Chi-Wei, Chen

CONTACT

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EDUCATION

National Taiwan University, Taipei, Taiwan
M.S., Electrical Engineering - cybersecurity, July 2022
- gpa : 3.9/4.0

National Tsing Hua University, Hsinchu, Taiwan
B.S., Computer Science, Jun 2019
- major :3.62/4.0

INTERESTS

Security, Hardware Security, Security System

RESEARCH EXPERIENCE

Research Assistant, National Taiwan University 02/2020-07/2022
Department of Electrical Engineering

1. **Adversarial Malware Generation :**
   - Engineered an efficient system for generating adversarial malware, assessed using a comprehensive evaluation framework.
   - Manipulated PE files with the LIEF tool for examination by 68 antivirus engines, and verified malware functionality with the Cuckoo Sandbox.
2. **Hardware Trojan Detection :**
   - Developed a semi-supervised gate-level hardware Trojan detection method, achieving a 99.47% TPR, 99.99% TNR, and 99.99% accuracy.
   - Enhanced detection performance through topology-based location analysis.
3. **Hardware Trojan Insertion :**
   - Designed a flexible insertion framework for hardware Trojans, efficiently reducing SCOAP values to counter SCOAP-based detection.
   - Validated the greedy method's superiority over random approaches in hardware Trojan structure generation to against structure-based detection.
4. **Hardware Trojan Concealment :**
   - Introduced a pioneering method to counter SCOAP-based cluster detection, achieving an average 91% reduction in CC and CO values.
   - Reduced SCOAP values while maintaining an upper bound on payload trigger probability, with an average 33% FPR and 78% FNR in SCOAP-based cluster detection.

- Funded by Institute for Information Industry
- Advisor : Professor Sy-Yen Kuo, IEEE fellow

Research Assistant, National Chengchi University 03/2021-10/2021
College of Communication
- Developed and managed a web crawler program to extract sociological research data from the PTT website.
- Funded by the National Science and Technology Council research program.
- Advisor: Associate Dean Prof. J.-J. Sheu

Research Assistant, Minghsin University of Science and Technology 08/2020-07/2021
Department of Finance
- Developed and managed a decision tree-based system to advance finance research.
- Funded by the National Science and Technology Council research program.
- Advisor: Associate Prof. Ko-Tsung Chu

Research Assistant, Academia Sinica 09/2019-02/2020
Institute of Information Science
- Developed BeDIS positioning system with LBeacon technology.
- Built user application with React and Redux.
- Evolved technology into a startup venture. link

- Advisor: Prof. Jane Liu, IEEE fellow

Summer Intern, Academia Sinica 07/2019-09/2019
Institute of Information Science
- Study areas: quantum theory, algorithms, and cryptography.
- Authored educational materials in Chinese aimed at simplifying and promoting understanding of quantum algorithms. link
- Advisor: Prof. Kai-Min Chung

Undergraduate Research, National Tsing Hua University 02/2018-06/2019
Department of Computer Science
- Created a decentralized electronic ticket system using Hyperledger Fabric, Hyperledger Composer, and MongoDB for data storage.
- Developed the user interface with a React Native mobile app.
- Advisor: Prof. Ren-Song Tsay

TEACHING ASSISTANT

National Taiwan University,Taipei,Taiwan
- Computer Programming, prof. Jiun-Lang Huang, spring 2021
- Machine Learning Foundation, prof. Hsuan-Tien Lin, fall 2021
- Discrete Mathematics, prof. Sy-Yen Kuo, fall 2021

National Tsing Hua University, Hsinchu, Taiwan
- Data Structure, prof. Ren-Song Tsay, fall 2018
- Programming 1&2, prof. Hwann-Tzong Chen, spring 2017

OTHER EXPERIENCE

Assistant Engineers, Kingston 09/2017-03/2018
Mechanical Design Engineering Department
- Led a cross-university focus group, coordinating product testing with 200 students and providing feedback to senior engineers.
- Supported senior engineers by conducting experiments, analyzing data, and maintaining the database.

Summer Intern, Lee And Li Attorneys-at-law 06/2017-09/2018
Patent and Technology Department
- Supported senior lawyers at the largest law firm in Taiwan by reviewing research papers related to customer products and drafting patent documents.

PUBLICATIONS

[1] Wei-Ting Hsu, Pei-Yu Lo, Chi-Wei Chen, and Chin-Wei Tien, Sy-Yen Kuo, "Hardware Trojan Detection Method against Balanced Controllability Trigger Design," IEEE Embedded Systems Letters, 2023. Accepted.

[2] C.-W. Chen, P.-Y. Lo, W.-T. Hsu, C.-W. Chen, C.-W. Tien and S.-Y. Kuo, "A Hardware Trojan Insertion Framework against Gate-Level Netlist Structural Feature-based and SCOAP-based Detection," IEEE 65th International Midwest Symposium on Circuits and Systems (MWSCAS), Fukuoka, Japan, 2022

[3] P.-Y. Lo, C.-W. Chen, W.-T. Hsu, C.-W. Chen, C.-W. Tien and S.-Y. Kuo, "Semi-supervised Trojan Nets Classification Using Anomaly Detection Based on SCOAP Features," IEEE International Symposium on Circuits and Systems (ISCAS), Austin, TX, USA, 2022

UNDER REVIEW

[4] Chi-Wei Chen, Pei-Yu Lo, Chin-Wei Tien, and Sy-Yen Kuo, "A Novel Hardware Trojan Insertion Method against SCOAP-based Cluster Detection Method"