Tairan Wang

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Education

University College London **London**
Master of Engineering - Mathematical Computation *26 Sep 2022 - now*

Research Projects

Hoare Prompt - *University College London & Peking University* **May 2024 - September 2024**

Independently contributed to a project in collaboration with Prof. Sergey Mechtaev (UCL, later PKU) and Prof. Yingfei Xiong (PKU), later expanding to a larger team. The project focuses on leveraging Hoare logic-inspired reasoning, symbolic execution, and prompt engineering to enable LLMs to automate program correctness analysis, enhance program interpretability, and improve program repair capabilities. The project is ongoing, with code to be released at an appropriate stage.

The Axiom of Choice - *University College London* **June 2023**

Collaborated with three team members on a research project exploring the Axiom of Choice, its proofs, and applications in mathematical computation and physics. Investigated its equivalence with Zorn's Lemma and studied the use of ordered sets and structural induction in computer algorithms. Concluded the project with a presentation at UCL.

Skills

- Proficient in Python with strong programming standards and project management skills. Familiar with Java, C++, R and Haskell.
- Prompt engineer skilled in AI-assisted programming, with the ability to quickly deploy projects, modify code, debug, and test applications.
- Python Software Engineer with a strong focus on maintaining clean coding practices and design patterns in collaborative projects, ensuring code readability and scalability.
- Familiar with ML algorithms; independently implemented projects such as time series data forecasting and dnCNN.
- Proficient in various programming and productivity tools, including GitHub, Docker, LaTeX, ANTLR, Word, and PowerPoint.

Performance

Demonstrated strong learning abilities, achieving top scores at least in COMP0010 Software Engineering (1/150) and COMP0169 Machine Learning for Visual Computing (1/130).

Recent Projects

- Improved Poisson Image Editing using gradient and divergence field algorithms.
- Variance reduction in Monte Carlo integration for path tracing equations using methods like MIS and low-discrepancy sequences.
- Developed a game project using GameMaker.
- Stock market prediction based on time series data.
- A gradual face transformation based on traditional Face Morphing algorithms and facial feature recognition techniques.