

YINING SHE

Pittsburgh, PA

EDUCATION

Carnegie Mellon University

Ph.D. in Software Engineering, Advised by Eunsuk Kang
Software and Societal Systems Department, School of Computer Science
CQPA: **3.84/4.0**

Teaching Assistant: *Formal Methods 2023, Advanced Formal Methods 2023*

Pittsburgh, PA
Aug.2022-May 2027(expected)

ShanghaiTech University

Bachelor of Engineering in Computer Science and Technology
GPA: **3.83/4.0**

Teaching Assistant: *Algorithms and Data Structure 2021 and 2022, Software Engineering 2021*
Selected Honors: *Outstanding Graduate, Merit Student, Outstanding Teaching Assistant*

Shanghai, China
Sep.2018-Jun.2022

PROFESSIONAL SKILLS

Programming Languages

Python, C/C++, C#, MATLAB, R, RISC-V

Tools and Frameworks

PyTorch, scikit-learns, OpenCV, Alloy, UPPAAL, LTSA, Unity, Unreal, Git

GRADUATE RESEARCH

Carnegie Mellon Software Design and Analysis Lab | Advised by Eunsuk Kang

Pittsburgh, PA

FAIRSENSE: Long-Term Fairness Analysis of ML-enabled Systems

Dec.2022-Present

- Proposed a simulation-based framework FAIRSENSE to detect and analyze the long-term unfairness in ML-enabled systems
- Defined and raised the long-term unfairness issue in ML-enabled systems
- Modeled feedback loop between an ML-enabled system and the environment where system will be deployed, and designed a monte-carlo simulation framework to analyze the effect of feedback loop in long term
- Employed sensitivity analysis technique on simulation traces to identify the most impactful system configuration variables on long-term fairness
- Applied sampling heuristic to efficiently explore exponentially large configuration space without affecting sensitivity analysis results
- Evaluated FAIRSENSE on three real-world benchmarks: loan approval, opioid risk scoring, and predictive policing, and results show it can effectively detect long-term fairness issues and identify system configuration variables with the greatest impact for developers

Formal Model Extraction from Source Code with Large Language Model (LLM)

Aug.2023-Present

- Propose an automated approach to extract formal models from source code using LLM
- Utilize LLM to extract intermediate representation (IR) as a semi-formal structured natural language (UML, etc.) from input source code (C/C++, etc.) to bridge the gap between source code and formal models
- Build rule-based model-conversion method to turn IR into a specific formal language (AADL, Alloy, P, etc.)
- Design validation algorithm to check the consistency between extracted model and original source code
- Refine the prompts and guide LLM to improved IR models continuously based on the consistency checking results

UNDERGRADUATE RESEARCH

ShanghaiTech Human-Cyber-Physical-System Lab | Advised by Zhihao Jiang

Shanghai, China

Cognitive Digital Twin for Driving Assistance

Sep.2021-Mar.2022

- Created a cognitive digital twin framework that models and learns the driver's decision process
- Analyzed how a driver updates his perception during driving a car
- Presented a method to calculate driver's utilities and predict their strategies
- Validated model through experiments in a virtual driving environment

Model-checking-based Diagnosis Assistance for Cardiac Ablation *Apr.2021-Sep.2021*

- Proposed a model-checking-based diagnosis assistance system to improve accuracy and efficiency of diagnosis in cardiac ablation
- Introduced a kind of heart model to represent cardiac conditions and implemented it using UPPAAL
- Implemented a model-checking-based method to enumerate ambiguity using heart model refinements
- Proved the soundness and completeness of the method

Stable Interaction of Autonomous Vehicle Platoons with Human-Driven Vehicles *Jun.2021-Sep.2021*

- Developed a first-person driving simulator to collect data of human drivers in Unity
- Designed and held experiments for identifying the human behavior model

ShanghaiTech Virtual Reality and Visual Computing Center | Advised by Jingyi Yu *Shanghai, China*

High-Resolution Neural Face Swapping for Visual Effects *Dec.2020-Mar.2021*

- Studied on the ML model that swaps the appearance of a target actor and a source actor while maintaining the target actor's performance
- Improved and refined the method introduced in the paper "High-Resolution Neural Face Swapping for Visual Effects"
- Designed and captured the data set for face swapping to prove the robustness
- Accelerated the training speed by paralleling multiple GPUs

Portrait Shadow Manipulation *Aug.2020-Nov.2021*

- Trained a Neural Network to remove foreign shadow on human face in a portrait image based on paper "Portrait Shadow Manipulation"
- Generated training data using GAN-generated portrait images and a foreign shadow synthesis algorithm

The Image-Based Relighting *Jan.2020-May.2020*

- Achieved to generate images of object under arbitrary illumination using the One-Light-at-A-Time (OLAT) dataset captured by a light stage according to paper "Acquiring the Reflectance Field of a Human Face"

PUBLICATIONS

- Sumon Biswas, **Yining She**, Eunsuk Kang. "**Towards Safe ML-based Systems in Presence of Feedback Loops**", *In SE4SafeML, Proceedings of the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) 2023*.
- Mohammad Piran, **Yining She**, Renzhi Tang, Zhihao Jiang, Yash Vardhan Pant. "**Stable Interaction of Autonomous Vehicle Platoons with Human-Driven Vehicles**", *In American Control Conference (ACC) 2022*.