TAO LV (吕涛)

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EDUCATION

University of Chinese Academy of Sciences, Beijing, China ..... September 2018 - June 2021
M.S. in Cyber Security, State Key Laboratory of Information Security GPA: 3.83/4.00
Advisor: Kai Chen.

Huazhong University of Science and Technology, Wuhan, China ..... September 2014 - June 2018
B.E. in Information Security, School of Computer of Science and Technology GPA: 87.93/100.00

RESEARCH INTERESTS

I am broadly interested in operating systems, software engineering and computer security at all layers (e.g., software, system and hardware security). Recently, I focus on vulnerability discovery, including fuzzing and static analysis.

PUBLICATIONS

[1] **RTFM! Automatic Assumption Discovery and Verification Derivation from Library Document for API Misuse Detection.** Tao Lv, Ruishi Li, Yi Yang, Kai Chen, Xiaojing Liao, XiaoFeng Wang, Peiwei Hu and Luyi Xing.
In *Proceedings of the ACM Conference on Computer and Communications Security (**CCS**)*, November, 2020.
> This research utilizes sentimental analysis to recover APIs' integration assumptions (IAs) from documentation and translates them to verification code for a compliance check on the softwares integrating these IAs. We implemented this design and evaluated it on 5 popular libraries (OpenSSL, SQLite, libpcap, libdbus and libxml2) and 39 real-world applications. 193 API misuses were detected at the end.

[2] **FuzzGuard: Filtering out Unreachable Inputs in Directed Grey-box Fuzzing through Deep Learning**
Peiyuan Zong, Tao Lv, Dawei Wang, Zizhuang Deng, Ruigang Liang and Kai Chen.
In *Proceedings of the USENIX Security Symposium (**Security**)*, August, 2020.
> To predict the reachability of testcases before executing, helping directed grey-box fuzzing filtering the unreachable ones to boost the performance of fuzzing, we propose step-forwarding and representative data selection approach to solve the challenge: lacking of balanced, labeled and representative data. Evaluations on 45 real vulnerabilities show that our approach boosts the efficiency of the state-of-the-art AFLGo up to 17x.

PROJECT EXPERIENCES

Software Clone Detection ..... September 2018 - December 2018
- Implement the CFG-3D clone detection methods on the Windows and Linux platform.
- Run on hundreds of softwares to construct a feature database.
- Contribute 2K+ lines of C/C++ code.

Malware's Behaviors Display Based on the Analysis of Continuous Dumped Memory . April 2017 - July 2017
- Run malwares in Qemu and then dump the memory continuously.
- Extract process information from the dumped memory through the tool Volatility.
- Display the information through D3.js webpages.

INTERNSHIP EXPERIENCES

NSFOCUS, Xi'an, China ..... July 2018 - August 2018
- Security Service Engineer: vulnerability exploit training for China Mobile and China Unicom.

PROFESSIONAL SKILLS

Vulnerability discovery: Proficient in fuzzing and static analysis (e.g., CodeQL).

Program analysis techniques: Taint analysis, symbolic execution, software reversing and writing LLVM Pass.

Natural language processing: Preliminary in sentiment analysis, dependency parsing, word embedding, Part-of-speech tagging and shallow parsing.

Programming language: Proficient in C, Python and x86_64 assembly language.

HONORS AND AWARDS

National Scholarship, China Ministry of Education (Top 2%, 10/500)	2020
Merit Student, University of Chinese Academy of Sciences (Top 15%, 76/500)	2020
Outstanding Graduates, Huazhong University of Science and Technology	2018
Merit Student, Huazhong University of Science and Technology (Top 3%, 1/30)	2017
First Class Prize, The 10th National College Student Information Security Contest (15%, 38/246)	2017

REPORTED BUGS

Tcpreplay: Heap Overflow
Apache: Information Leakage
VTK: NULL Dereference
PoDoFo: CVE-2019-10723, Stack Overflow, NULL Dereference, Segmentation Fault, Infinite Loop

LANGUAGE PROFICIENCY

GRE: 320 + 3.0 (Verbal: 155/170; Quantitative: 165/170; Analytical Writing: 3.0/6.0).

REFERRERS

Dr. Kai Chen (Master Advisor)
Professor of Cyber Security
Chinese Academy of Sciences
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Dr. Luyi Xing (Publication co-advisor)
Assistant Professor of Computer Science
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Dr. Xiaojing Liao (Publication co-advisor)
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Dr. Guozhu Meng
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