Mutation-Based Fault Localization

Description

The search for an error that occurred in a program is often times more time-consuming than the actual repair. In automated fault localization, a tool attempts to locate the source of the bug automatically with or without the support of the developer. Different techniques were (and are still being) developed and steadily improved to accomplish this goal, including, for example, spectrum-based fault localization (SBFL) [1] and mutation-based fault localization (MUSE) [3]. In SBFL, program traces of failing and succeeding test cases are compared to identify program elements that are likely to be faulty, whereas in MUSE, the mutation of program statements allows for conclusions about the mutated statements being correct or faulty based on the results of executed test cases. Additionally, combinations of the two mentioned techniques are possible, as presented in [2].

The student should examine the current state of existing automated fault localization techniques, with special focus on mutation-based techniques.

References


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