

Hongchao Fang

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EDUCATION

- **The Pennsylvania State University** State College, PA
*Ph.D. in Computer Science, **Fellowship*** Aug 2024 - Present
- **Northeastern University** Seattle, WA
M.S. in Computer Science ; GPA: 3.94/4.0 Sep 2021 - Dec 2023
- **Central University of Finance and Economics** Beijing, China
B.S. in Information Security Sep 2017 - Jun 2021

RESEARCH INTERESTS

My research focuses on customized Large Language Models with two directions: LLM with domain knowledge and LLM with certain personalities. I'm currently interested in applying self-supervised learning on generation tasks to explore the ability of large language models learning personality from domain dialogues.

PUBLICATIONS

1. **Hongchao Fang**, Pengtao Xie; An End-to-End Contrastive Self-Supervised Learning Framework for Language Understanding. Transactions of the Association for Computational Linguistics 2022.
2. **Hongchao Fang**, Sicheng Wang, Meng Zhou, Jiayuan Ding and Pengtao Xie. 2020. CERT: Contrastive Self-supervised Learning for Language Understanding. ArXiv abs/2005.12766.
3. Guangtao Zeng, Wenmian Yang, Zeqian Ju, Yue Yang, Sicheng Wang, Ruisi Zhang, Meng Zhou, Jiaqi Zeng, Xiangyu Dong, Ruoyu Zhang, **Hongchao Fang**, Penghui Zhu, Shu Chen, and Pengtao Xie. 2020. MedDialog: Large-scale Medical Dialogue Datasets. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing
4. Renze Lou, Hanzi Xu, Sijia Wang, Jiangshu Du, Ryo Kamoi, Xiaoxin Lu, Jian Xie, Yuxuan Sun, Yusen Zhang, Jihyun Janice Ahn, **Hongchao Fang**, Zhuoyang Zou, Wenchao Ma, Xi Li, Kai Zhang, Congying Xia, Lifu Huang, Wenpeng Yin. AAAR-1.0: Assessing AI's Potential to Assist Research. Arxiv abs/2410.22394.

RESEARCH EXPERIENCE

- **Stanford** Remote
Research Assistant (Natural Language Processing) Sep 2023 - Mar 2024
 - Proposed a new framework for fine-grained value control exploring the capability of LLM to imitate human personalities like MBTI
 - Generated the dataset by GPT4 with a pre-defined prompt set and trained our reward model based on LLAMA.
 - Built our value control model to generate characterized dialogues steered by value prompts, using RLHF
 - Evaluated by ranking metrics like Kendall, our framework brought significant improvement compared to GPT-3.5.
- **H2lab, UW** Seattle, WA
Research Assistant (Natural Language Processing) Jan 2023 - Jul 2023
 - Applied self-supervised learning method like Setfit on NPM(Nonparametric Masked Language model), Which improves the few-shot performance on GLUE benchmark
 - Analysed the meaning of self-supervised learning for text classification tasks with inadequate training sentences.
 - Proposed new self-supervised frame for multiple classification tasks based on setfit.
- **AI4H Lab, UCSD** Remote
Research Assistant (Natural Language Processing) Apr 2020 - Oct 2020
 - Established a large-scale medical dialogue dataset: MedDialog with 3.4 million conversations between patients and doctors, 11.3 million utterances, 660.2 million tokens, covering 172 specialties of diseases, which is the largest medical dialogue dataset so far .

- Proposed a special self-supervised method to solve the common problem that large pre-trained language models cannot perfectly represent the features of new sentences.
- Applied our special method to different language models including BERT, ERNIE, and Robert. The results show that our model brings about 3% improvements to various language models today.

- **Chinese Academy of Sciences** Beijing, China
Research Assistant (Computer Vision) *Apr 2019 - Aug 2021*
 - Trained appropriate image classification models (ResNet, AlexNet, InceptionV3) on our own dataset, and used data augmentation to improve the accuracy from 0.84 to 0.91.
 - Optimized the image classification algorithm and saved the time and energy costs on mobile devices by 50%.
 - Implemented the function that mobile devices can automatically generate different classification models adapting to their environment, under the instructions of the server.

WORK EXPERIENCE

- **Amazon** Seattle, WA
Software Engineer Intern *May 2022 - Aug 2022*
 - Designed and implemented a Java API for sellers to fetch billing and invoice information from DynamoDB.
 - Optimized frond-end Ember.JS UI to show more detailed invoices information.
 - Designed for a new pub/sub system for users to get real-time invoice change using native AWS tools.
 - Scalied the search API to handle 200% more queries under real-time load tests and query events.
- **Yonyou** Beijing, China
Machine Learning Engineer *Feb 2024 - Aug 2024*
 - Applied DPO methods to improve the overall agent ability of our domain LLM agents, solving 97 bad case of 102.
 - Argumented the data and finetuned the Baichuan2 model to improve the accuracy of table answers from 63% to 91%.
 - Implemented a dataset searching function with Elasticsearch, similarity calculation and LLM agents finetuning.

HONORS & AWARDS

- **University Graduate Fellowship (UGF) of The Pennsylvania State University** State College, PA
graduate student *Aug 2024*
- **Scholarship in College of Engineering, The Pennsylvania State University** State College, PA
graduate student *Aug 2024*
- **Academic Excellence Award at Central University of Finance and Economics** Beijing, China
undergraduate student *Oct 2018*