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# Pei-Fu (Fred) Guo

*I am a second-year M.S. student in Computer Science at NTU, advised by Prof. Shou-De Lin. My research focuses on Natural Language Processing, particularly LLM uncertainty estimation, benchmarking, and domain-specific applications. I expect to graduate in June 2026 and am currently applying for Ph.D. opportunities to start in Fall 2026.*

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## Education

- **National Taiwan University (NTU)** *2024/2 - Present*
  *M.S. in Computer Science & Information Engineering (Current GPA : 3.98/4.3)*
  – Member of MSLab (Advised by Prof. Shou-De Lin)
- **National Taiwan University (NTU)** *2019/9 - 2023/12*
  *B.S. in Economics (Overall GPA : 3.89/4.3)*

## Publications (81 citations by Nov 2025).

[1] **Pei-Fu Guo**, Yun-Da Tsai, Chun-Chia Hsu, Kai-Xin Chen, Ya-An Tsai, Kai-Wei Chang, Nanyun Peng, Mi-Yen Yeh, and Shou-De Lin. LiveCLKTBench: Towards Reliable Evaluation of Cross-Lingual Knowledge Transfer in Multilingual LLMs. *Under review at ACL ARR October 2025.* **[PDF]**

[2] **Pei-Fu Guo**, Yun-Da Tsai, and Shou-De Lin. Why is the LLM unsure? Profiling the Causes of LLM Uncertainty for Adaptive Model and Uncertainty Metric Selection. *Under review at ICLR 2026.* **[PDF]**

[3] **Pei-Fu Guo**, Yun-Da Tsai, and Shou-De Lin. Benchmarking Uncertainty Metrics for LLM Target-Aware Search. *EMNLP 2025 Findings.* **[PDF]**

[4] Yun-Da Tsai*, Ting-Yu Yen*, **Pei-Fu Guo**, and Shou-De Lin. Text-centric Alignment for Bridging Test-time Unseen Modality. *EMNLP 2025 Findings.* **[PDF]**

[5] **Pei-Fu Guo***, Ying-Hsuan Chen*, Yun-Da Tsai, and Shou-De Lin. Towards Optimizing with Large Language Models. *KDD 2024 Kowledge-Infused Learning Workshop.* **[PDF]** (60 citations)

## Research Projects

- **Towards Reliable Evaluation of Cross-Lingual Knowledge Transfer in LLMs.** **LLM Evaluation** *2025/3-*
  *Graduate Research, MSLab & UCLA-NLP (Advisors: Kai-Wei Chang, Nanyun Peng, Mi-Yen Yeh, Shou-De Lin)*
  – Existing cross-lingual transfer benchmarks often suffer from data leakage, leading to unreliable evaluation.
  – Proposed a new benchmark that measures genuine cross-lingual knowledge transfer by curating LLM-unseen knowledge, ensuring contamination-free testing.
- **Profiling LLM Uncertainty for Adaptive Model & Metric Selection.** **LLM Uncertainty** *2025/2-*
  *Graduate Research, MSLab (Advisor: Shou-De Lin)*
  – Existing uncertainty estimators capture total response uncertainty but provide limited guidance for improvement.
  – Decomposed LLM uncertainty into multiple interpretable sources and analyzed metrics/models across diverse tasks to identify optimal model–metric combinations.
- **AI-Trading Agent** **Applied ML/DL** *2024/7-2025/2*
  *Graduate Research, MSLab & UC Capital (Advisor: Shou-De Lin)*
  – Traditional trading strategies often rely on limited signals and fixed rules, constraining decision quality.
  – Developed models with distinct objectives to provide data-driven decision support for traders.
- **Benchmarking Uncertainty Metrics for LLM Target-Aware Search** **LLM Uncertainty** *2024/3-*
  *Graduate Research, MSLab (Advisor: Shou-De Lin)*
  – Current LLM search algorithms often rely on statistical uncertainty measures (e.g., UCB) to guide search. However, LLM-derived uncertainty metrics may encode richer task-relevant information.
  – Proposed a benchmarking framework to evaluate how well LLM-derived uncertainty metrics can guide search towards task-specific objectives.
- **Text-centric Alignment for Bridging Test-time Unseen Modality.** **LLM Applications** *2023/9-2024/5*
  *Undergraduate Research, MSLab (Advisor: Shou-De Lin)*
  – Addressed modality mismatch problem in multimodal learning.
  – Leveraged the pretrained knowledge and reasoning ability of LLMs to align multimodal representations into a unified text-centric space, enabling effective zero-shot prediction.
- **Towards Optimizing with Large Language Models** **LLM Evaluation** *2023/3-2023/10*
  *Undergraduate Research, MSLab (Advisor: Shou-De Lin)*
  – Despite strong mathematical reasoning, LLMs' potential as search optimizers remains underexplored.
  – Designed mathematical/combinatorial optimization tasks with evaluation metrics to analyze LLM performance.

## Work Experience

- **APPIER – LLM Research Scientist Intern** **LLM Applications** *2024/7 – 2025/3*
  *AI SaaS company specializing in AI-driven marketing and sales automation solutions. Taipei, Taiwan*
  – Developed AI Sales-Bot, an LLM-based agent that integrates retrieval, dialogue management, and recommendation modules for personalized user interaction in online shopping.
  – Implemented context-aware intent detection using multi-turn dialogue history and user behavior signals.
  – Constructed large-scale product knowledge graph capturing relationships among thousands of items to provide structured domain context for LLM reasoning in e-commerce settings.
  – Designed an internal evaluation framework to benchmark the agent's performance in recommendation accuracy and intent understanding across dialogue scenarios.

## Competitions

- **TSMC IT CareerHack: Digital Transform x Generative AI** **LLM Applications** *2024/1*
  *Finalist (Top 6 teams selected)*
  – Competition topic: Factory domain knowledge chatbot implementation.
  – Developed a retrieval-augmented generation (RAG) system with adaptive LLM caching and dynamic model switching to reduce inference cost and support multimodal input.

- **Ministry of Interior Hackathon: Data Innovation Application Competition** **Applied ML/DL** *2023/7*
  *Finalist (Top 8 teams selected)*
  – Applied machine learning and statistical analysis to derive indicators for pedestrian road safety in Taipei City.
  – Developed a web-based visualization platform presenting city-wide safety maps and analytics results.

## Academic Services

**Reviewers**: ACL ARR 2025, ACML 2024