Huihui Huang

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Education

Southern University of Science and Technology   Sept. 2020 - Jun. 2024 (*exp.*)
Shenzhen, China

    B.Eng. in Computer Science and Engineering

    Member of ARiSE lab, supervised by Prof. Yuqun Zhang

    GPA: 89.12/100

    Major Courses: Software Engineering(96), Computer Security(93), Operating Systems(99), Computer Networks(94), Principles of Database Systems(98), Digital Logic(97)

National University of Singapore   Aug. 2023 - Present
Singapore

    Visiting Student in School of Computing

    Member of PLSE lab, supervised by Prof. Umang Mathur

Publications

[**ICSE'2024**] Ling Jiang, Junwen An, **Huihui Huang**, Qiyi Tang, Sen Nie, Shi Wu, and Yuqun Zhang. "BinaryAI: Binary Software Composition Analysis via Intelligent Binary Source Code Matching."
Proceedings of the 46th International Conference on Software Engineering. **Status: Under Review**

Academic Experience

Translating Concurrent C Programs to Safe Rust   **Aug. 2023 - Present**
Keywords: Rust, C, Automatic Translation, Concurrent Program, Memory-Safety   *PLSE lab, NUS*

○ Evaluated the C2Rust tool and studied Equality Saturation methodology.

○ Manually translated concurrent C programs into safe Rust programs and conducted an in-depth analysis of the underlying principles.

○ Intending to develop an automatic tool that can translate concurrent C programs into equivalent safe Rust programs.

An Extensive Study on Software Composition Analysis (SCA)   **Sept. 2022 - Aug. 2023**
Keywords: Binary-to-Source SCA, Software Security, AI4SE, Semantic Extraction   *ARiSE lab, SUSTech*

○ Collected a substantial dataset of binary-to-source function pairs and labeled reused third-party libraries within open-source software projects.

○ Realized a Transformer-based model to retrieve similar source functions and utilized link-time locality to augment function-matching precision, in cooperation with Tencent Keen Lab

○ Wrote up an academic paper that has been submitted to the ICSE'24 conference.

Binary Code Diffing via Network Alignment   **Feb. 2023 - Jun. 2023**
Keywords: Binary Similarity Detection, Network Alignment, AI4SE, Disassembly   *ARiSE lab, SUSTech*

○ Studied state-of-the-art binary similarity detection techniques(DeepBinDiff and jTrans) and famous open-source binary diffing tools(Diaphora and BinPro).

○ Collected baseline binary datasets containing 5 binaries(e.g. objdump) and a total of 18 different versions, and evaluated the above tools.

○ Designed a seed-and-extend graph matching algorithm paired with Bert-based binary similarity detection technique, resulting in 12% performance increase than DeepBinDiff, the SOTA binary diffing technique.

Selected Projects

School forum website
Techniques: Spring Boot, PostgreSQL, JMeter, Huawei Cloud, Docker Hub   *Feb. 2023 - Jun. 2023*

- A full-stack forum website with several features, including anonymous mode and AI integration for post recommendation and toxic detection.
- Responsible for back-end, including the implementation, testing, and deployment of the web server.
- Project result: displayed at the software engineering lecture as full score representative, and is currently being further optimized and promoted.

Lisp Interpreter in Java

Realizations: Function, Closure, Lambda Operator, Lazy Evaluation   *Jun. 2022 - Sept. 2022*

- Implemented a Lisp interpreter using the Java programming language.
- Accomplished the previously mentioned functionalities.

Single-cycle CPU Supporting Simple MIPS Instructions

Tools: Vivado, Minisys, Assembler, Mars, Uart Tools   *Feb. 2022 - Jun. 2022*

- Developed a single-cycle central processing unit (CPU) using Verilog code, which is operational on the Minisys Development Board.
- Programmed and executed MIPS instructions on the CPU to realize simple scenarios.

Teaching Experience

- Teaching Assistant of Computer Organization Principle   *Feb. 2023 - Jun. 2023*
- Teaching Assistant of Introduction to Java Programming   *Sept. 2022 - Jan. 2023*

Selected Awards

- Honorable Mention in Mathematical Contest in Modeling (Top 20%)   Feb.2023
- The Second Class Scholarship of the University (Top 15%)   Nov. 2021 & Nov. 2022
- Bronze Award of Huawei Kunpeng Innovation Application Competition   Nov.2022
- Outstanding Student Leaders of the University (Top 5%)   Sept.2022

Skills

- Programming Languages: Java, Rust, Python, C/C++, SQL, JavaScript, Verilog, MIPS, OCaml
- Frameworks: Spring Boot, MyBatis, JUnit, Node.js, Vue.js
- Developer Tools: GitHub, Visual Studio Code, PyCharm, IntelliJ IDEA, CLion
- Language Proficiency: Chinese - native, English - fluent (IELTS: 7)