Mea culpa How developers fix their own simple bugs differently from other developers

Wenhan Zhu, Michael W. Godfrey

University of Waterloo

04 May 2021
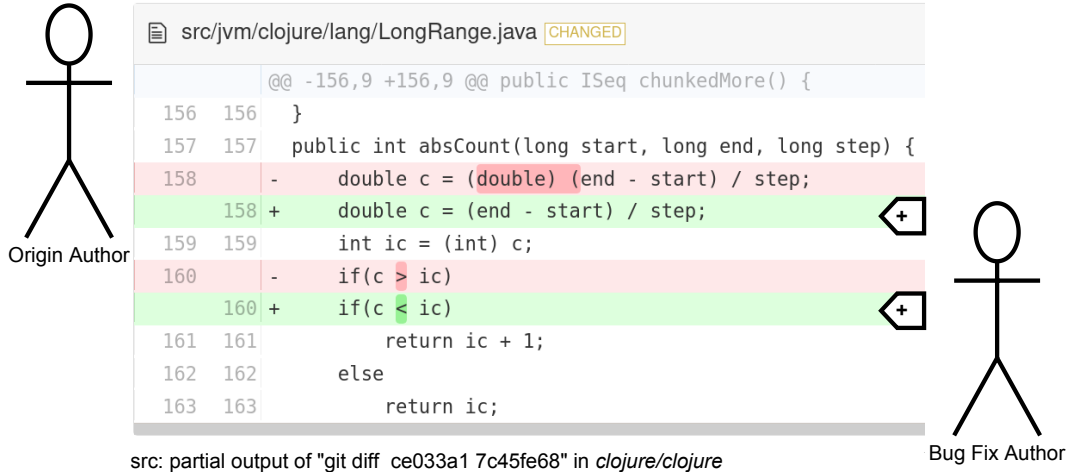
Bug fixing in Open Source Software (OSS)

src: partial output of "git diff ce033a1 7c45fe68" in *clojure/clojure*

Figure 1: Example git diff

Dataset collection

- 10,231 SStuBs from the top 100 Maven projects by popularity
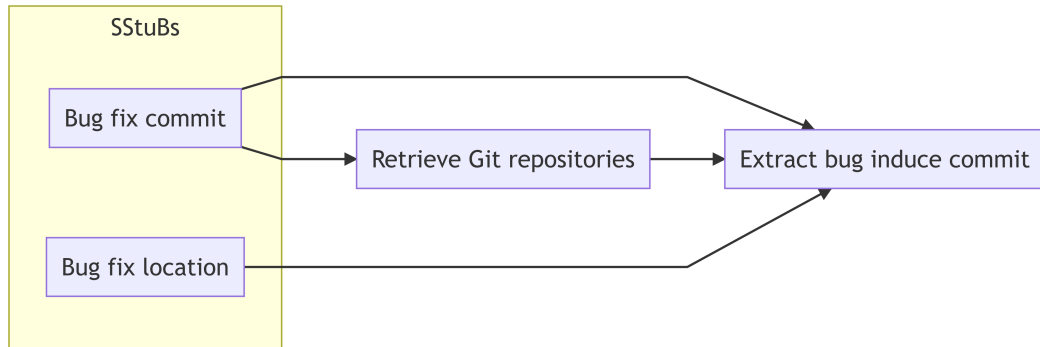

Figure 2: Extracting bug induce commit

Adapting the SZZ algorithm to git

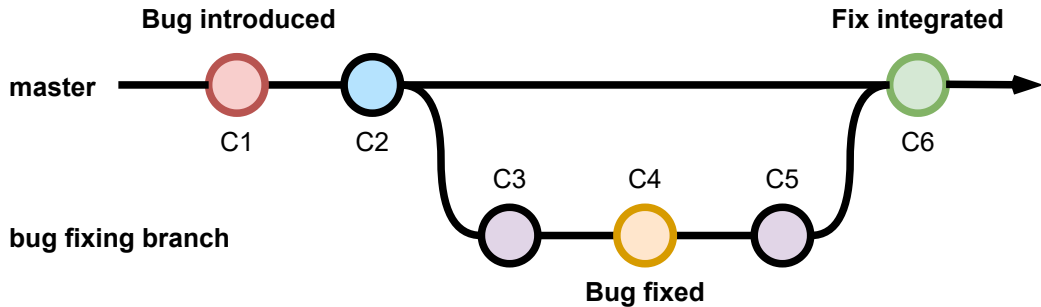Integration (e.g., C6) vs Implementation (e.g., C4)

