Feng-Ting Liao

MediaTek Research | Taipei, Taiwan

PERSONAL DATA

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RESEARCH INTEREST

Large Language Models, Deep Reinforcement Learning, Meta-Learning, Speech Processing, Diffusion Models, Generative Models, Computer Vision

APPLICATION DOMAINS

Large foundation models, e.g. LLMs, for digital assistants and IC design; Deep reinforcement learning for chip design; Computer vision for event detection

Programming languages: Python, C++, Shell (proficient); SQL (basic)
Technologies: PyTorch, JAX, CUDA, NumPy, Pandas, Docker, Kubernetes, Git, Jenkins, AWS, GCP, Tableau

WORK EXPERIENCE

Senior Research Scientist Nov 2020 - Present
MediaTek Research Taipei, Taiwan

- **Project lead of deep reinforcement learning for floor planning in chip design**.
  - Solved floor-planning in chip top design optimization (6 weeks down to 6 hours). Formulated, prototyped, and delivered deep reinforcement learning agents based on graph neural network and Transformer.
  - Coordinated cross-departmental collaboration to integrate and evaluate AI agents on chip design cases; cross-institutional collaboration for building shaping and routing tools for RL environments.
- **Co-creator of Breeze-7B/BreeXe-8x7B**, SOTA Traditional Chinese LLMs with **>6k downloads/month.**
  - **Productized BreeXe-8x7B via cloud API and on-premises deployment** to the Traditional Chinese market through aligning diverse stakeholders including internal leadership, legal, marketing, and product and external system integrators and IT departments of corporations within the ecosystem.
  - Core-contributor to key stages of LLM development for Breeze-7B and BreeXe-8x7B, including data collection, pre-training and post-training processes, evaluation, marketing, and productization.
- **Research publications at ICML, EACL, and ASRU** in Large Language Model, Diffusion Models, Meta-Learning, Natural-Language-Processing, and Speech Recognition.
- **Advanced LLM evaluations** through open-sourcing TCEval, the first comprehensive language model benchmark in Traditional Chinese; RAD-Bench, the first benchmark on retrieval augmented dialogues.
- **Advanced cross-modal application of LLMs** via proposing Generative Fusion Decoding, an algorithmic framework for shallow fusing speech recognition model and LLM without re-training.
- Mentor for interns on algorithm prototyping and research publications; coordinator of staff hiring, cross-departmental reading groups, and lab compute infrastructure.

Research Engineer in Computer Vision Mar 2019 - Feb 2020
Umbo Computer Vision Taipei, Taiwan

- Led a 90% cost reduction and 350% service speed boost for cloud cameras through algorithmic optimization; architected a vehicle detection API for real-time surveillance with cross-functional teams.

Postdoctoral Research Assistant Jan - Dec 2018
DPhil Researcher Oct 2013 - Jan 2018
Department of Physics, University of Oxford Oxford, UK

- Core-contributor to the first result of the world's largest dark matter detector in direct detection.
- Led the Oxford team in delivering £50K worth of sensors and investigated applying machine learning to dark matter research. Designed a state-of-the-art monitoring system and collaborated with ~20 researchers on the detector's time projection chamber.

EDUCATION

DPhil in Particle Physics, University of Oxford 2013 - 2018
Supervisor: Professor Hans Kraus

B.Sc. in Electrophysics, National Chiao Tung University 2008 - 2012

MENTORSHIP

Tzu-Lin Kuo (M.S student at NTU CSIE) May - June, 2024
Yung-Chieh Chan (M.S student at Stanford CS) April - June, 2023
Ren-Chu Wang (M.S student at GeorgiaTech CS) Jan - June, 2022
Chien-Yi Yang (PhD student at UCSD EE) Jan - June, 2022

PUBLICATIONS

RAD-Bench: Evaluating Large Language Models Capabilities in Retrieval Augmented Dialogues
Tzu-Lin Kuo, Feng-Ting Liao, Mu-Wei Hsieh, Fu-Chieh Chang, Po-Chun Hsu, Da-Shan Shiu, *Preprint, 2024*
[paper][code]

Let's Fuse Step by Step: A Generative Fusion Decoding Algorithm with LLMs for Multi-modal Text Recognition
Chan-Jan Hsu, Yi-Chang Chen, Feng-Ting Liao, Pei-Chen Ho., Yu-Hsiang Wang, Po-Chun Hsu, Da-Shan Shiu, *Preprint, 2024*
[paper][code]

Breeze-7B Technical Report
MediaTek Research, *Technical Report, 2024*
[paper][model weight]

Image generation with shortest path diffusion
Ayan Das, Stathi Fotiadis, Anil Batra, Farhang Nabiei, Feng-Ting Liao, Sattar Vakili, Da-shan Shiu, Alberto Bernacchia, *International Conference on Machine Learning, 2024*
[paper][code]

Zero-Shot Domain-Sensitive Speech Recognition with Prompt-Conditioning Fine-Tuning
Feng-Ting Liao, Yung-Chieh Chan, Yi-Chang Chen, Chan-Jan Hsu, Da-shan Shiu, *IEEE Automatic Speech Recognition and Understanding Workshop (ASRU), 2023*
[paper][code]

Advancing the evaluation of traditional chinese language models: Towards a comprehensive benchmark suite
Chan-Jan Hsu, Chang-Le Liu, Feng-Ting Liao, Po-Chun Hsu, Yi-Chang Chen, Da-shan Shiu, *Preprint, 2023*
[paper][code]

Meta-learning with MAML on trees
Jezabel R Garcia, Federica Freddi, Feng-Ting Liao, Jamie McGowan, Tim Nieradzik, Da-shan Shiu, Ye Tian, Alberto Bernacchia, *EACL Workshop on Domain Adaptation for NLP, 2021*
[paper]

First dark matter search results from the LUX-ZEPLIN (LZ) experiment
J Aalbers et al. (The LZ Collaboration), *Physical review letters 131 (4), 041002, 2023*
[paper]

Projected WIMP sensitivity of the LUX-ZEPLIN dark matter experiment
DS Akerib et al. (The LZ Collaboration), *Physical Review D 101 (5), 052002, 2020*
[paper]

LUX-ZEPLIN (LZ) Technical Design Report
B.J. Mount et al. (The LZ Collaboration), *Preprint, 2017*
[paper]

LUX-ZEPLIN (LZ) conceptual design report
DS Akerib et al. (The LZ Collaboration), *Preprint, 2015*
[paper]

Characterization and Performance of Germanium Detectors with sub-keV Sensitivities for Neutrino and Dark Matter Experiments
A.K. Soma et.al (The Texono Collaboration), *Nuclear Instruments and Methods A 836, 67-82 (2016)*
[paper]

AWARDS & HONORS

Leche Trust Award, The Leche Trust, London UK	2017
Technology Incubation Scholarship, Ministry of Education, Taipei, Taiwan	2013 - 2016
CZFF Scholarship, Cengzhong Culture and Education Focus Foundation, NY	2013 - 2014
Presidential Awards, National Chiao Tung University, Hsinchu, Taiwan	2011 - 2012

INTERNSHIP

Data Science Intern Dec 2018
Burberry London, UK

- Enhanced the digital retail experience for 12M customers during Winter 2018 sales by designing and deploying a trending algorithm using the Mann-Whitney U test.

TEACHING EXPERIENCE

Tutor in Sub-atomic Physics, St Cathrine's College, University of Oxford	2016 - 2017
Junior Demonstrator in 1st & 3rd year labs, Department of Physics, University of Oxford	2016 - 2017
Teaching Assistant in Particle Physics, Department of Physics, University of Oxford	2015 - 2016