A Language-Based Version Control System for Python (Artifact)

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Abstract

We extend prior work on a language-based approach to versioned software development to support versioned programs with mutable state and evolving method interfaces. Unlike the traditional approach of mainstream version control systems, where a textual diff represents each evolution step, we treat versions as programming elements. Each evolution step, merge operation, and version relationship is represented explicitly in a multifaceted code representation. This provides static guarantees for safe code reuse from previous versions and forward and backwards compatibility between versions, allowing clients to use newly introduced code without needing to refactor their program manually. By lifting versioning to the language level, we pave the way for tools that interact with software repositories to have more insight into a system's behavior evolution. We instantiate our work in the Python programming language and demonstrate its applicability regarding common evolution and refactoring patterns found in different versions of popular Python packages.

1 Scope

The artifact includes a custom code editor with an extension to manage Python versioned programs. It allows the editing, slicing, and type checking of such programs.

2 Content

The artifact package includes:

- A code editor to edit and run versioned Python programs.
- Example files demonstrating such programs.

3 Getting the artifact

The artifact endorsed by the Artifact Evaluation Committee is available free of charge on the Dagstuhl Research Online Publication Server (DROPS). In addition, the artifact is also available at: `https://github.com/ecoop108/ecoop-artifact`.

4 Tested platforms

Works on any operating system where Docker can run.

5 License

The artifact is available under Creative Commons license.

6 MD5 sum of the artifact

6c42e04e945d3c9685ba71ab7102f6c8

7 Size of the artifact

2 GiB