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 (EMNLP)

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.
  - Scaled 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*