Shivansh Rai

shivansh@freebsd.org
+91-7755047792
github.com/shivansh
shivansh.github.io
linkedin.com/in/shivanshrai

Aspiring graduate with a solid foundation in mathematics, data structures and algorithms, who is passionate about writing efficient code, solving challenging problems, and learning new technologies.

Technical Skills

- **Languages**: C, C++, Go, Python, Bash, Haskell, Java
- **Web Technologies**: TypeScript, Angular, Django
- **Tools**: Git, Vim, Linux shell utilities
- **Operating Systems**: Ubuntu, FreeBSD
- **Extensive Experience in**: Operating Systems, Compiler Design & Development, Testing (Smoke, Stress, Unit, Regression), Networking Protocols
- **Interests**: Virtualization technologies, Containerization, Docker, Kubernetes

Distinguished Projects

MIPS Compiler for GoLang / Prof. Subhajit Roy

github.com/shivansh/gogo

- Implemented a Go language compiler using Go
- Generated lexer and parser using gocc toolkit
- Contributed to the improvement of gocc toolkit
- Improved the generated MIPS assembly by implementing peephole optimizations and reaching definition analysis
- Implemented a mark-and-sweep garbage collector

B+ Tree Key Value Store / Prof. Amey Karkare

github.com/shivansh/kiwi

- Implemented a B+ Tree based persistent key-value store in Haskell and Go along the lines of ACID properties
- Analyzed the two implementations to draw comparisons based on metrics such as performance and runtime memory requirements
- Identified the pros and cons of modeling in functional and imperative styles of programming

Statistical Bug Localization / Prof. Subhajit Roy

github.com/shivansh/bugLocate

- Explored the problem of statically localizing bugs in a given C program using statistical approaches
- Designed an instrumentor using Rose compiler
- Utilized the instrumentor to improve branch predictions by learning all branch correlations using Pearson's chi-squared test

Experience

Google Summer of Code '17 / FreeBSD

MAY 2017 – AUGUST 2017

- Developed an infrastructure to automate generation of tests for all the utilities in the FreeBSD base system
- Discovered and fixed a bug in the implementation of ln(1) utility in FreeBSD (link)
- All code was reviewed, improved and pushed to production
- *github.com/shivansh/smoketestsuite*

Google Summer of Code '16 / FreeBSD

MAY 2016 – AUGUST 2016

- Developed test scripts for regression testing of TCP/IP stack implementation in FreeBSD
- Used Google's packetdrill to develop test scripts
- Discovered and reported a bug in the behavior of TCP stack implemented in FreeBSD-11.0-Release (link)
- All code was reviewed, improved and pushed to production
- *github.com/shivansh/tcptestsuite*

Full Stack Developer / NYC Office, IIT Kanpur

SEPTEMBER 2015 – ONGOING

- Contributed to the development of a large scale polyglot web application with an extensive technology stack
- Designed and developed features for frontend using Angular2 and features for backend using Scala

Education

Bachelor of Science

Indian Institute of Technology (IIT) Kanpur

Major: Mathematics and Scientific Computing

AUGUST 2014 – MAY 2019 (*anticipated*)

Course Work: Operating Systems, Compiler Design, Distributed Systems, Computer Networks, Linux Kernel Programming, Functional Programming, Data-Driven Program Analysis, Data Structures and Algorithms, Theory of Computation, Computer Systems Security, Computer Organization, Computational Methods, Fundamentals of Computing