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 **120** previously unknown bugs in different open-source projects, including Apache Druid and Netty, as well as **63** 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 University of Illinois Urbana-Champaign (UIUC), advised by Prof. Lingming Zhang.
  - Utilized Large Language Models (LLMs) for static analysis of the Linux Kernel and have already detected **63** previously unknown bugs. **48** of them were independently discovered and reported by me.
  - Led the pipeline design and implementation. Built a pipeline which could learn from the patch and generate a static analyzer to detect similar bugs in the Linux Kernel.
  - Applied the pipeline in bug hunting. Led the experiments such as comparing with state-of-the-art static analyzers and ablation studies. Assisted in paper writing.
  - The paper is expected to be published in January and will be submitted to one of the top four Security conferences 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 independently discovered and reported **63** previously unknown bugs.
- The paper has been submitted to one of the top four Software Engineering conferences for review.

- **SRTP, Zhejiang University** *Oct. 2023 - Apr. 2024*
  Research Assistant Hangzhou, China
  - Student Research Training Project (SRTP) at 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.

PROFESSIONAL EXPERIENCE

- **Tencent CDG** *Jul. 2024 - Sept. 2024*
  Software Testing Engineer Intern 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 LLMs (including both standard and multi-modal models) 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.