ZICHEN XIE

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Homepage ◇ Google Scholar ◇ GitHub Profile

RESEARCH INTERESTS

I'm broadly interested in **Software Engineering, Software Security and Machine Learning**, especially in leveraging machine learning for program analysis, program testing, and improving the reliability of software systems.

To date, my work has uncovered more than **110** previously unknown bugs in different open-source projects, including Apache Druid and Netty, as well as **50** bugs in the Linux kernel.

EDUCATION

- **Zhejiang University, Undergraduate** *Sept. 2021 - Expected Jun. 2025*
  B.Eng. in Information Security GPA: 3.97/4, 90.90/100

  Member of ACEE (Chu Kochen Honors College)

PUBLICATION

- **Exploring Automatic Cryptographic API Misuse Detection in the Era of LLMs** *Preprint*
  Yifan Xia, **Zichen Xie**, Peiyu Liu, Kangjie Lu, Yan Liu, Wenhai Wang, Shouling Ji [Paper]

RESEARCH EXPERIENCE

- **PL/FM/SE Group, UIUC** *May 2024 - Present*
  Research Intern IL, US
  - Research intern at PL/FM/SE Group at UIUC, advised be Prof. Lingming Zhang.
  - Utilizing Large Language Models (LLMs) for static analysis of the Linux Kernel and have successfully detected 50 previously unknown bugs. Five of them are critical and exploitable bugs which allow the users to enter a extremely long string and overwrite the kernel memory.
  - Designed a framework to automatically generate static analyzers tailored for Linux Kernel by leveraging LLMs. Automatically generated a few analyzers for different bug patterns.
  - The paper is expected to be published within the next month and will be submitted to Top 4 System Conference for review.

- **NESA Lab, Zhejiang University** *Dec. 2023 - Jun. 2024*
  Research Assistant Hangzhou, China
  - Research assistant at Network System Security & Privacy (NESA) Research Lab in Zhejiang University, advised by Prof. Shouling Ji.
  - Evaluation of leveraging LLMs for detecting cryptographic API misuse.
  - Designed the pipeline for the framework and evaluated the effectiveness of various LLMs in detecting cryptographic API misuse using established cryptographic API misuse benchmarks.
  - Extended the framework to real-world scenarios and tested the effectiveness of GPT-4 in detecting cryptographic API misuse. Identified and selected 175 crypto-related files from 1,095 GitHub repositories. Finally discovered and reported 63 bugs.
  - The paper is submitted to Top 2 Software Engieering Conference for review.

- **SRTP, Zhejiang University** *Oct. 2023 - Apr. 2024*
  Research Assistant Hangzhou, China
  - Student Research Training Project (SRTP) in Zhejiang University, advised by Prof. Shouling Ji.

- Research on black-box adversarial example attack towards Linux malware detection systems.
- Acted as the research team leader. Designed a framework to mutate the malware, rendering it undetectable by Function Call Graph (FCG) based malware detection systems.
- Various knowledge such as disassembly, heuristic algorithms, Graph Convolutional Networks (GCN), etc. are involved and used.

INDUSTRIAL EXPERIENCE

- **Tencent CDG** *Jul. 2024 - Sept. 2024*
  Software Testing Engineer Shenzhen, China
  - Worked as a software testing engineer in the WeChat Ads division of Tencent's Corporate Development Group (CDG).
  - Collected and labeled data for model training, and fine-tuned several multi-modal LLMs based on Hunyuan, a large language model developed by Tencent.
  - Integrated fine-tuned models into the existing testing framework and developed the first general automated testing tool for advertisement testing in the WeChat Ads division.

AWARDS AND HONORS

- **Zhejiang Provincial Government Scholarship** *Nov. 2024*
  - Only 3% of the students were awarded.
- **National Second Prize of the China Undergraduate Mathematical Contest in Model** *Oct. 2023*
  - We studied the factors that impact the efficiency of heliostat fields and wrote a paper on the subject. The only team to be honored with a second-place national award in Zhejiang University.
- **Third-Class Scholarship for Outstanding Students** *Oct. 2023*
  - Set for the top 20% students.
- **Zhejiang Provincial Government Scholarship** *Oct. 2022*
  - Only 3% of the students were awarded.

SKILLS

- **English Proficiency**
  Toefl 107 (Reading 30, Listening 29, Speaking 23, Writing 25).
- **Programming Skills**
  Python, C/C++, PyTorch, Java, HTML, CSS, Javascript.