The Genetic Algorithm and Binary Search Technique in the Program Path Coverage for Improving Software Testing Using Big Data

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Software program testing is the procedure of exercising a software component with a selected set of test cases as a way to discover defects and assess quality. Using software testing automation, especially the generating of testing data increases the effectiveness and efficiency of software testing as a whole. Instead of creating testing data from scratch, Big Data (BD) offers an important source of testing data. Although it is a good source, there is a need to select a proper set of testing data for the sake of selecting an optimal sub-domain input values from the BD. To refine the efficiency of software testing, this paper proposes a hybrid Genetic Algorithm and Binary Search (BSGA) technique that is used for detecting the error-prone path in a program. The BSGA combines the Genetic Algorithm (GA) with the Binary Search (BS) algorithm that uses the BD as input values for the program path coverage, and thus enhances the software testing. The BSGA represents a robust nonlinear search technique and a better quality solution, which therefore results in a cost reduction in the software testing industry. The experiments show that the results approved the impact of using the BS to enhance the performance of the GA, in terms of finding optimal test cases and test data for the input Big Data domain values. Whereas, these results minimize the cost of testing.

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