Tao Xijia

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EDUCATION

The University of Hong Kong   Sep 2024 – Jun 2028

Incoming PhD at HKU NLP Lab, Department of Computer Science

The University of Hong Kong   Sep 2020 – Jun 2024

Bachelor of Engineering in Computer Science

- Full-tuition scholarship for 4 years of undergraduate study
- Dean's Honours List of Faculty of Engineering, 2021-22

Technical Courses

- Discrete mathematics, computer organization, OOP & Java
- Software engineering, artificial intelligence, computer architecture
- Database management, communication networks, data structure & algorithms
- Data-driven computer animation, NLP, computer vision, quantum information

National University of Singapore   Aug 2022 – Dec 2022

Taking a 1-semester exchange with modules on

- computer architecture, where I designed and implemented a microprocessor with verification on an FPGA
- machine learning, where I got acquainted with mathematical concepts and computational methods behind nowadays AI technologies

TECHNICAL SKILLS

Languages: Python, C++, Java, MySQL, JavaScript, TypeScript, R, MATLAB

Frameworks / Libraries: PyTorch, Transformers, HuggingFace, TensorFlow, OpenCV, OpenGL, Django

Platforms: Linux, WSL, Windows, Microsoft Visual Studio, AWS

Areas of interest: NLP, Large Language Models (LLMs), AI for Science, Multi-modality

RESEARCH PROJECTS

Final Year Project on AI for Math   Sep 2023 – May 2024

- With a focus on the Lean formal prover, investigated the performance gap between
  - generalists (e.g., GPT-4) and
  - specialists (e.g., 7B LLMs finetuned on domain datasets),
  and the effects of various prompting methods on the task of formal theorem proving (FTP).
- Open-sourced fine-tuned LLMs, the codebase and an VS Code extension for aiding FTP with LLMs.
- Summarized findings in a detailed report, available at the project webpage.

ImgTrojan: Jailbreaking Vision-Language Models (VLMs) with ONE Image   Sep 2023 – Mar 2024

- Led the project on designing and evaluating a novel jailbreak attack targeted at VLMs.
- Resulted in a paper currently in submission at COLM 2024; work done at HKU NLP lab.

Language Versatilists vs. Specialists: An Empirical Revisiting on Multilingual Transfer Ability   May 2023

- Conducted research on the multilingual transfer ability of LLMs with a resulting paper.

EXPERIENCE

AI Research Intern, Zhipu AI   Jul 2024 – Oct 2024

- Worked on the methods of synthesizing domain-specific training data.
- Evaluated on reasoning benchmarks to verify the data quality by training GLM-4 9B.

ML Research Intern, Huawei, Hong Kong Research Center   Jun 2023 – Sep 2023
- Worked closely with two senior mentors in a team focusing on text-to-image generation.
- Implemented multi-modal networks in the MindSpore framework in both CUDA and Ascend environment.
- Contributed to the open-source project [MindONE](#).
- Surveyed related on language-vision feature alignment for large-scale generative models.

Research Assistant, NLP Group, HKU   Sep 2021 – Mar 2024
- Participated in a project on LLMs and knowledge distillation.
- Participated in a project that aimed to investigate the use of pretrained language models (PLMs) in the legal domain, with findings summarized in a paper.
    - Constructed a bilingual legal corpus from judgement files in Hong Kong.
    - Evaluated the performance of different PLMs in our proposed tasks on the dataset.

Research Intern, Department of Computer Science, HKU   Jul 2022 – Sep 2022
- Conducted research in computer graphics under the supervision of Prof. Komura Taku.
- Investigated the application of Cauchy-Green invariants formulated ARAP energy in strand simulation.
- Reproduced the methods (for finite elements) proposed in recent SIGGRAPH papers and adjusted them to fit in the new 1-dimensional setting.

RoboMaster University AI Challenge, HerKules team   Aug 2020 – Sep 2022
- Responsible for the development of reinforcement algorithms, which enable our robot with decision-making capacity in motion planning, shooting, etc., in a multi-agent environment.
- Led a group of four to tackle the robot detection and localization task. Our investigation covers various cutting-edge technologies in computer vision.
- Explored the use of multimodal machine learning with point cloud and infrared data.

Research Assistant, uLab, Faculty of Architecture, HKU   Jun 2022 – Aug 2022
- Collected relevant comments from social media and websites, then conducted sentiment analysis on the comments.
- Identified themes with topic modelling and a machine learning approach.
- Helped with quality control of geospatial data collection using the QGIS software for the street locations.

Teaching Assistant, ENGG1330 Computer Programming I, HKU   Sep 2021 – Dec 2021
- Organized tutorial sessions for 16 undergraduate CS students on Python programming syntax, data structures and algorithm design.
- Discussed the weekly tutorial problems and demonstrated them through live coding in each session.
- Provided video feedback on assignments and facilitated communication between students and the lecturer.

Research Assistant, PANDM Lab, Department of Psychology, HKU   Sep 2021 – Dec 2021
- Assisted in a project on multi-element emotion perceptual decision-making with eye movement analysis.
- Translated theoretical models to Python programs, with eye movement data as an input and the decision made as the target; Optimized parameters accordingly.
- Migrated the lab's MATLAB codes to Python.