Yannan Li

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EDUCATION

Ph.D., Computer Science *2018 - 2023*
University of Southern California (USC)
GPA: 3.78/4.0

B.E., Computer Science *2013 - 2017*
University of Science and Technology of China (USTC)
GPA: 3.84/4.3 Rank: 7/109

Relevant Coursework: Advanced Algorithm, Advanced Program Analysis and Verfication, Formal Method for Robotics, Data Structure, Operating Systems, Computer Architecture, Computer Network, Computer Organization, Compilers, Parallel Computing, Introduction to Artificial Intelligence

WORKING EXPERIENCE

[Google Intern] Explored a new feature for Google Nest Cameras *May - Aug 2022*
- Designed, implemented, tested, tuned different machine learning (ML) algorithms
- Demonstrated the feasibility of this new feature via experiment results and clear demonstrations
- Contributed a new algorithm to the launched feature familiar face alert) for nest cameras
- Actively discovered and solved groudtruth mislabeling problem during the exploration
- Rapidly optimized code efficiency using a new data structure

RESEARCH EXPERIENCE

Certifying/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 while maintaining accuracy
- Experiments show the high accuracy and high efficiency of our methods on both small and large datasets

Constraint-Based Precomputation on Energy-Harvesting Devices *2018 - 2019*
- Developed a sound static analysis to identify precomputation opportunities
- Used an SMT solver based method to optimize the precomputation policy
- Applied a semantic-preserving transformation to generate the optimized program
- Implemented our method in the LLVM compiler

Privacy-Preserving Image Trading through Crowdsourcing *2016 - 2017*
- Led a five-member team
- Designed a privacy-aware image trading system based on crowdsourcing
- Designed an image selection method, 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
- Minimized computation and communication overhead in both servers and clients sides

Optimized Distributed 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 2-path Shortest Algorithm on 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 newest 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 *2022*
- Helped students get familiar with Java, JUnit, Cucumber, Ant, GitHub, Android Studio
- Helped students to implement a mini-piano using Android Studio
- Helped students to implement and test a reservation application using Android Studio, Firestore database, JUnit, Cucumber

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
Compile	LLVM, Java Soot (Static Analysis, Program Transformation)
Verification/Synthesis	Z3 (SAT/SMT Solver), SyGus (Program Synthesis)
Others	Android Studio, JUnit, Cucumber, Unity (Game Engine)