Yankai Jiang

(+1)773-997-6553 | yankai@u.northwestern.edu | https://lukejyk.github.io/

1915, Maple Avenue, Engelhart Hall, Evanston, IL, USA 60201

EDUCATION

Northwestern University
Evanston, IL

Master of Science in Computer Engineering
Sept. 2021 – Jun. 2023 (expected)

- Relevant Courses: Operating Systems, Low-level Software Development, Machine Learning, Introduction to Networking, Computer Architecture, Advanced System Security, Distributed System.

Xi'an Jiaotong University
Xi'an, China

Bachelor of Engineering in Automation (Youth Program, equivalent to Honors Program)
Aug. 2016 – Jun. 2020

- Honorary Graduate of Qian Xuesen College.

EXPERIENCE

Research Assistant
Evanston, IL

PSEC Lab - Northwestern University
Mar. 2022 – Oct. 2022

- Advisors: Prof. Xinyu Xing, Northwestern University; Prof. Yueqi Chen, University of Colorado Boulder.
- Reproduced 100+ vulnerabilities in QEMU based on proof-of-concepts (PoC) generated from Syzkaller.
- Identified vulnerable objects manually with GDB, compared with the results generated from static analysis tool.
- Found allocation sites, free sites and allocation API & Flag of specific vulnerable objects.
- *"HotBPF: On-demand Isolation of Vulnerable Kernel Objects Before Patches are Available"*, submit to S&P 2023.

Research Assistant
Evanston, IL

Prescience Lab - Northwestern University
Mar. 2022 – Now

- Advisors: Prof. Peter Dinda, Northwestern University.
- Customized runtime libraries and dependence of Parallel Standard ML language (Maple) in the Nautilus kernel.
- Ported Maple to an aerokernel (Nautilus), made Maple generated code compatible with Nautilus kernel.
- Run NAS-MPL benchmark to test the variation of performance of Maple codebase.

Research Assistant
Xi'an, China

Control Theory and Control Engineering Research Institute - Xi'an Jiaotong University
Feb. 2020 – Aug. 2020

- Advisors: Prof. Qingyu Yang, Xi'an Jiaotong University; Prof. Dou An, Xi'an Jiaotong University.
- Bachelor's thesis: *"Research on Privacy Protection Mechanism of Electric Energy Transaction via Blockchain"*.
- Researched on cross-domain privacy protection via blockchain based on undergraduate thesis.
- Deployed a distributed computer system and simulated transaction processes via blockchain.

Research Intern
Singapore

National Cybersecurity R&D Laboratories - National University of Singapore
Jul. 2019 – Aug. 2019

- Advisor: Prof. Ee-Chien Chang, National University of Singapore.
- Simulated Address Resolution Protocol (ARP) attacks in Oracle VM VirtualBox to display security of system.
- Implemented distributed system and SPLUNK platform to simulate ARP attacks for NUS teaching; created 10,000 Linux sessions for system evaluation.
- Designed two attacking scenarios to exploit vulnerability CVE-2017-7494, CVE-2019-12735, CVE-2019-13272.
- Participated in a paper work: *WATSON: Abstracting Behaviors from Audit Logs via Aggregation of Contextual Semantic"(NDSS 2021)*.

Research Assistant
Xi'an, China

Laboratory of Intelligent Network and Network Security - Xi'an Jiaotong University
May 2018 – Apr. 2019

- Advisors: Prof. Pinghui Wang, Xi'an Jiaotong University; Dr. Jing Tao, Xi'an Jiaotong University.
- Created a system for retrieving Packet Capture (PCAP) and conducted software correlation analysis.
- Developed scripts to enable unattended installation for quick system restoration in virtual environments.
- Obtained isolated PCAP in virtual machines with Sniffer (packet analyzer) and Monkey (monkey testing tool).
- Applied Random Walks Algorithm on Directed Graph and analyzed software similarity from PCAP data.

Publications

HotBPF: On-demand Isolation of Vulnerable Kernel Objects Before Patches are Available
*IEEE Symposium on Security and Privacy (**SP**) in submission 2023*

Teaching

CS340 Introduction to Computer Networks	Peer Mentor, Fall 2022
CS340 Introduction to Computer Networks	Peer Mentor, Winter 2023

Course Projects

Supervised Part-of-Speech Tagging based on Hidden Markov Model (HMM) and Viterbi Algorithm
- Used HMM and Viterbi algorithm to conduct supervised training, and achieved 0.966 prediction accuracy.
- Ranked 1st among 45 students in the Machine Learning (MATH525207) course project.

Single Voice Recognition System
- Extracted Mel Frequency Cepstrum Coefficient (MFCC) features with Python from 500 people's voice data.
- Used Dynamic Time Warping (DTW) to classify MFCC features with accuracy of 84.32%, compared to accuracy of machine learning algorithms: KNN (60.13%), CART (58.33%), Bayes (74.21%), and RNN (95.23%).
- Achieved an accuracy of 95.23% based on the voice input of number 0 through 9 in Chinese.

Technical Skills

Programming: Python, C++/C, C#, Java; SQL; MATLAB; Verilog, VHDL; LaTeX, Markdown
OS: Windows, Linux, MacOS
Tools: QEMU, GDB, SPSS, LabVIEW, IDA, Altium Designer