

平成28年度 情報工学コース卒業研究報告要旨

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卒業研究題目	A Tool to Reduce Change Cost of Testing Resources	
<p>With the increasing development of information technology, no matter software or hardware, the upgrade and update are becoming more and more frequent. Also, as the functions of devices and software are incredibly numerous and complicated, in order to create reliable products, the cost of testing phase is approximately more than 50% of total development cost of IT systems. Moreover, recent IT systems tend to depend on the execution environment. Therefore, testing of these systems are also depended on environment situations. This means that testing modern IT systems needs to concern on varieties of environmental resources for executing IT systems. Testing should be implemented by managing environmental resource variable changes, because the order of testing resources may affect the total testing cost. The testing resource preparation cost may change for each test cases according to the necessary environment for the execution. For different test cases need the change of resources, the testing cost will increase. So, it is necessary to make the test more efficient by minimizing the resource change cost.</p> <p>For instance, suppose there is a test for a software, which queries data from different tables from different databases. If we manage the objects in the same table to be tested together, we can save the cost of changing in and out of these databases and tables.</p> <p>This paper presents a tool written in Python 3, which helps minimize the testing execution time of changing resources by extracting a minimum cost sequence for a set of test cases which depend on resources. There are two input for this tool: testing cases and relationship among resources (both in Excel sheet). And the output is the sequence of testing cases of reduced cost. The purpose of this tool is to extract data matrix from Excel and minizing the change cost in testing phase.</p> <p>This paper firstly gives the defination of test matrix and resource matrix and provides the way to extract these two kinds of matrix from the Excel sheet in this tool. Notice here that the resource matrix is a kind of compressed data from test matrix by identifying the test cases which has the same cost, hence we can simply test these cases together with no resource changing cost. Then, this paper discusses two algorithms (nearest neighbor algorithm and cheapest link algorithm) of the tool to minimize the cost, comparing the efficiency and deficiency of these two approaches. And finally gives some further possibility of improving the minimizing tool.</p>		