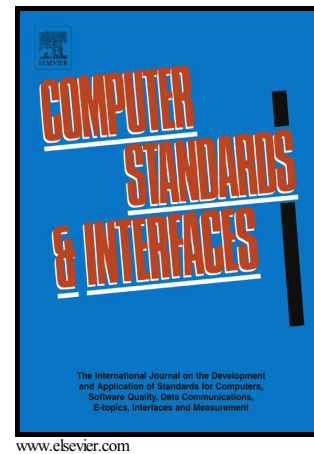


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GECOJAP: A novel source-code preprocessing technique to improve code coverage

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Abstract

Safety critical standards such as DO178B/DO178C/ RTCA (Radio Technical Commission for Aeronautics) mandates coverage based testing in Aerospace applications. These standards mandate Level A certification for Modified Condition/Decision Coverage (MC/DC). To perform exhaustive and rigorous testing, concolic testing is used in the testing phase of the software development life cycle. But, still some concolic testers need to improve their performance, so that they can achieve higher coverage. We present an automated Java code transformation technique that can be used as a front-end to concolic testing tool for achieving high coverage. We have developed four modules. The tool named GECOJAP for implementation of our approach. The first module shows a source code preprocessing technique called JEX-NCT (Java Exclusive-NOR Code Transformer) that inserts dummy branches according to Modified Condition / Decision Coverage (MC/DC) criterion. The second module represents a concolic tester named jCUTE (an open source tool) we used to generate test cases. The third module presents computation of MC/DC% using the generated test cases and original program. The fourth module shows the speed calculator that measures speed of test case generation, GECOJAP is more powerful and efficient in comparison to the existence techniques in terms of code transformation. Using GECOJAP one can, achieve higher code coverage. Also, GECOJAP results in the time and speed of the test case generation process. Our experimentation on ten

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