Shreya

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Research interests

Program analysis and compilers

Research Experience

Precise and efficient point-to analysis in LLVM IR Mar 2021 – Present

Advisor: Professor Uday Khedker

- Modelling LLVM instructions for retaining precision in points-to analysis
- Abstracting LLVM IR based on pointer suitable modeling

Experience

Undergraduate Trainee May 2019 – July 2019

BSNL *Lucknow, India*

- Worked on finding bottlenecks in the present mobile networking and communication infrastructures that can be made more efficient by efficient load predictions

Eklavya Summer Intern May 2018 – July 2018

IIT Bombay *Mumbai, India*

- Advisor: Professor D.B. Phatak
- Developed a system using the open source tool DSpace for archiving high loads of generated data from collaborative community services
- Deployed the system on docker containers and contributed to the middle-ware

Education

ACM India Summer School 2021 Hyderabad, India

on Programming Language Analysis and Optimization
July 2021

Rajkiya Engineering College Sonbhadra Sonbhadra, India

B.Tech, Aug-2016 – July 2020 *78.83%*

BRIC Rampur Deoria, India

12th board exam *81.2%*

DAV centenary public school Siwan, India

10th board exam *9.6 CGPA*

Projects

Modeling Implementation and Optimization in LLVM Aug 2021 – Present

- Automatically generates abstract representation of LLVM IR
- Uses textual description of the modeling as input
- Eliminates the need of finding manual patterns in the IR by conservatively replacing uses with defs for the LLVM generated temporaries
- Optimizes the representation to match source level constructs

Live Variable Analysis in LLVM March 2021

- Implemented intra-procedural live variable analysis in LLVM
- Upgraded to an inter-procedural version

Strong Live Variable Analysis in LLVM March 2021

- Implemented intra-procedural and inter-procedural strong live variable analysis in LLVM

Modelling LLVM IR instructions Feb 2021 – Mar 2021

- Modelled LLVM IR instructions into a small grammar close to C

- Handled memory instructions, Load, Store, Alloca, BitCast, and GetElementPointer
- Binary arithmetic operations, Add, Mul, Sub, and UDiv

Early Flood Detection and Avoidance System Aug 2019 – Oct 2019

- Capable of sending early alert messages through social media
- We used NodeMCU platform

Skills

C, C++, LLVM

Languages

English, Hindi