modal Self-Supervised Embeddings.**” *Advances in Multi-modal Hearing Assistive Technologies (AMHAT) at IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2023*. .
- **I-Chun Chern**, Steffi Chern, Heng-Cheng Kuo, Huan-Hsin Tseng, Kuo-Hsuan Hung, Yu Tsao. “**Voice Direction-of-Arrival Conversion.**” *IEEE International Workshop on Machine Learning for Signal Processing (MLSP) 2023*.
- Kao-Yueh Kuo, **I-Chun Chern**, and Ching-Yi Lai. “**Decoding of Quantum Data-Syndrome Codes via Belief Propagation.**” *IEEE International Symposium on Information Theory (ISIT) 2021*. .

Research Experience

Generative AI Lab, Shanghai AI Lab

Shanghai, China

RESEARCH ASSISTANT (ADVISOR: PROF. PENGFEI LIU)

May. 2023 - Present

- **Factool: Factuality Detection in Generative AI**
 - Pioneered the development of a sophisticated tool-augmented factuality detection framework designed to identify factual inaccuracies within generative AI outputs across various tasks and diverse domains.
 - Delivered a fine-grained factuality detection system for precise identification and rectification of factual inaccuracies.
- **Building Alignment Approaches for Safer LLMs**
 - Developing alignment approaches to ensure coherence between LLMs and existing human norms and criteria.
 - Building retrieval-based systems to enhance the alignment between LLM and existing laws.
- **Scalable Evaluation for Generative Chatbots**
 - Formulating a robust evaluation framework to critically assess the performance of generative chatbots under diverse scenarios.
 - Building AI-assisted meta evaluation framework to facilitate alignment between LLM-based evaluation metrics and human.
- **Unleashing Math Capabilities of LLM**
 - Building empirical approaches to unleash the capabilities of LLMs in mathematical and scientific domains.

Research Projects in Carnegie Mellon University

Pittsburgh, PA

INDEPENDENT RESEARCH (ADVISORS: PROF. GRAHAM NEUBIG, DR. PENGFEI LIU)

Aug. 2021 - May 2023

- **Factool: Factuality Detection in Generative AI**
 - Advisors: Prof. Graham Neubig, Dr. Pengfei Liu
 - Established robust factual error detection workflow designed to identify inaccuracies within the generated text of LLMs.
- **Improving Factuality of Abstractive Summarization via Contrastive Reward Learning**
 - Advisors: Prof. Graham Neubig, Dr. Pengfei Liu
 - Developed contrastive reward learning paradigm aiming at providing factual consistent abstractive summarization.

Biomedical Acoustic Signal Processing Lab, Academia Sinica, Taiwan

Taipei, Taiwan

STUDENT RESEARCH ASSISTANT (ADVISOR: PROF. YU TSAO)

Mar. 2022 - May 2023

- **Audio-Visual Speech Enhancement based on Efficient Multimodal Neural Networks**
 - Built end-to-end SSL-based audio-visual multimodal speech enhancement and speech separation models.
- **Voice Direction-of-Arrival (DOA) Conversion**
 - Proposed voice DOA conversion; devised generative models to perform voice DOA conversion.

Quantum Computing Lab, NYCU

Hsinchu, Taiwan

RESEARCH ASSISTANT (ADVISOR: PROF. CHING-YI LAI)

Feb. 2020 - Aug. 2021

- **DS-BP: A Novel Fault-Tolerant Quantum Computation Scenario**
 - Devised a low complexity decoding algorithm (refined GF(4)-based belief propagation) for quantum data-syndrome (DS) codes to correct both data qubits and syndrome bit-flip errors concurrently.
 - Outperformed the classical decoding strategy (repeated syndrome measurements) under realistically defined physical realization condition.

Perception Signal Processing Lab, NYCU

Hsinchu, Taiwan

RESEARCH ASSISTANT (ADVISOR: PROF. TAI-SHIH CHI)

Feb. 2019 - Jan. 2020

- **A Hybrid DSP/Deep Learning Approach to Real-Time Speech Enhancement**
 - Implemented a hybrid DSP/deep learning algorithm targeting at “keeping the computing consumption as low as possible (compared to typical NN algorithm), while maintaining high-quality speech enhancement (compared to conventional algorithm).”
 - Outperformed the conventional MMSE-based approach at an average of 0.3 under PESQ MOS-LQO quality evaluation.
- **A CNN-based Auditory Model for Feature Extraction in Speaker Identification**
 - Revamped a traditional two-stage auditory model, replacing the original framework with a layered 1-D and 2-D CNN structure to simulate 1-D cochlear and 2-D spectro-temporal modulation filtering.
 - Achieved a higher accuracy in speaker identification (14% improvement) compared to the original structure.

Work Experience

Luca.ai

Pittsburgh, PA

MACHINE LEARNING ENGINEER

Oct. 2022 - May 2023

- **Reading Fluency Learning Platform for Children with Dyslexia**
 - Designed innovative story generation systems utilizing advanced large language models technology.
 - Developed phoneme-level ASR systems for real-time disfluencies detection.
 - Integrated systems workflows to provide real-time analytical reports and facilitate effective instructional approaches.

Amazon (AWS), Amazon Go

Seattle, WA

SOFTWARE DEVELOPMENT ENGINEER INTERN

May 2022 - Aug. 2022

- **In-Store Devices Provisioning and ML Deployment Systems Improvements**
 - Enhanced the visibility of in-store devices (cameras and edge computing devices) to facilitate the device provisioning and ML software deployment.
 - Initiated and executed the automation of device provisioning (cameras, edge computing devices) debugging workflow and ticketing process, resulting in significantly reduced response time and improved efficiency in addressing technical issues.
 - Generated cross-team impacts to the vision algorithm deployment team, tech installation team, hardware device team, and device provisioning and management team.

Realtek Semiconductor Corp., Multimedia Department

Hsinchu, Taiwan

DIGITAL IC CONSULTANT

June 2019 - July 2021

- **Chip Design for AI-Driven Keyword Wake-Up Function**
 - Optimized AI-based voice keyword algorithm, developed optimized IC hardware architecture, and implemented RTL coding to deliver voice-wake-up function for TV in standby mode, with compact die size and low power consumption.
 - Designed a highly efficient digital circuit scheduling and control flow for the speech recognition module, optimized for reduced computational complexity while striking a balance between computation and memory usage; only 1/16 of the original computing capacity is required.
 - The end product of this project won the 2022 Computex Best Choice of the Year Award & Golden Award.

Skills

Software

Python (TensorFlow, PyTorch), Large Language Models, Distributed Training, C/C++, MATLAB, Java, JavaScript, HTML, Assembly language (x86-64, 8051)