Jie Hu

Univerisity of California Riverside

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Research Interest

Computer System Security, Dynamic Program Analysis, Vulnerability Detection, Deep Learning, Software Engineering.

Education

Ph.D. in Computer Science *09/2017-09/2024(Expected)*
University of California Riverside (UCR), CA, USA
Advisor: Prof. Heng Yin

B.E. in Computer Science *09/2013-06/2017*
Huazhong University of Science and Technology, Wuhan, China

Professional Experience

Graduate Student Researcher **UCR** *09/2017 - Present*

LLM-Based Solutions for Path Divergence in Concolic Execution

- Tackling path divergence, an open challenge in concolic execution, via a novel LLM-based approach.

Augmenting Greybox Fuzzing with Generative AI

- Designed three research questions to drive a systematic study on LLMs' fuzzing capabilities, and present our findings.
- Provide guidance on how to build an effective LLM-based greybox fuzzer that is not limited to existing LLMs but also considers future LLMs.

Marco: A Stochastic Asynchronous Concolic Explorer

- Evaluated the state-of-the-art branch-flipping policy and reveal several important yet unreported limitations.
- Proposed a stochastic and asynchronous branch scheduling algorithm that is able to effectively pick the most promising branch for new input generation.

Security Research Intern **Baidu X-Lab, USA** *07/2020 - 12/2020*

- Conducted research for developing techniques to improve the effectiveness and efficiency of concolic executor which is a commonly used method for program analysis.

Software Engineer Intern **MoboTap(Wuhan) Inc.** *08/2016 - 05/2017*

- Focused on the applications of convolutional neural network (CNN) model on image analysis.

Publication

- (**In Progress**) **Jie Hu**, Heng Yin, LLM-Based Solutions for Path Divergence in Concolic Execution.
- (**Under Submission**) **Jie Hu**, Heng Yin, How Well can LLMs Generate Fuzzing Inputs?
- (**USENIX'24**) Zhenxiao Qi, **Jie Hu**, Zhaoqi Xiao, and Heng Yin, SymFit: Making the Common (Concrete) Case Fast for Binary-Code Concolic Execution, to appear in the 33rd USENIX Security Symposium, August 2024.
- (**ICSE'24**) **Jie Hu**, Yue Duan, and Heng Yin, Marco: A Stochastic and Asynchronous Concolic Explorer, to appear in the 46th International Conference on Software Engineering, April 2024.
- (**RAID'19**) Yue Duan, Lian Gao, **Jie Hu**, and Heng Yin, Automatic Generation of Non-intrusive Updates for Third-Party Libraries in Android Applications, in the 22nd International Symposium on Research in Attacks, Intrusions and Defenses, September 2019.

Skills & Other

Languages: C/C++, Python
Program Analysis Tools: AFL/AFL++, QSYM, SymSan, Marco

Honors & Awards

- 2024 UCR GSA Conference Travel Grant
- 2024 Outstanding Teaching Assistant in CSE Department
- 2022 CCS Student Travel Grant
- 2017 Dean's Distinguished Fellowship, UC Riverside

Professional Service

Journal Reviewer

- TDSC 2022, 2024
- PeerJ Computer Science

External Conference Reviewer

- S&P 2021, 2022, 2024, 2025
- RAID 2023
- DIMVA 2019
- USENIX 2021, 2022
- AsiaCCS 2019, 2020