Assertion-Driven Test Repair Based on Priority Criteria

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Abstract : Repairing broken test cases is an expensive and challenging task in evolving software systems. Although an automated repair technique with intent preservation has been proposed, but it does not take into account the association between test repairs and assertions, leading to a large number of irrelevant candidates and decreasing the repair capability. This paper proposes an assertion-driven test repair approach. Furthermore, an intent-oriented priority criterion is raised to guide the repair candidate generation, making the repairs closer to the intent of the test. In more detail, repair targets are determined through post-dominance relations between assertions and the methods that directly cause compilation errors. Then, test repairs are generated from the target in a bottom-up way, guided by the intent-oriented priority criteria. Finally, the generated repair candidates are prioritized to match the original test intent. The approach is implemented and evaluated on the benchmark of 4 open-source programs and 91 broken test cases. The result shows that the approach can fix 89% (81/91) of broken test cases, which is more effective than the existing intentpreserved test repair approach, and our intent-oriented priority criteria work well.