

MECHATRONICS BOOK SERIES
SELECTED PAPERS FROM
ICOM'01, ICOM'05 AND
ICOM'08

Editors

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IMPROVING SOFTWARE TESTING BY USING STATISTICAL METHODS TO GENERATE MULTI-STRUCTURED TEST DATA

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ABSTRACT

Statistical Knowledge is an important factor for the success of scientists, researchers and developers in different fields of science. They used statistics as a powerful tool to get an efficient and effective result that leads to quality products. Software Quality is one of the important issues of recent computer-based solution since software now is widely used, complex, costly, and used in the core of many critical and risky systems. The dealing with such issue, effort required for improving software testing becomes a real challenge for software engineers. To improve software quality, an efficient and effective software testing tools is needed which requires an efficient set of test data. The recent test data generation has many problems; some of these problems can be summarized as shortage and inefficiency of some of test data generation techniques and tools; using inefficient generation techniques and resource data; and finally focusing on developer or database administrator viewpoints regardless of the user's concerns. These problems lead to lack of user's confidence in test data and software testing as all. This paper will discuss a research work for solving the above problems by designing a new model for generating test data. The model offers good flexibility that allows the user to have a full control over the test data generation processes. The model uses sample of real or assumed data as resource data and set of efficient statistical based generation techniques such as permutations, combination, sampling, and statistical distributions. The generated test data is validated according to the data specifications then tested by one of the normality testing techniques to be close to the real world or environment of the testing processes. This leads to increase the user's confidence in the generated test data and to improve the testing processes as a whole and for the betterment of the software development.

Keywords : Software Testing, Test Data Generation, Statistical Methods, Sampling, Permutation.