

Ruoyi Wang

6685 Curtis Street, Burnaby, BC, Canada, V5B 2A8

☎ +1 (604) 773-1599 | ✉ endvroy@gmail.com | 🏠 ruoyi.me | 📱 endvroy

Research

Hybrid Training NPI

Oct. 2018 - present

- Reduce supervision for Neural Programmer Interpreters (NPI) via hybrid training
- Backpropagation on traces to bootstrap the model, and reinforcement learning on I/O examples to fine-tune the model
- Investigated the numerical relationship among the data size of each type, the training time, and the accuracy

Neural Code Generation

Oct. 2018 - May. 2019

Supervisor: Anoop Sarkar

- General-purpose code generation from natural language descriptions with a grammar-agnostic model
- Two-Phase Coarse-to-Fine Synthesis
- Copy Mechanism with Pointer-Generator Network

STOKE for HRM

Apr. 2018 - Aug. 2018

Supervisor: Nick Sumner

- Superoptimization for the Human Resource Machine architecture via Markov Chain Monte Carlo (MCMC) sampling
- Use average edit distance on output stream as program equivalence approximator to reward partial success
- Efficiently implemented in Rust

Test Case Reduction

Jun. 2018 - Aug. 2018

Supervisor: Nick Sumner

- Test Case Reduction by leveraging fact that sometimes the grammar of the tests is known
- Implemented as a skippy Earley Parser, adding a 'SKIP' action to forward Earley items, then extract test cases from the compact representation of the parse forest
- Allow for parallel testing because the method is not adaptive

SuperHuman

Nov. 2017 - Jan. 2018

Supervisor: Nick Sumner

- Search-based synthesizer and superoptimizer for the Human Resource Machine architecture
- Used handcrafted heuristics and symbolic I/O examples for aggressive pruning over the vast program space
- Able to find the shortest program(13 instructions) in 5 seconds within a single basic block
- Also tried syntax-guided synthesis (SyGuS) and prototyped with Rosette

Selected Projects

Neural Turing Machine

May 2018

<https://github.com/endvroy/ntm>

- Implemented the Neural Turing Machine with Pytorch
- Tested the implementation with the COPY task and the REPEATED COPY task

Efficient Path Profiler

Nov. 2017

<https://github.com/endvroy/efficient-path-profiler>

- An LLVM-based, dynamic path profiler
- Records which execution path in each function is actually executed
- Uses an efficient encoding of execution paths as described in *Efficient Path Profiling*

Buffer Overflow Detector

Oct. 2017

<https://github.com/endvroy/buffer-overflow-detector>

- Detecting potential buffer overflow with dataflow analysis
- static analysis with the dataflow framework on the range of array indices
- Implemented with LLVM

Call Graph Profiler

Sep. 2017

<https://github.com/endvroy/callgraph-profiler>

- An LLVM-based, dynamic call graph profiler
- Modifies a given program to count the number of times each call site is actually invoked while maintaining its original functionality
- When calling through function pointer, the actual called function is inferred from the address stored in the pointer

Linguist

Jul. 2017

<https://github.com/endvroy/linguist>

- An LALR(1) compiler-compiler that is built upon itself
- Implemented a custom DFA-based regular expression engine that efficiently handles negative character sets
- User-specified actions can be associated with each lexical or grammatical rule

WebTetris

Dec. 2017

<https://github.com/endvroy/webtetris>

- An online Tetris match system that runs in a browser
- Two players can join a match in the lobby, competing with real-time updates of the other player's status
- Implemented with Flask and websocket, designed to be anti-cheating

miniSQL

May 2016

<https://github.com/endvroy/minisql>

- Led a team of 3 and built our own database engine
- Supports lazy deletion, B+ tree indexing and block cache management with the Least Recent Used (LRU) policy
- Adopted a Test-Driven Development (TDD) approach

my-shell

Oct. 2016

https://github.com/endvroy/my_shell

- Built a simple shell in C
- Supports pipelining, background execution and job control

Library Management System

April 2016

<https://github.com/endvroy/library>

- Built an example library management system with GUI using Python
- Adopted a Model-View-Controller (MVC) design, use SQLAlchemy to connect to MySQL, and built GUI with Kivy
- Provide a different interface for students and administers, allow administers to borrow and return books, search the history and manage library cards

Awards

2018	VP Research - Undergraduate Student Research Award - Science, Simon Fraser University	Vancouver, Canada
2018	Undergraduate Open Scholarship, Simon Fraser University	Vancouver, Canada
2017	Undergraduate Open Scholarship, Simon Fraser University	Vancouver, Canada
2016	5th Place, Microsoft Coding Competition	Vancouver, Canada
2016	SFU-Zhejiang University DDP Entrance Award, Simon Fraser University	Vancouver, Canada

Education

New York University

Master in Computer Science

Sep. 2019 (to start) -
New York City, USA

Simon Fraser University

B.Sc. in Computer Science

Sep. 2016 - April 2019
Vancouver, Canada

Zhejiang University

B.Sc. in Computer Science

Sep. 2014 - Jun. 2016
Hangzhou, China