Methods of Synthesis of Controlled Random Tests

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2016

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Keywords: Random tests, controlled tests, multiple tests, Hemming distance, Euclidean distance.

Abstract: Controlled random tests, methods of their generation, main criteria used for their synthesis, such as the Hamming distance and the Euclidean distance, as well as their application to the testing of both hardware and software systems are discussed. Available evidences suggest that high computational complexity is one of the main drawbacks of these methods. Therefore we propose a technique to overcome this problem. A method for synthesizing multiple controlled random tests based on the use of the initial random test and addition operation has been proposed. The resulting multiple tests can be interpreted as a single controlled random test. The complexity of its construction is significantly lower than the complexity of the construction of classical random tests. Examples of generated tests as well as estimates of their effectiveness compared to other solutions have been presented in experimental studies.

Published in: Proc. IFIP International Conference Computer Information Systems and Industrial Management. CISIM 2016. Cham, September 2016. – P. 429-440. – https://doi.org/10.1007/978-3-319-45378-1_38.

Inernet link: https://link.springer.com/chapter/10.1007/978-3-319-45378-1_38.