Jianlin Li

@lijianlin   BBoZG7gAAAAJ   @ljlin
ljlin.github.io   lijianlin1995@gmail.com

EDUCATION

JOINT MASTER'S PROGRAM

SAARLAND UNIVERSITY
Master in Computer Science
Advisor: Holger Hermanns|Grade: 1.3
Oct. 2019 - present | Saarbruecken

UNIVERSITY OF CHINESE ACADEMY OF SCIENCES
Master in Computer Science
Advisor: Lijun Zhang | GPA: 3.88/4.0
Sep. 2018 - present | Beijing

NANJING UNIVERSITY OF AERONAUTICS AND ASTRONAUTICS
Bachelor of Computer Science
Advisor: Zhe Chen
GPA: 4.3/5.0 | Ranking: No.1 / 102
Jun. 2018 | Nanjing, China

COURSEWORK

COURSE PROJECTS

• Generalized Minsky machine halting $\preccurlyeq_m$ 2 counter machine halting in Coq.
• C(resp. Java)interprocedural points-to analysis in LLVM(resp. Soot).
• xv6 programming projects for OS.
• 5 stage pipelined MIPS-32 processor.

SKILLS

PROGRAMMING SKILLS

C++ • Java • LATEX • Shell • Python
For Developing Mobile Apps:
iOS • Objective-C • Swift
For Course Projects:
Coq • LLVM • Soot • Verilog •
MIPS Assembly • Tensorflow
Generally Interested in:
OCaml • Haskell • Scala

PERSONAL

• I shoot landscapes, street photography, and portraits of friends in my spare time.
• I often offer help in academic events as a photojournalist at work.
• Gallery: https://500px.com/p/vcg-ljlin.

HIGHLIGHTS

• Self-motivated 3rd-year MSc student in computer science with strong research experience in abstract interpretation [1,2], probabilistic model checking [3], linear temporal logic, and ω-regular languages [4].

• Solid background in computer science; ranked first in the class of 102 students; enrolled in the double degree program in computer science at the University of Chinese Academy of Sciences and Saarland University.

• Research assistant at the Institute of Software, Chinese Academy of Sciences and Sino-Europe Institute of Dependable and Smart Software.

• Good academic writing and presentation skills. Served as a student volunteer at CONCUR'18, SSFM'18, SSFM'19, and LICS'20, as a subviewer at LICS'18, TASE'19, FM'19, FMAC'19, and TACAS'21.

RESEARCH INTERESTS

• Code-Level Verification of Real-World Software,
  – Certified system software (OS Kernel, Smart Contract, etc.),
  – Correctness of compilation,
• Interactive Theorem proving (Coq,Iris, Proof Engineering),
• Theory and Logic,
  – Type theory (dependant types, semantic typing, logical relations),
  – Concurrent separation logic and incorrectness logic,
  – Process calculus, bisimulations and coinduction,

PUBLICATIONS

[1] **Jianlin Li**, Jiangchao Liu, Pengfei Yang, Liqian Chen, Xiaowei Huang, and Lijun Zhang. Analyzing deep neural networks with symbolic propagation: Towards higher precision and faster verification. In *Static Analysis - 26th International Symposium, SAS 2019, Porto, Portugal, October 8-11, 2019, Proceedings*, volume 11822, pages 296–319, 2019.

[2] Renjue Li, **Jianlin Li**, Cheng-Chao Huang, Pengfei Yang, Xiaowei Huang, Lijun Zhang, Bai Xue, and Holger Hermanns. PROdeep: a platform for robustness verification of deep neuralnetworks. In *Proceedings of the ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering, ESEC/FSE 2020*, (to appear).

[3] Hongfei Fu, Yi Li, and **Jianlin Li**. Verifying probabilistic timed automata against omega-regular dense-time properties. In *Quantitative Evaluation of Systems - 15th International Conference, QEST 2018, Beijing, China, September 4-7, 2018, Proceedings*, volume 11024, pages 122–139, 2018.

[4] **Jianlin Li**. Translating ltl to fdfa and fdfa model checking. Bachelor's thesis, Nanjing University of Aeronautics and Astronautics, 2018.

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COURSEWORK

GRADUATE

Semantics,
Formal methods,
Program analysis,
Introduction to Computational Logic,
Constructive Theory of Computation,
Compilers: An Advanced Course,
Quantum Info. and Quantum Crypto.,
Deep learning

UNDERGRADUATE

Model Theory(audit),
Process calculus CCS(audit),
Modal Logic(audit),
Formal Language and Automata Theory,
Digital Circuit and Logic Design,
Principles of Computer Organization,
Operating Systems Principles and Practice,
Compiling Principle,
Algorithm, Data Structure,
Linear Algebra, Modern Algerbra,
Mathematical Analysis

RESEARCH PROJECTS

ANALYZING DEEP NEURAL NETWORKS WITH SYMBOLIC PROPAGATION: TOWARDS HIGHER PRECISION AND FASTER VERIFICATION SAS 2019

- Improved on a recent proposal of analyzing DNNs through the abstract interpretation technique, by a novel symbolic propagation technique.
- Achieved significantly higher precision and thus can prove more properties than using only abstract domains.
- The bounds derived from our approach on the hidden neurons bring significant benefits to a state-of-the-art SMT based verification tool with an overall 549.43% speedup (9.16 hours compared to 1.41 hours).

PRODEEP: A PLATFORM FOR ROBUSTNESS VERIFICATION OF DEEP NEURALNETWORKS ESEC/FSE 2020 Tool Paper

- Proposed PRODeep, a platform for robustness verification of DNNs.
- PRODeep incorporates constraint-based, abstraction-based, and optimisation-based robustness checking algorithms.
- It has a modular architecture, enabling easy comparison of algorithms.

VERIFYING PROBABILISTIC TIMED AUTOMATA AGAINST OMEGA-REGULAR DENSE-TIME PROPERTIES QEST 2018

- The problem of model-checking PTAs against deterministic-TA specifications can be solved through a product construction.
- The computational complexity of the model-checking problem with deterministic-TA specifications is EXPTIME-complete.
- It becomes undecidable when relaxed to nondeterministic TAs.

TRANSLATING LTL TO FDFA AND FDFA MODEL CHECKING Bachelor's Thesis

A translation algorithm from Linear Time Logic to families of DFAs.

INDUSTRY EXPERIENCE

NUAAX.COM | Co-Founder + iOS Developer

Apr. 2015 – Sep. 2017 | Nanjing, China
Apps avaliable on Apple App Store (served 55,000+ users in the first three years):

- YanHuPan: The Missing NUAA Lecture Timetable Utility for iOS.
- NUAA portal in Hand: One App for All Information You Need in NUAA.

I co-founded this non-official student team and developed Apps to help students register courses, get information (timetables, grades, etc.) and socialize online.

AWARDS

2019	First-Class	Academic Scholarships of Institute of Software, CAS (Top 10%)
2015	**Silver Medal**	ACM-ICPC Shanghai Metropolitan programing Contest
2014	**Silver Medal**	ACM-ICPC Asia Regional Contest AnShan site
2014	National	China National Scholarship (Top 0.2%)
2014	Winning Prize	RoboCup China Open Soccer Simulation 2D