
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 Verification, 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 groundtruth 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, combining 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

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)
Game Engine	Unity