Pranav Kant

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Work Experience

Microsoft
Redmond, Washington

Compiler Engineer
June 2020 - Present

- Working on Microsoft's C++ compiler team touching various low-level system software components including native code-generation for x86 and ARM, linking, debug info generation, COFF and PE binary formats, and Microsoft's internal post-link tooling.
- Substantial runtime performance improvements (up to 3x speedup) for debug builds.

University of Utah
Salt Lake City, Utah

Graduate Research Assistant
January 2019 - May 2020

- Worked on dataflow-based pruning (published in OOPSLA'20) for speeding up superoptimizer for LLVM IR
- Worked on code size reduction tool using Alive2 - a verification tool for LLVM transformations.

Collabora
Cambridge, UK (Remote)

Software Engineer
Jan 2016 - Jul 2018

- Worked on LibreOffice Online (similar to Google docs).
- Created a monitoring console from scratch to monitor the LibreOffice Online server from the browser (backend in **C++** and frontend in Javascript).
- Made LibreOffice Online feature rich by working on framework to expose core functionality in LibreOffice desktop, such as comments, dialogs, and context-menus.

Projects

Little Lang: New programming language for high-performance integer computation
University of Utah, USA

Course project for Advanced Compilers
Aug 2018 - Dec 2018

- Wrote a recursive descent parser and typechecker in **C++** for our language; used visitor pattern for AST traversal.
- Lowered the AST to LLVM IR format; runtime checks for array out-of-bounds; analyzed, researched, and improved lowering with help of various benchmarks.
- Analyzed, and researched the effect of varying integer widths on performance.

Program Dependence Mesh: A data-driven interpretation of imperative programs
NIT Hamirpur, India

Undergraduate thesis
Aug 2014 - May 2015

- Worked on a synthesizable representation of programs written in imperative languages.
- Used LLVM to write a compiler pass to generate this representation from LLVM IR targetting a unified platform that can be used as an ASIC, a CPU, or even a CGRA.

Fingerprint authentication platform
Remote

Consultant developer
Aug 2013 - Oct 2013

- Next generation secure login system using NBIS. **Reverse-engineered** Windows drivers for Futronics fingerprint scanner.

Education

University of Utah
Salt Lake City, Utah, USA

M.S., Computer Science
Aug 2018 - May 2020

- **GPA**: 4.0/4.0
- **Courses**: Advanced Compilers, Computer Architecture, Programming Languages, Advanced Algorithms, Embedded Systems, Advanced Operating Systems, Machine Learning, Software Verification
- **Project**: Semantic function equivalence checker

National Institute of Technology
Hamirpur, Himachal Pradesh, India

B.Tech., Computer Science and Engineering
Aug 2011 - May 2015

- **GPA**: 7.4/10 (90th percentile)
- **Courses**: Algorithms & Data structures, Object-oriented Paradigm, Advanced Computer Architecture, Advanced Computer Networks, Advanced Operating Systems, Information Security, Artificial Intelligence, Digital Image Processing
- **Thesis**: Program Dependence Mesh: A data-driven, synthesizable intermediate representation for imperative programs

Conferences & Talks

Oct '17	**Google Mentor Summit**, Represented LibreOffice	*Mountain View, USA*
Oct '17	**LibreOffice Conference**, Talk on "Native comments" and "Dialog tunneling"	*Rome, Italy*
Sep '16	**LibreOffice Conference**, Talk on "New features in LOKDocView widget'	*Brno, Czech Republic*
Sep '15	**LibreOffice Conference**, Talk on GSoC '15 project, "Integrating LibreOffice with GNOME"	*Aarhus, Denmark*
Aug '15	**GNOME Conference**, Talk on GSoC '15 project, "Integrating LibreOffice with GNOME"	*Gothenburg, Sweden*
Jul '15	**Fedora Conference**, Talk on "Automated UI testing"	*Pune, India*
Jul '14	**GNOME Conference**, Talk on GSoC '14 project, "Browsing DLNA Media servers"	*Strasbourg, France*

Extracurricular Activity

Google Summer of Code 2017

Remote

Mentor

May 2017 - Aug 2017

- Mentored a GSoC project on LibreOffice Online to successful completion. It involved several bug fixes and improvements to LibreOffice Online including adding a horizontal ruler for the documents.

GNU/Linux User Group (GLUG-NITH)

NIT Hamirpur

Sysadmin & Club lead

May 2012 - May 2015

- Awarded certificate of appreciation by university for reporting and fixing major security vulnerabilities in college exam result server: Microsoft SQL server vulnerability found by using Metasploit, SQLi, and XSS.
- Installed & maintained Ubuntu, Fedora, BOSS, GNU, kernel.org, LinuxMint, and LDP mirror servers.
- Developed & maintained pastebin, and an exam result software.
- Installed and maintained club's mail server, web server, wiki, and local project hosting.
- Organized inaugural events: Software Freedom Day, Linux fests, hackathons, coding competitions, and several educational meetups.