

## Multi-Criteria Test Case Selection Using Ant Colony Optimization

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**Abstract :** Test case selection is to select the subset of only the fit test cases and remove the unfit, ambiguous, redundant, unnecessary test cases which in turn improve the quality and reduce the cost of software testing. Test cases optimization is the problem of finding the best subset of test cases from a pool of the test cases to be audited. It will meet all the objectives of testing concurrently. But most of the research have evaluated the fitness of test cases only on single parameter fault detecting capability and optimize the test cases using a single objective. In the proposed approach, nine parameters are considered for test case selection and the best subset of parameters for test case selection is obtained using Interval Type-2 Fuzzy Rough Set. Test case selection is done in two stages. The first stage is the fuzzy entropy-based filtration technique, used for estimating and reducing the ambiguity in test case fitness evaluation and selection. The second stage is the ant colony optimization-based wrapper technique with a forward search strategy, employed to select test cases from the reduced test suite of the first stage. The results are evaluated using the Coverage parameters, Precision, Recall, F-Measure, APSC, APDC, and SSR. The experimental evaluation demonstrates that by this approach considerable computational effort can be avoided.

**Keywords :** ant colony optimization, fuzzy entropy, interval type-2 fuzzy rough set, test case selection

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