Yilin Zhu

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EDUCATION

Huazhong University of Science and Technology   **Wuhan, China**
Bachelor of Science   *Sep. 2021 - Jun. 2025(Expected)*
- **Major:** Articifial Intelligence
- **GPA:** 4.20/5.00 (87.1/100)
- **TOEFL:** 97/120

University of California, Riverside-Extension   **Riverside, CA, USA**
Graduate Preparation Program, Computer Science   *Sep. 2024 - Jun. 2025(Expected)*
- **Major:** Computer Science

SKILLS & INTERESTS

Programming Languages: C, Python, C++, Rust, Go, LaTeX
System Security Libraries: LLVM, SVF, Syzkaller, Pwndbg, Qemu
ML & DL Libraries: Pytorch, Keras, TensorRT
Research Interests: LLM/DL/ML for Security and Resilience of Large Scale Software System

RESEARCH EXPERIENCE

Compartmentalization and Privilege Management
University of California, Riverside   *May. 2024 - Sep. 2024*
- Analyzed alias analysis results from Linux kernel test cases, identified inconsistencies in the generated access control rules, and diagnosed underlying faults. Debugged the alias analysis tool, ensuring accurate generation of access rules for kernel compartments.
- Researched heap object allocators in the context of privilege management from academic literature and integrated them into the analysis tool to identify heap object aliases.
- Identified limitations in the existing compilation method for generating LLVM IR for the entire Linux kernel. Developed a specialized tool to compile the kernel into LLVM IR.

Research Project in Image Matting
Stereo Matching And leaRning Technologies, HUST.   *Nov. 2022 - May. 2023*
- Enhanced existing implementations of various image matting models to streamline comparisons of augmentation techniques, backbone architectures, and loss functions.
- Conducted an in-depth literature review to understand state-of-the-art (SOTA) models in image matting, gaining insights into current trends and methodologies.
- Designed and executed experiments to evaluate the performance of different models, analyzing the effectiveness of the techniques they employ.
- Selected and labeled images for a new dataset, ensuring high-quality annotations to support model training and evaluation.

PROJECTS

AIxCC
University of Colorado Boulder   *Jan. 2024 - Mar. 2024*
- Compiled CodeQL databases for over 50 CVEs by analyzing the build processes of target codebases. Investigated build processes to identify and compile only the relevant code files for large-scale software projects, such as the Linux kernel, optimizing database generation.
- Developed custom CodeQL queries to verify that CVE vulnerabilities were successfully captured in the compiled databases, ensuring the reliability of subsequent analyses.

Intelligence+ Track in College Students Engineering and Innovation Competition
Science & Technology Innovation Center, HUST. *Feb. 2022 - March. 2023*

- Annotated a dataset for classification of particular objects to train YoloV5 model.
- Fine-tuned a pretrained YOLOv5 model to optimize its performance for detecting and classifying the target objects.
- Deployed the optimized model on an NVIDIA Jetson Nano and enhanced its inference speed by integrating TensorRT for hardware acceleration.
- Designed and implemented a GPIO-based program to transmit control signals to a microcontroller, enabling seamless interaction with a mechanical system.

SELECTED COURSE PROJECTS

Compiler Design Course Lab
University of California, Riverside *Sep. 2024 - Nov. 2024*

- Developed a compiler for a custom language in **Rust** from scratch, implementing a lexer, parser, and code generator for the language.

Pattern Recognition Course Project
Huazhong University of Science and Technology *May. 2024 - Jun. 2024*

- Reproduced the FairMOT model for multi-object tracking, adapting it to a custom dataset for effective performance analysis.
- Analyzed and debugged a GNN-based multi-object tracking model, studying the corresponding research paper to understand its architecture and methodology.
- Evaluated and compared the performance of end-to-end models like FairMOT against multi-stage pipelines such as YOLOv8 integrated with various trackers, using the custom dataset.

ASU CSE 466 & 494: Computer System Security
Online course *Oct. 2023 - Feb. 2024*

- Exploited basic vulnerabilities like stack and heap memory errors, sandbox escaping, race conditions, etc. in CTF (Capture The Flag) environment.

MIT 6.S081 2021: Operating System Engineering
Online course *Sep. 2023 - Dec. 2023*

- Implemented OS features like copy-on-write, lazy allocation, sigalarm, multithreading, etc. in XV6, a simplified Unix-like teaching OS.
- Implemented system calls like mmap, sleep, ping-pong, pgaccess, etc. in XV6.
- Implemented utilities like find, xargs, system call tracing, e1000 driver etc. in XV6.

Electronic & Electrical Engineering Course Design
Science & Technology Innovation Center, HUST. *Mar. 2022 - Mar. 2022*

- Designed and built the circuitry for a self-balancing dual-wheel vehicle, including selecting and integrating appropriate sensors.
- Developed the vehicle's control system using an STM32 microcontroller and additional sensors, ensuring stable and responsive operation.

C Programming Language Course Project
Huazhong University of Science and Technology *Jan. 2022 - May. 2022*

- Developed user interfaces using DOS API within the **DOSBox** emulator, creating an intuitive interaction layer.
- Implemented the A* algorithm for efficient pathfinding between points on a rasterized map.
- Developed a dynamic programming algorithm to address the Traveling Salesman Problem in given scenario.

AWARDS & SCHOLARSHIPS

Awards
- First Prize: Smart Car Competition of Huazhong University of Science and Technology — Dec. 2021
- Second Prize in Hubei Province: Contemporary Undergraduate Mathematical Contest in Modeling — Dec. 2023
- Meritorious Winner: Mathematical Contest in Modeling — Apr. 2024

Scholarships
- 2021-2022 Freshman Self-improvement Scholarship — Apr. 2022
- 2021-2022 Academic Progress Scholarship — Oct. 2022