

REGRESSION TEST SELECTION
BY EXCLUSION

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Regression Test Selection by Exclusion



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Abstract

This thesis addresses the research in the area of regression testing. Software systems change and evolve over time. Each time a system is changed regression tests have to be run to validate these changes. An important issue in regression testing is how to minimise reuse the existing test cases of original program for modified program. One of the techniques to tackle this issue is called regression test selection technique. The aim of this research is to significantly reduce the number of test cases that need to be run after changes have been made. Specifically, this thesis focuses on developing a model for regression test selection using the decomposition slicing technique.

Decomposition slicing provides a technique that is capable of identifying the unchanged parts of the system. The model of regression test selection based on decomposition slicing and exclusion of test cases was developed in this thesis. The model is called Regression Test Selection by Exclusion (ReTSE) and has four main phases. They are Program Analysis, Comparison, Exclusion and Optimisation phases.

The validity of the ReTSE model is explored through the application of a number of case studies. The case studies tackle all types of modification such as change, delete and add statements. The case studies have covered a single and combination types of modification at a time. The application of the proposed model has shown that significant reductions in the number of test cases can be achieved. The evaluation of the model based on an existing framework and comparison with another model also has shown promising results. The case studies have limited themselves to relatively small programs and the next step is to apply the model to larger systems with more complex changes to ascertain if it scales up. While some parts of the model have been automated tools will be required for the rest when carrying out the larger case studies.