SEOYOUNG KWEON

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EDUCATION

UC San Diego — La Jolla, CA
PhD in Computer Science — Present

Columbia University — New York, NY
MS in Computer Science — May 2024

Columbia University — New York, NY
BS in Computer Science, Software System Track (3.89/4.0) — May 2023

PUBLICATION

[1] **FOX: Coverage-guided Fuzzing as Online Stochastic Control**, Dongdong She, Adam Storek, Yuchong Xie,Seoyoung Kweon, Prashast Srivastava, and Suman Jana, *ACM SIGSAC Conference on Computer and Communications Security* (CCS 24)

[2] **What Makes A Video Radicalizing? Identifying Sources of Influence in QAnon Videos**, Lin Ai, Yu-Wen Chen, Yuwen Yu, **Seoyoung Kweon**, Julia Hirschberg and Sarah Ita Levitan, 2024

POSTER

[2] Unveiling the Influencers of Radical Content: A Multimodal Analysis of QAnon Videos, Lin Ai, Yu-Wen Chen, Yuwen Yu, Seoyoung Kweon, Julia Hirschberg and Sarah Ita Levitan, IC2S2 2023

EXPERIENCE

Columbia University, FOX Fuzzer [1] — New York, NY
Research Assistant — Jan 2023 – May 2024

- Enhance AFL++, the current state-of-art fuzzer (software testing program), with a line search algorithm
- Modify LLVM instrumentation to extract metadata required for the line search and insert a coverage guide into the binary
- Add file locks into LLVM instrumentation to reduce overhead in metadata generation and facilitate scalable multicore compilation
- Curate an evaluation set to ensure comprehensive assessment and reflect real-world program scenarios
- Identify a performance degradation resulting from a faulty implementation during the evaluation and propose a fix, resulting in a 20% improvement in coverage performance
- Participating in the SBFT 2024 competition and is planning to submit result to 2024 USENIX conference

Columbia University, Spoken Language Lab [2] — New York, NY
Research Assistant — Jan 2022 - Dec 2022

- Analyzed multimodal features of 6000+ videos related to domestic politically radical organizations uploaded on media platforms.
- Extracted five facial emotion features and transcripts from a video dataset, and conducted facial emotion & textual sentiment analysis
- Studied video metadata(like/view) to categorize popularity and identify the multimodal features that contribute to a video's likability
- Analyzed the correlation between patterns in metadata (video uploads or comments) and real-life events

ClouZen — Gyeonggi Hwaseong-si, KOR
Summer Internship — May 2021 - Sep 2021

- Developed a complete prototype application with 10+ functionalities to parse and display data for user interaction
- Designed both the frontend and backend of an application and the server, to improve the user interface and data processing efficiency
- Conducted a weekly presentation to report progress on assignments and receive feedback

ACADEMIC PROJECTS

Malware Analysis & Reverse Engineering — New York, NY
September 2023 - Present

- Analyzed the behavior of real-world malware (e.g., WannaCry) using various static and dynamic analysis tools such as IDA, FakeNet, and CFF Explorer
- Unpacked and restored malware packed with various packers and anti-reverse engineering techniques

Programming Language Translator — New York, NY
DABOR [github] — Feb 2023 - Apr 2023

- Led a group of 5 members in designing a new language and compiler using LLVM and OCaml
- Built a scanner and parser for the language to parse code, and developed algorithms for generating AST, SAST, and code execution for 10+ behaviors

- Created a test set with 30+ cases to thoroughly test all implementations and error outputs

Linux Operating System New York, NY
OS Project [github] Sept 2022 - Dec 2022

- Led a group of 3 members and established a communication system for the effective distribution and sharing of work
- Implemented three different lock mechanisms in custom system calls to facilitate concurrent execution of multiple processes
- Built 5+ modules to add system calls, demonstrating an understanding of task_struct and virtual address translation
- Created a simplified round-robin scheduler and file system, replacing the existing ones

TEACHING EXPERIENCE

Columbia University, Teaching Assistant New York, NY
COMS 4181, Security I Sept 2023 – Present

Korean Community Services of Metropolitan New York, Tutor New York, NY
Smartphone Class for Seniors Sept 2023 – Present

Columbia University, Tutor New York, NY
PHYS 1402, Electricity & Magnetism Jan 2023 - May 2023
COMS 4701, Artificial Intelligence Jan 2023 - May 2023
COMS 4118, Operating Systems I Sept 2022 - Dec 2022

LANGUAGE AND IT SKILLS

C, C++, Java, Python, JavaScript, TensorFlow, PostgreSQL, LaTEX, IDA Pro, Docker

HONORS

Dean's List Fall 2020, Spring 2021, Fall 2021, Spring 2023
Cooper Union Half Tuition Scholarship Fall 2019, Spring 2020