

Shengyuan Yang

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EDUCATION

Nanjing University

Sept 2017-Jun 2021

- ◆ **Major:** Software Engineering **Degree:** Bachelor of Engineering
- ◆ **Ranking:** 2/222 **Major GPA:** 4.62/5 **Overall GPA:** 4.58/5

Nanjing University

Sept 2021-Sept 2023

- ◆ **Major:** Electronic Information - Software Engineering **Degree:** Master of Engineering
- ◆ **Ranking:** 2/240 **GPA:** 4.62/5

RESEARCH EXPERIENCE

A Cut-Shortcut Approach to Fast and Precise Pointer Analysis

Oct 2021-Nov 2022

- ◆ Proposed a new pointer analysis approach for object-oriented languages, which is faster than traditional fast but imprecise analysis and achieves a high precision comparable to modern precise but heavy analysis approaches.
- ◆ The approach leverages a novel principle of improving the precision of pointer analysis by modifying the on-the-fly pointer flow graph (cutting off imprecise edges and adding precise shortcuts).
- ◆ Implemented the approach on pointer analysis framework Doop in Datalog and evaluated on 10 large java programs.
- ◆ Research paper published on **PLDI' 2023** (co-first author). Artifact received reusable and available badges.

A Hybrid Heap Abstraction for Pointer Analysis

Mar 2021-Jun 2021

- ◆ Presented *Hymers*, a hybrid heap abstraction strategy to accelerate pointer analysis by dividing abstract heaps into precision-critical and precision non-critical to apply corresponding abstraction methods.
- ◆ Developed *Hymers* as a stand-alone tool and implemented it on framework Doop.
- ◆ Evaluation results on 9 benchmarks show *Hymers* can speed up both traditional analysis and state-of-the-art analysis by about 30% with a precision loss below 4%.

PROJECTS

Online Cinema System

Mar 2019-Jun 2019

- ◆ A 2 KLOC web system to release and schedule movies for cinema and to book tickets and choose seats for audience.
- ◆ In responsible for most of the backend coding in a 4-person group (using SpringBoot+MyBatis+MySQL).

OCEANIA, an Online Program Call-Graph Visualization System

Mar 2020-Jun 2020

- ◆ A web system to visualize the call-graph of a given program uploaded by users.
- ◆ As team leader of a 3-person group, designed the whole system and was responsible for all backend coding (using SpringBoot+Neo4j/MySQL) including parsing code uploaded by users and constructing call-graphs.
- ◆ Implemented two call-graph construction algorithms in the system: one using code traversal to get fast but imprecise graphs, the other using static analysis to get slow but precise graphs.

A Side-Scrolling Tactical RPG by Unity

Oct 2018-Dec 2018

- ◆ Designed the whole game (mechanism, level, characters), developed the game maps and animation state machines.
- ◆ As the leader of an 8-person team, managed the team's workflow, assigned tasks to other game developers and game artists, hold regular meetings, and composed design & development documents.
- ◆ Game demo won 1st place in *Game Development Contest by Thunder Fire Studio, NetEase & Nanjing University*.

Campus Vacant Classroom Way-finding App Based on WIFI Detection Apr 2019-May 2019

- ◆ An Android App using WIFI detection to locate the user's position in buildings, searching for vacant classrooms based on course schedules and enabling in-building navigation for each classroom.
- ◆ As the backend developer in a 4-person group, be responsible for the way-finding service and algorithms.
- ◆ App won 1st place in *hackathon by Academic Collaboration Dept., Microsoft Research Asia & Nanjing University*.

Online Judge System Mar 2021-Apr 2021

- ◆ As the Scrum manager of the team, guided the team to complete an agile software process in 2 sprints.
- ◆ Used agile software management tool Zenhub to manage Kanban and burndown chart for our software process, used Jenkins to build and test the system, hold daily Scrums for the team.

Test Impact Analysis Tool Nov 2020

- ◆ Leveraged static analysis framework WALA to design and implement a tool that selects test cases impacted by a given change to the user program.

SERVICE & ACTIVITIES

Research Assistant - Dept. of Computer Science and Technology, Nanjing University. Sept 2021-May 2023

Advisor: Yue Li, Tian Tan

- ◆ Research in static analysis

Teaching Assistant - Course *Software Analysis* Sept 2021-Jan 2022

Advisor: Yue Li, Tian Tan

- ◆ Designed test cases and composed official answers for programming assignments (live variable analysis, constant propagation, dead code detection, CHA, context-sensitive pointer analysis, taint analysis).
- ◆ Assisted with teaching, answered students' questions, created final exam paper, scored assignments and exams.

Vice President in Science Fiction Association of Nanjing University Sept 2018-Jun 2019

- ◆ Organized several campus essay competitions and symposiums, invited local writers to give lectures.

Volunteer of Cyrus Tang Foundation Sept 2017-Jun 2021

- ◆ Organized and took part in community volunteer services each summer and winter holiday.

PUBLICATION

Context Sensitivity without Contexts, A Cut-Shortcut Approach to Fast and Precise Pointer Analysis

Wenjie Ma#, **Shengyuan Yang#**, Tian Tan, Xiaoxing Ma, Chang Xu, Yue Li

(the author with # contributed equally to this work)

44th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI' 2023)

HONORS & AWARDS

Cyrus Tang Foundation Scholarship for 4 years 2017-2018, 2018-2019, 2019-2020, 2020-2021

China National Scholarship for 1 year 2018-2019

The First-class Scholarship of Nanjing University for 2 years 2017-2018, 2019-2020

SKILLS

Programming Language: Java, Python, C, C++, SQL, Datalog

Platform & Framework: SpringBoot, Tai-e, Doop, WALA, Soot, Unity

Tools: MongoDB, Neo4j, MySQL, Git, Jenkins, JetBrains Tools, Visual Studio