

Li Zhong

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Education

University of California, San Diego (UCSD) Sept 2019 - June 2024 (*expected*)

PhD Candidacy in Computer Science Advisor: Yuanyuan Zhou

Thesis Topic: Detecting Bugs by Identifying Developers' Blind Spots

University of Science and Technology of China (USTC) Sept 2015 - June 2019

Bachelor in Computer Science Class for the Gifted Young

Publication

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1. Effective Bug Detection with Unused Definitions. [[paper](#)][[code](#)]
Li Zhong, Chengcheng Xiang, Haochen Huang, Yuanyuan Zhou. (**EuroSys'24**)
Selected Patch to Linux Kernel: [[patch1](#)] [[patch2](#)][[patch3](#)][[patch4](#)][[patch5](#)]
 2. Can We Trust LLMs in Software Development? A Study on Robustness and Reliability of LLM-Generated Code. [[paper](#)][[code](#)]
Li Zhong, Zilong Wang. (**AAAI'24**)
 3. Protecting Data Integrity of Web Applications with Database Constraints Inferred from Application Code. [[paper](#)][[code](#)]
Haochen Huang, Bingyu Shen, **Li Zhong**, Yuanyuan Zhou. (**ASPLOS'23**)
 4. PYLIVE: On-the-Fly Code Change for Python-based Online Services. [[paper](#)][[code](#)]
Haochen Huang*, Chengcheng Xiang*, **Li Zhong**, Yuanyuan Zhou. (**ATC'21**)
 5. Detecting risky access-control changes with automatic configuration testing. (Under Submission to **S&P'24**)
 6. ACSym: Detecting Access Control Change with Symbolic Execution. (Under Submission to **SOSP'24**)
 7. Detect Vulnerabilities in Web Services by Code Mutation. (Under Submission to **ASPLOS'24**)

Industry Experience

Large Language Model Inference Weight Update on Neural Engine (Apple)

Host: Cecile Foret, Co-host: Zheng Li

June 2023 - Sept 2023

- Support inference weight update for LoRA in LLMs.
- Optimize the runtime overhead for weight update
- Support compressed linear layers in transformers.

Value Profiling Driven Memory Operation Optimization (Meta)

Host: Hongtao Yu, Co-host: Wenlei He, Lei Wang

June 2022 - Sept 2022

- Extend LLVM infrastructure to parse Linux perf traces
- Profile C++ workload value characteristics on workload Clang-10 and HHVM
- Modify memcpy lowering pass in LLVM based on value profiling results.

Call Arg Profiling Driven Code Specialization (Google)

Host: Snehasish Kumar, Co-host: Sotiris Apostolakis

June 2021 - Sept 2021

- Develop an LLVM pass to instrument C++ programs for arguments profiling
- Replace the heuristic in current function specialization pass of LLVM
- Improve the function specialization pass in LLVM with profile results.

Reduce runtime instruction count on the Transcoder benchmarks up to 5%.

Dynamic Self-tuning Optimizer (Microsoft Research Asia)

Host: Youshan Miao

Nov 2018 - May 2019

- Investigate different optimizers in machine learning
- Come up with a novel SGD optimizer using adaptive learning rate and prove its convergence
- Achieve a better performance over the Adam optimizer

Research Experience

Erasing Harmful Contents from Stable Diffusion Models (UCSD)

Advisor: Rose Yu

Sep 2023 - Now

- Propose an external classifier-based method to erase concepts
- Fine tune stable diffusion models to control content generations in PyTorch
- Achieve a better erasure while preventing interference with other concepts.

Self-Guided Debug in Large Language Models (UCSD)

Advisor: Jingbo Shang

Oct 2023 - Now

- Propose an automated debug technique for large language models
- Achieve state-of-the-art performance (95.1%) in the HumanEval dataset
- Apply chain-of-thought to build an agent for using external debugging tools.

Detecting Missing Constraints in Database from Web App Code (UCSD)

Advisor: Yuanyuan Zhou

Sep 2021 - June 2022

- Summarize code patterns with implicit assumptions on data integrity
- Static analysis on Django apps based on AST
- Detect 210 missing constraints in popular Django apps

Detect Unused Definition to Expose Bugs in System (UCSD)

Advisor: Yuanyuan Zhou

Aug 2020 - May 2021

- Develop an inter-procedural analysis LLVM tool to detect 'unused' values
- Prune false positives based on cross-scope features and SMT solvers
- Detect 40 existing bugs and 213 new bugs in MySQL, Linux, NFS-ganesha, etc.

Python Framework for Dynamic Code Change (UCSD)

Advisor: Yuanyuan Zhou

Sep 2019 - May 2020

- Develop a framework for dynamic code change for Python-based services
- Take advantage of meta-object protocol, dynamic typing to make it flexible
- Implement light-weight mechanism for byte code manipulation on Python

KV Database on Open-channel SSD (UIUC)

Advisor: Jian Huang

July 2018 - Oct 2018

- Profile the I/O amplification of popular key-value stores
- Combine Cuckoo filter with software-defined FTL
- Optimize the implementation based on LevelDB

Professional Service

EuroSys'22 Shadow PC

NeurIPS 2022 Workshop MetaLearn Reviewer

PAKDD'23, IEEE Internet of Things, IEEE Transactions on Wireless Communications Reviewer