YOU LI

(+1)224-714-8656 ⋄ you.li@u.northwestern.edu
1720 Oak Ave. Apt. 403
Evanston, IL, 60201

OBJECTIVE

To find a PhD intern position.

EDUCATION

Northwestern University *September, 2016 - Present*
Ph.D. in Computer Engineering (Advisor: Prof. Hai Zhou)

Shanghai Jiao Tong University *September 2012 - August 2016*
Bachelor of Science and Engineering, Electrical and Computer Engineering

INTERNSHIP

Synopsys, Inc. Mountain View, CA. *June, 2017 - September, 2017*
Worked as a R&D intern in Verification Group. Created new features on top of Synopsys VCS, a synthesis/simulation/verification tool for Integrated Circuits. My main contributions include the implementation in *C++* of a set of handy routines, which can effectively determine the reachability of wires in sequential circuit designs.

PROJECTS

Formal Verification and Vulnerability Detection of LTE/5G Protocols
This project aims at detecting vulnerabilities in 3GPP protocols. Protocols are manually converted in to Finite State Machines, and then checked using model checkers include NuSMV and TLA+. Potential vulnerabilities are then verified on testbed.

Software Model Checking in Large Scale
A way to bypass manual specification is to launch formal verification on software implementations. In this work, we deal with cellular network emulators with over 1 million lines of code in C++. Technical challenges include control flow extraction, pointer analysis, model composition, and code slicing. The resulting model is then verified on CPAChecker platform with symbolic execution and counter example guided abstraction refinement.

Hardware Logic Encryption
The purpose of this project is to thwart Intellectual Property theft to Integrated Circuit designs. Our approach adds additional gates and functional units protected by key bits to the original design. It resists both SAT-based attack and layout analysis attack.

Global Robustness Verification on Neural Networks
Neural networks are prone to adversarial attacks. We extend existing works of local robustness verification to global robustness. Specifically, we verify a Bayesian generator together with the targeted neural network with bound arithmetic and abstract interpretation.

Determination of Safe Configuration Space with Model Checking
A complicated system can have multiple asynchronous components interacting to each other. In designing such a system, the designer may want to know the boundaries in the configuration space that make the system secure and reliable. We employ counter example driven inductive generalization and improved IC3 algorithm to determine the safe configuration space.

Pseudo-random Committee Selection Algorithm
This project targets the security of Proof of Stake consensus protocols of Block chain. It combines SHA and Goldreich's pseudo-random generator, so that it can select a voting committee which is mathematically proven to be unpredictable from former execution, and indistinguishable from random sequence. My implementation in *GOLANG* is adopted by block chain projects initiated by listed companies.

Accelerate the Convergence of IC3 model checking Algorithm
IC3 is the state of the art algorithm in infinite state model checking. We review heuristics used in IC3 and propose new ones, in order that the algorithm can converge faster on common benchmarks.

TECHNICAL STRENGTHS

Languages	C/C++, Python, Golang
Courses in Computer Science	Algorithms, Data Structures, Operating Systems, Compilers, Computer Networks, Parallel Computing, CUDA programming, Deep Learning, Theoretical Machine Learning, Cryptography