

A Replication Study on Test Case Failure Prediction in the Context of Test Case Prioritization

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ABSTRACT

Background: The process of prioritizing test cases aims to come up with a ranked test suite where test cases meeting certain criteria are prioritized. One criterion can be the ability of test cases to find faults that can be predicted *a priori*. Ranking test cases and executing the top-ranked test cases is particularly beneficial when projects have tight schedules and budgets. **Aims:** In this replication study, we aim to re-investigate research questions on the ability of a logistic regression model proposed in a previous work to predict and prioritize the failing test cases based on some test quality metrics. **Method:** We performed the comparison by first rebuilding the predictive models using the features from the original study and then made an effort to improve the predictive models using new features by combining existing ones. **Results:** The results of our study, using a dataset of five open-source systems, confirm that the findings from the original study hold and that our predictive models with new features outperform the original models in predicting and prioritizing the failing test cases. **Conclusions:** We plan to apply this method to a large-scale dataset sourced from the IBM Canada Lab, to better demonstrate the improvement that our modified features provide and to explore the model's performance at scale.

KEYWORDS

Test Case Prioritization, Prediction, Logistic Regression Model, Machine learning, Replication Study.

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