

Evaluating the usage of fault
localization in automated program
repair: an empirical study

Deheng YANG, Yuhua QI, Xiaoguang MAO, Yan LEI

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Problems & Ideas

- Problem:
 - The two widely deployed algorithms (SFA and RFA) of utilizing fault localization differ in guiding the program repair to explore the search space and may have different impacts on automated program repair in both repair effectiveness and efficiency. However, little is known about the impacts of the two strategies on automated program repair.
- Idea:
 - A large-scale and comprehensive evaluation on the two algorithms
 - The evaluation involves 3 metrics, 4 novel repair techniques, 6 localization techniques, 60 real-world bugs and 51,000 repair attempts in total.

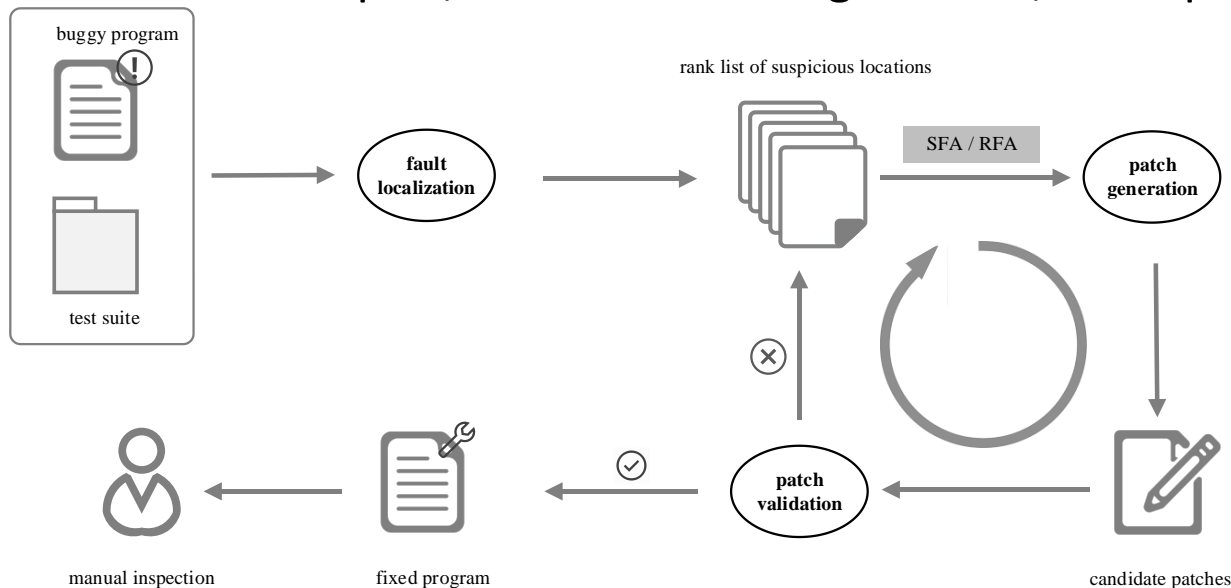


Fig. 1
SFA and RFA in the automated program repair pipeline.

Main Contributions

- 1. RFA outperforms SFA in 70.02% of cases when measured by NCP
- 2. SFA performance can be improved by increasing the suspiciousness accuracy

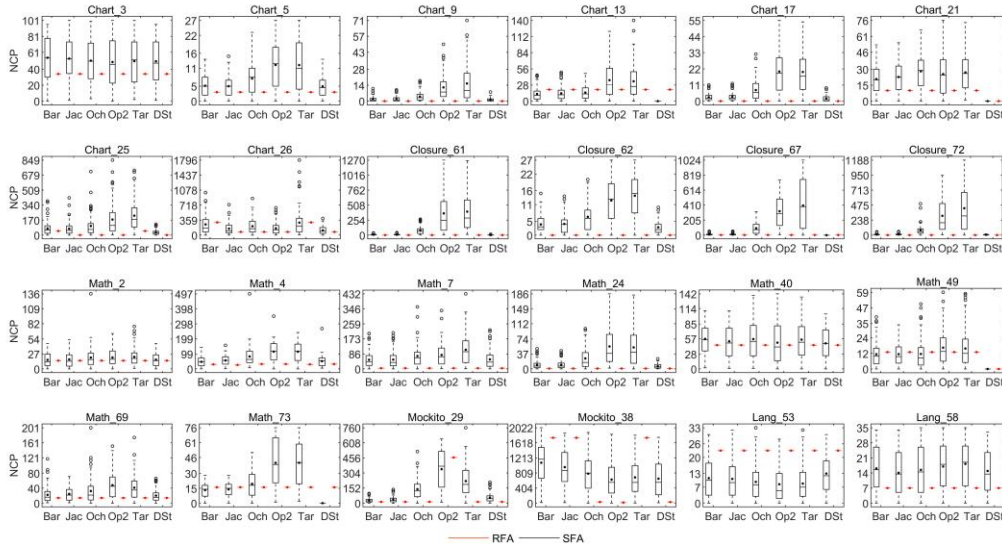


Fig. 2 NCP distributions of RFA and SFA

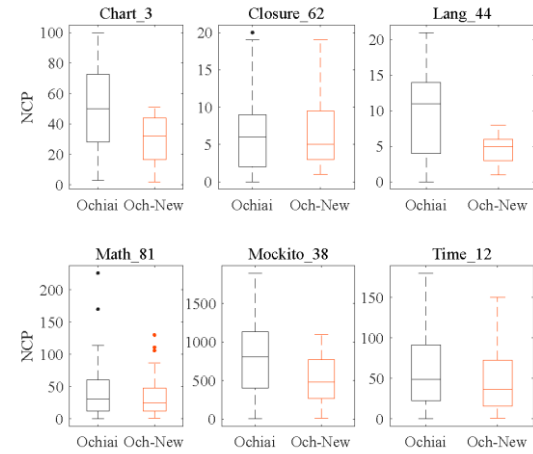


Fig. 3 NCP distributions of SFA obtained from Ochiai and "Och-New"

- 3. SFA performs better in patch diversity

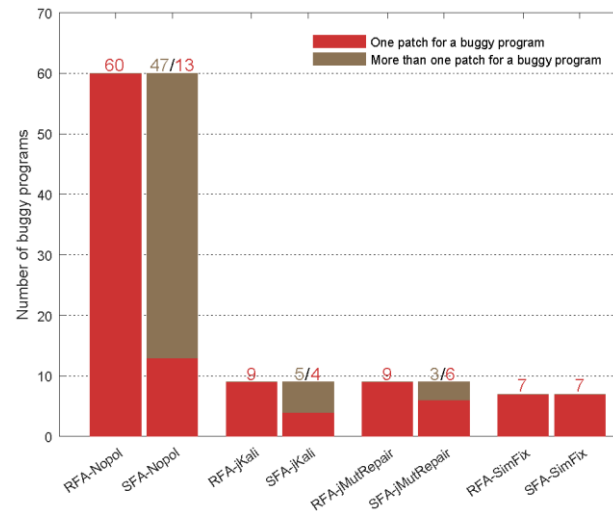


Fig. 4 Patch diversity of RFA and SFA