Zhanwei Zhang (张展玮)

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Education

B.Sc. in Computer Science and Technology, Southern University of Science and Technology (SUSTech) **Sep. 2021 ~ Now**

Turing Master Class

Advisor: Prof. Yepang Liu

GPA: 3.79 / 4.0 | Weight Avg Score: 90.86 | Ranking: 39 / 188

Main courses: Introduction to Math Logic(A+), Introduction to Computer Programming(A+), Calculus(A), Linear Algebra(A), Data Structures and Algorithm Analysis(A), Principles of Database Systems(A-), Machine Learning(A), Compilers(B+)

Visiting Researcher, Wuhan University **May. ~ Aug. 2024**

Advisor: Prof. Jinfu Chen (WHU); Prof. Weiyi Shang (UWaterloo)

Internships

Large Language Model Intern in Lingxun, Shenzhen, Guangdong **Sep. 2024 ~ Now**

Enhance Large Language Models using Retrieval Augmented Generation (RAG).

Working on query preprocessing tasks, including query expansion, transformation, and classification.

Optimizing GraphRAG code for better integration into the company, enhancing document structuring and entity recognition.

Publications

Numerical Error Detection (Under Review) **July 2024 ~ Oct. 2024**

Contributed as second author and co-first author, under the supervision of Prof. Weiyi Shang (UWaterloo), Prof. Jinfu Chen (WHU), and Zishuo Ding (HKUST(GZ)), with two papers submitted to a CCF-A conference.

Developed novel methods and LLVM pass-based analysis for detecting numerical errors, focusing on improving the efficiency and accuracy of error detection processes.

Our approach showed strong alignment (correlation over 0.8) with high-precision programs and required only about 1/1000 of the time needed by high-precision programs.

Research

Estimating Global Aviation CO2 Emissions with Comprehensive Flight Data **Apr. ~ Dec. 2022**

Analyzed 10 TB data (1 billion records) using statistical and machine learning methods.

Submitted to Environmental Pollution on 5 Nov., 2024.

LLM-Based JSON Parser Fuzzing for Bug Discovery and Behavioral Analysis **Sep. 2023 ~ Jan. 2024**

Used opensource LLMs such as Llama2-7B/13B to generate test cases.

13 JSON Parsers and over 100 types of cases have been tested. Over 26 behavioral diversities have been found.

Selected Projects

Othello Game through Java and Python Programming with Strong AI **Oct. ~ Dec. 2021 & Mar 2023**

Developed visually appealing interface and implemented Monte Carlo & Alpha Beta Pruning algorithm.

Rank: 3/29 | Win Rate: 81% (In Turing Class)

Capacitated Arc Routing Problem Solver **May 2023**

Implemented a memetic algorithm and hybrid metaheuristic approach to produce high-quality solutions efficiently.

Achieved optimal solutions in small and medium-sized instances within 180 seconds.

Produced comparable results with 20% deviation for larger instances with up to 255 vertices and 347 routes.

Canteen Traffic Monitoring (https://sustech.online/canteen) **Dec. 2023 ~ Jan. 2024**

Calculated the length of the queue by monitoring data and displayed a chart showing the changes in queue length.

Won award for finalist in National College Students' Innovation and Entrepreneurship Training program.

About 30,000 visits within three months.

Simple Compiler **Sep. 2023 ~ Jan. 2024**

Developed a compiler that translates C language files into Intermediate Representation (IR) and MIPS32.

Supported essential features such as I/O operations, control flow and function calls.

Included lexical, syntax, and semantic analysis, along with informative error messages.

Patents

一种点餐方法、系统、终端及介质（Innovative Ordering Method, System, Terminal, and Medium Patent) **May 2023**

Innovated a method and system to alleviate peak-hour traffic in cafeterias.

Applied on May 5, 2023; Application no: 202310498065

Skills

Languages: English (Fluent; IELTS: 6.5), Mandarin (Native), Cantonese (Native)

Programming Languages & Frameworks: Java, Python, C/C++, SQL, Spring Boot, Vue

Tools: IntelliJ IDEA, PyCharm, Visual Studio Code, Anaconda, Git, CMake

Honors & Scholarships

Honorable Mention, Mathematical Contest in Modeling May 2023

Finalist, National College Students' Innovation and Entrepreneurship Training program June 2023

Third Prize, China Undergraduate Mathematical Contest in Model Sep. 2023

Outstanding Student Jan. 2024