Yannan Li

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EDUCATION

Ph.D., Computer Science *2018 - 2023*
University of Southern California (USC)

B.E., Computer Science *2013 - 2017*
University of Science and Technology of China (USTC)

Relevant Coursework: Advanced Algorithm, Advanced Program Analysis and Verification, Computer-Aided Verification, Formal Method for Robotics, Quantitative Information Flow and Side Channels, Compilers, Data Structure, Operating Systems, Computer Architecture, Computer Network, Computer Organization, Parallel Computing, Introduction to Artificial Intelligence, etc.

WORKING EXPERIENCE

[Google Intern] Exploring a New Recognition Feature for Nest Cameras *May-Aug 2022*
- Explored various machine learning (ML) algorithms
- Built a prototype to demonstrated the feasibility
- Contributed a new algorithm to production code
- Significantly optimized code speed with a new data structure

RESEARCH EXPERIENCE

Vertifying/Falsifying the Robustness of KNNs against Data-Poisoning Attacks *2019 - 2021*
- Proposed a method for soundly over-approximating the KNN behaviors during both parameter tuning and prediction phases under data-poisoning attacks
- Used SAT-solver-based method to detect data-poisoning vulnerability
- Developed optimizations to prune the search space without losing accuracy
- Achieved high accuracy and high efficiency on both small and large datasets

Applying Static Analysis for Constraint-Based Precomputation using LLVM *2018 - 2019*
- Developed sound static analysis techiques on LLVM bitcode to identify precomputation opportunities
- Used an SMT-solver-based method to optimize the precomputation policy
- Applied a semantic-preserving transformation to automatically generate optimized LLVM bitcode
- Added a number of enhancements to LLVM compiler for implementing our method

Privacy-Preserving Image Trading through Crowdsourcing *2016 - 2017*
- Led a five-member team
- Designed a privacy-aware crowdsourcing-based image trading system
- Designed an image selection algorithm, which first uses a pre-trained CNN model to extract embedding features, then uses an autoencoder to reduce feature dimensions, and uses clustering to select images
- Optimized computation and communication overhead in both servers and clients sides

Optimizing HPC Applications *2016*
- Optimized two classical scientific softwares (Lammps and Splotch) on a ten-node cluster with 3000W power constraint. Ranked 4th in the Final of 2016 International Student Cluster Competition (ISC)
- Implemented and optimized a two-path shortest algorithm on a CPU/GPU heterogeneous platform

SELECTED COURSE PROJECT

Schedule Multi-Robot Systems using Sound Deadlock Detection *Jan-May 2021*
- Personal project of 'Formal Methods for Robotics', advised by Prof. Jyotirmoy V. Deshmukh
- Designed a scheduling algorithm with reduced computation cost and increased robot utilization
- Applied the latest sound deadlock prediction method for coordination efficiency and effectiveness

Game: Cooking Journey *Aug-Dec 2019*
- Wrote a game, Cooking Journey, combing both cooking and racing games using Unity
- Team Project of 'Advanced Mobile Devices and Game'
- Collaborated with other three students Using Bitbucket
- Invited by Prof. Mike Zyda to attend USC Games Showcase

Implemented a MIPS-Based CPU on FPGA *2015*
- Personal project of 'Computer Organization'
- Implemented a verified five-stage pipeline MIPS-based CPU on the FPGA using Verilog HDL

TEACHING EXPERIENCE

Teaching Assistant of CSCI310: Software Engineering *Spring 2022, Fall 2022*
- Taught students to use Java, JUnit, Cucumber, Ant, GitHub, Android Studio, Firestore database
- Mentored students to build Android games and a booking application

PUBLICATION

1. Proving Robustness of KNNs Against Adversarial Data Poisoning
Yannan Li, Jingbo Wang, Chao Wang
22nd International Conference on Formal Methods in Computer-Aided Design (**FMCAD 2022**)

2. Falsifying the Robustness of KNNs under Data-Poisoning Attacks
Yannan Li, Jingbo Wang, Chao Wang (Under Submission)

3. Constraint-Based Analysis for Energy Optimization via Precomputation
Yannan Li, Chao Wang (Under Submission)

4. Synthesizing Fair Decision Tree Learning via Iterative Constraint Solving
Jingbo Wang, **Yannan Li**, Chao Wang
34th International Conference on Computer Aided Verification (**CAV 2022**)

5. CrowdBuy: Privacy-friendly Image Dataset Purchasing via Crowdsourcing
Lan Zhang, **Yannan Li**, Xiang Xiao, Xiang-Yang Li, Junjun Wang, Anxin Zhou, Qiang Li
37th IEEE International Conference on Computer Communications (**INFOCOM 2018**)

TECHNICAL SKILLS

Programming Languages	C, C++, Python, TensorFlow, Java, Shell, Verilog HDL, HTML
Compilers	LLVM, Java Soot (Static Analysis, Program Transformation)
Verification/Synthesis	Z3 (SAT/SMT Solver), SyGus (Program Synthesis)
Miscellaneous	Android Studio, JUnit, Cucumber, Unity (Game Engine)