Kirill Bobyrev

Software Engineer · Machine Learning Engineer

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Summary

I am Software Engineer at Google and work on **clangd**, C++ Language Server implementation that brings IDE experience to Visual Studio Code, Vim and other editors. I contribute to **LLVM** very often (**list** of commits). I specialize in Compilers and Machine Learning. C++, Rust and Python are typically my languages of choice.

Work Experience

Google

Software Engineer — *Nov 2019 - Present*

- Significantly improved **clangd**, Clang-based C++ Language Server Protocol implementation that brings IDE-like experience for for Visual Studio Code, Vim, CLion, XCode, Eclipse, a number of other IDEs and text editors.
- Designed and implemented IncludeCleaner: **IWYU**-like functionality in clangd for warning users about unused and missing headers.
- Implemented **Remote Index service** for LLVM and Chrome. This allows developers with slow machines to get precise code completion and navigation for these large projects. Deployed the service to Google Cloud and maintained it, the service is handling 1.5M+ requests per week.
- Took responsibilities of Product Manager and UX Researcher: continuously interviewed our users and processed feedback, built feature roadmaps and prioritized tasks based on the needs of our users.

Handl, Y Combinator-backed Machine Learning startup

Data Scientist — *Feb 2019 - Jun 2019*

- Secured a contract with AMG Mercedes Benz, worked out how to translate their business goals into fine-grained technical problems and led the project.
- Built Deep Learning models for a our clients' variety of tasks such as Image and Sound Segmentation, Image and Video Classification.
- Contributed to state-of-the-art Deep Learning models for Optical Character Recognition in PyTorch and TensorFlow.

Google

Software Engineering Intern — *Jul 2018 - Sep 2018*

- Designed and implemented **Dex** — efficient index for code completion based on Russ Cox **design** of Google Code Search.
- Replaced previous index implementation and gained **15x-60x performance boost** while providing more features such as advanced filtering for code completion-based symbol search.
- Reduced code completion average latency from **16 µs** to **1.09 µs** for LLVM codebase (3M Lines Of Code) and from **119 µs** to **1.9 µs** for Chromium codebase (16M LOC).
- Implemented Variable length Byte (VByte) compression algorithm and reduced memory overhead by 60% with insignificant loss of speed and no precision loss.
- Identified performance bottlenecks in commonly used LLVM YAML serializer and made it 3 times faster.

Google

Software Engineering Intern — *Jun 2016 - Sep 2016*

- Elevated performance of **Clang-Rename**, Clang-based tool that can perform efficient renaming actions in large-scale projects such as renaming classes, functions, variables, arguments, namespaces etc.
- Fixed inconsistent renaming bugs, added support for template classes, introduced new functionality and gained users for Clang-Rename.
- Built Vim and Emacs plugins for Clang-Rename tool.
- Designed and prototyped **Clang-Refactor**, which later transformed into **Clang's Refactoring Engine**
- Started a discussion about building Language Server Protocol implementation which later resulted in clangd creation and became the main focus of the team.
- Added new checks to **Clang-Tidy** and reduced false-positive rate for existing ones.

Google

Google Summer of Code Student — *Jun 2015 - Sep 2015*

Implemented Code Clone Detection tool in Clang Static Analyzer and used it to detect over 400 similar code pieces in Git, Vim, OpenSSL and other projects. The **overview** of key results is hosted on GitHub.

Talks & Publications

LLVM Developers' Meeting conference lightning talk

San Jose, CA, USA

"Dex: Efficient Symbol Index for clangd" (**video recording** and **slides**) — *2018*

LLVM Developers' Meeting conference poster *San Jose, CA, USA*

"Code Clone Detection in Clang Static Analyzer: Detecting Copy-paste using Static Analysis" (**poster**) *2015*

Education

Moscow Institute of Physics and Technology (MIPT)

B.S. in Mathematics and Physics

Open Source

LLVM

Contributor *2015 - Present*

Participating in LLVM-related projects and working on Clang-based C++ tooling. This includes contributing to clangd, Clang-Tidy, Clang Static Analyzer and other C++ Language tools. My work has been featured multiple times on **LLVM Weekly** covering the most important recent changes. **List** of all my commits.

Skills

Programming Languages	C++ , Rust, Python, Haskell
Expertise	Compilers, Machine Learning: Deep Learning, Reinforcement Learning, Computer Vision, Self-Driving Vehicles
Frameworks	Jax, NumPy, Tensorflow, Pytorch, LLVM