Yongwei Yuan

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EDUCATION

Purdue University, West Lafayette — Indiana, United States
Ph.D. in Computer Science — *Aug. 2020 - now*

CS580: Algorithm Design, Analysis, And Implementation

CS560: Reasoning About Programs

University of Michigan, Ann Arbor — Michigan, United States
B.S. in Computer Science — *Sept. 2018 - May. 2020*

Shanghai Jiao Tong University — Shanghai, China
B.S. in Electrical and Computer Engineering — *Sept. 2016 - Aug. 2020*

RESEARCH

SIS-Lambda — Advisor: Prof. Roopsha Samanta
Department of Computer Science, Purdue University — *Aug. 2020 - now*

- To take advantage of relational properties and add semantic bias to exmaple-based synthesis of functional programs
- Found evidence that augmenting user-provided examples could resolve the ambiguity problem in synthesis
- Working on the formalism of example augmentation process through defining a refinement type system

Pattern Matching with Typed Holes — Advisor: Prof. Cyrus Omar
Computer Science and Engineering, University of Michigan — *Jan. 2020 - now*

- To support incomplete structural pattern matching and provide feedback to users in every possible editor state
- Developed a simply typed lambda calculus, Peanut, where reasoning about exhaustiveness and redundancy is mapped to the problem of deriving first-order entailment between constraints
- Developed an operational semantics that allows us to evaluate match expressions in the presence of holes
- Proved key metatheoretic properties and formalized a procedure capable of deciding the necessary entailment

PROJECTS

Variable Usability in Hazel — Advisor: Prof. Cyrus Omar
Computer Science and Engineering, University of Michigan — *Sept. 2019 - Mar. 2020*

- To improve the usability of variables in Hazel, a live functional programming environment featuring typed holes
- Added support for static variable usage analysis for both the one under the cursor and other variables
- Provided variable-based program navigation
- Designed and Implemented secondary notations to display variable usage information
- Exposed hidden dependencies between the binding site and the usage site of variables to programmers

Bugbase V2 — Prof. Baris Kasikci
Computer Science and Engineering, University of Michigan — *Apr. 2019 - Sept. 2019*

- To verify the effectiveness of existing symbolic-execution-based bug-finding tools, like KLEE
- Reproduced dozens of bugs in docker containers, involving hacking into the codebase and transforming LLVM IR when necessary
- Digged into the codebase of large-scale software systems to analyze root cause for multiple bugs

Review-Me Automation — Advisor: Prof. Tawanna Dillahunt
School of Information, University of Michigan — *Jun. 2019 - Oct. 2019*

- Provided back-end support for review-me, a system dedicated to provide expert resume feedback for job seekers
- Automated the process of reviewing resumes and providing feedback by taking advantage of crowdsourcing

AWARDS

Honorable Mention, Mathematical Contest in Modeling — Apr. 2017