Chenxi Yang

CONTACT INFORMATION

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EDUCATION

The University of Texas at Austin *Sep. 2019 - Present*
Ph.D. in Computer Science
Advisor: Prof. Swarat Chaudhuri

Fudan University *Sep. 2015 - Jun. 2019*
B.Sc in Computer Science, *Honor Class*

RESEARCH INTERESTS

My research focuses on trustworthy machine learning systems. I aim to develop reliable, interpretable, verifiable machine learning methods. I am interested in bridging automated formal verification and foundational learning theories to build trustworthy and efficient machine learning systems.

INTERNSHIP EXPERIENCE

Google
PhD Software Engineer Intern *May. 2023 - Aug. 2023*
Student Researcher *Sep. 2023 - Present*

- Developed an infrastructure to optimize file placement in cloud storage systems, catering to millions of files.
- Designed an Oracle policy based on Integer Solver to place files in data processing pipelines.
- Leveraged imitation learning for file placement policies, surpassing traditional methods by over 50%.

Goldman Sachs Asia L.L.C
Technology Summer Analyst *Jun. 2018 - Aug. 2018*

- Worked at *Goldman Sachs Electronic Trading* (GSET) Team.
- Designed and implement automatically filling-in timesheet in the firm.
- Built a workload generation tool, which simulated the procedure of trading orders flowing through the OSI layers for testing the new generation ultra low latency DMA trading gateway. The tool spotted real bugs in the system development.

SELECTED RESEARCH EXPERIENCE

Neural Invariant Synthesis
Advised by Prof. Swarat Chaudhuri, Prof. Aditya Akella, UT-Austin *Aug. 2023 - Present*

- Developed algorithms for neural-represented invariants learning across general programs.
- Integrated the algorithms into loop invariant inference systems for neurosymbolic benchmarks.

Safe Reinforcement Learning for Systems
Advised by Prof. Swarat Chaudhuri, Prof. Aditya Akella, UT-Austin *Jan. 2023 - Present*

- Formulated reinforcement learning strategies targeting congestion control in networks.
- Built systems supporting reinforcement learning training for congestion control while ensuring agent adherence to safety protocols.

Safe Neurosymbolic Learning with Differentiable Symbolic Execution
Advised by Prof. Swarat Chaudhuri, UT-Austin *Jul. 2020 - Nov. 2021*

- Introduced a poineering approach for end-to-end, worst-case-safe parameter learning for neural networks within nondifferentiable, symbolic programs.
- Developed a novel integration of symbolic execution and stochastic gradient estimators, potentializing applications in autonomous driving and critical health care.
- Showcased experimental results underscoring the method's dominance over verified learning benchmarks.

Edge Server DNN Processing Acceleration
Advised by Prof. Lili Qiu, UT-Austin *Sep. 2019 - Jun. 2020*

- Conceived a batching-aware DNN scheduling methodology to enhance edge DNN request management.
- Implemented collaborative DNN executions at the client side to speed up processing.
- Demonstrated the algorithm's effectiveness for video analysis on commodity hardware.

PUBLICATIONS

- *Certifiably Robust Reinforcement Learning through Model-Based Abstract Interpretation.*
  Chenxi Yang, Greg Anderson, Swarat Chaudhuri.
  In submission.
- *On a Foundation Model for Operating Systems.*
  Divyangshu Saxena, Nihal Sharma, Donghyun Kim, Rohit Dwivedula, Jiayi Chen, **Chenxi Yang**, Sriram Ravula, Zichao Hu, Aditya Akella, Joydeep Biswas, Swarat Chaudhuri, Isil Dillig, Alex Dimakis, Daehyeok Kim, Christopher Rossbach.
  In submission.
- *Improved Modeling of RNA-binding Protein Motifs in An Interpretable Neural Model of RNA Splicing.*
  Kavi Gupta, **Chenxi Yang**, Kayla McCue, Osbert Bastani, Phillip A. Sharp, Christopher Burge, Armando Solar-Lezama.
  In submission.
  ICML 2023, Computational Biology Workshop, Spotlight.
- *Adaptive Scheduling for Edge-Assisted DNN Serving.*
  Jian He, **Chenxi Yang**, Zhaoyuan He, Ghufran Baig, Lili Qiu.
  MASS 2023.
- *Safe Neurosymbolic Learning with Differentiable Symbolic Execution.*
  Chenxi Yang, Swarat Chaudhuri.
  ICLR 2022.
  AIPLANS (Advances in Programming Languages and Neurosymbolic Systems) Workshop in Neurips 2021
- *Sensing People's Time Management Activities: A Study Using Wearable Devices.*
  Chenxi Yang, Yang Chen, Yuan Xuan.
  SenSys 2018, Poster.
- *Understanding the Behavioral Differences Between American and German Users: A Data-Driven Study.*
  Chenxi Yang, Yang Chen, Qingyuan Gong, Xinlei He, Yu Xiao, Yuhuan Huang, Xiaoming Fu.
  Big Data Mining and Analytics 2018.
- *Accelerating Mobile Applications at the Network Edge with Software-Programmable FPGAs.*
  Shuang Jiang, Dong He, **Chenxi Yang**, Chenren Xu, Guojie Luo, Yang Chen, Yunlu Liu, Jiangwei Jiang.
  INFOCOM 2018.

PROFESSIONAL SERVICE

Teaching Assistant

- CS373: Software Engineering, The University of Texas at Austin *Fall 2019, Spring 2020*

Reviewer

- ICML 2023; ICLR 2023, 2024; Neurips 2022, 2023; AIPLANS@Neurips 2021.

SCHOLARSHIP, AWARDS, & HONORS

- PLMW@PLDI Scholarship *2022*
- Outstanding Graduates of Shanghai, China *2019*
- National Scholarship, The Ministry of Education of China *2017*

INVITED TALKS AND PRESENTATIONS

Learning File Placement Policies in Data Processing Pipelines

- AI Broadly Construed Meeting *Google Deepmind, Aug 2023*
- Storage Analytics Team *Google Cloud, Aug 2023*

Safe Neurosymbolic Learning with Differentiable Symbolic Execution

- NSF Meeting on Expedition Project *Boston, Oct 2022*
- Summer School on Neurosymbolic Programming *Caltech, Jul 2022*
- ICLR 2022 *Virtual, May 2022*

PROFESSIONAL SKILLS

- **Programming Languages**: Python, C/C++, SQL, Java, Javascript, Matlab...
- **Frameworks**: PyTorch, Tensorflow, Z3, Keras, Scikit-Learn, MySQL, LaTex, Git...