Figure 3: Example git tree

Determine commit attributes

Authorship
The author information stored in a *Git* commit

Bug fixing time
Time difference between bug induce and bug fix

Commit size (i.e., Churn)
Sum of added and removed lines

Developers fix their own simple bugs about half of the time

Table 1: Bug fixes by authorship

Fixed by same author	Fixed by a different author	Total
5,674	4,508	10,182

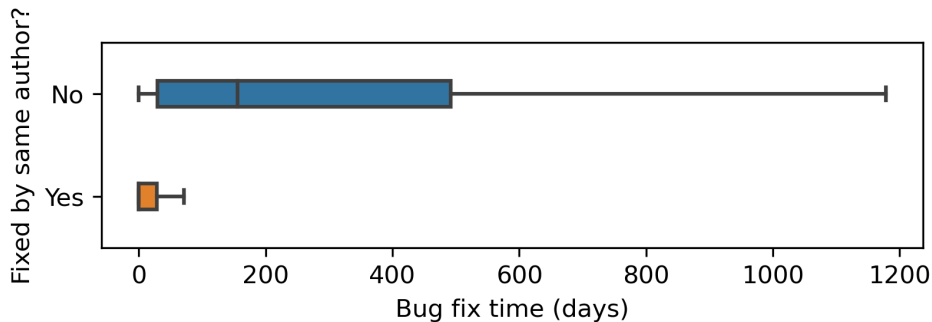# Bug fixes by same author is fast and often within the same day

Figure 4: Distribution of bug fix time by authorship

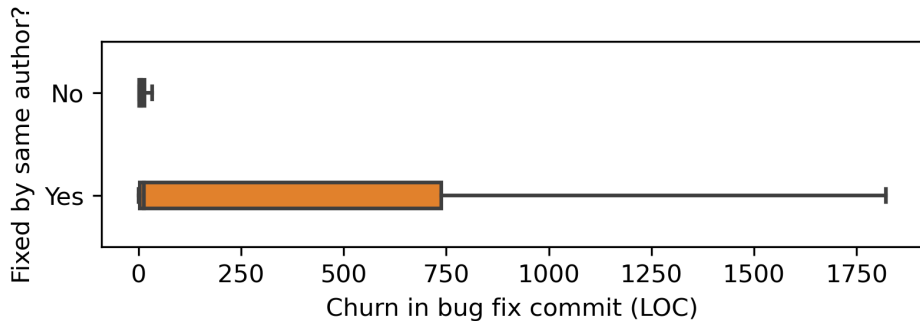# Bug fixes by same author is larger in size and varies widely

Figure 5: Distribution of bug fix size by authorship

Patterns of bug fixing

Same author simple bug fix

- Fixed quickly after introducing
- Often embedded in a larger commit

Difference author simple bug fix

- Occur sometime after the bug in introduced
- The commit often does only fixes the bug

Summary

Dataset collection

- 10,231 SStuBs from the top 100 Maven projects by popularity
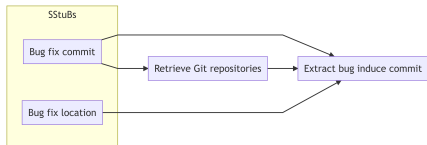

Figure 2: Extracting bug induce commit

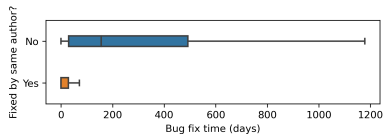## Bug fixes by same author is fast and often within the same day

Figure 4: Distribution of bug fix time by authorship

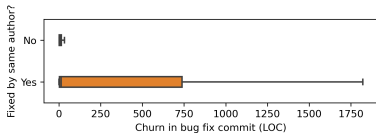## Bug fixes by same author is larger in size and varies widely

Figure 5: Distribution of bug fix size by authorship

Patterns of bug fixing

Same author simple bug fix
- Fixed quickly after introducing
- Often embedded in a larger commit

Difference author simple bug fix
- Occur sometime after the bug in introduced
- The commit often does only fixes the bug