Research of Software Reliability Test Based on Test Model

LI Hong-Hui, School of Computer and Information Technology, Beijing Jiaotong University, Beijing, China
Zhao Ai-Hua, School of Computer and Information Technology, Beijing Jiaotong University, Beijing, China
Zhang Jun-Wen, School of Computer and Information Technology, Beijing Jiaotong University, Beijing, China

ABSTRACT

This article describes how in recent years, models-based software reliability test methods have been a hot topic. In order to summarize the research results of the reliability test models created in recent years, and to find new research hot topics on this basis, two kinds of test models are in this article. These include the operational profile and the usage model which are introduced and compared. In addition, the methods of constructing a usage model are also discussed in detail. Finally, the topic of building a usage model is presented.

KEYWORDS

Markov Chain, Software Reliability Test, Software Reliability, Test Model
INTRODUCTION

Since the mid-1970s, software engineering has been developed rapidly, therefore the software reliability engineering has made great progresses and the reliability of software has been widely concerned. Software systems are widely used in aerospace, high-speed railway, weapon fields and so on. But the reliability is a weakness in the software system according to the U.S. department of defense and NASA. The reliability of software of today’s weapon systems and aerospace projects is about an order of magnitude lower than that of the hardware. Furthermore, the development and production of software is very manual, so it is very necessary to study the reliability of software. Software reliability test can find the defects that affect the software reliability in the program, and it is the premise of evaluating the software reliability. Models based test is a common method for the reliability test, and the research on test models has stimulated many researchers’ interests. Moreover, many scholars and institutions have made contributions to the reliability test.

OVERVIEW OF SOFTWARE RELIABILITY TEST

Concept of Software Reliability Test

Reliability is an important software quality characteristic. According to the definition given by IEEE, the software reliability is defined as the probability that software does not cause system failure under the specified conditions and in prescribed time. Software reliability test is a kind of test that carried out to ensure, verify and evaluate the reliability of the software in the environment that closes to the real Situation. It has the following characteristics:

- The test environment is high-demanded: similar to the real one when the software is in real use.
- The starting point of designing the software reliability test cases is to find the defect which has a great influence on the reliability.
- The test focuses on the functions that users often used, so test cases are designed according to the probability distribution of users’ using ways.
- The defects found in reliability test can be used to evaluate reliability of the software.
- The requirements of environment and input coverage are very high, which means that the number of software reliability test cases is also relatively large.

The software reliability test is different from the general software function test, which is mainly manifested in the following aspects:

- The type of test is different. The function test mainly uses the black box test method, while the software reliability test type belongs to the statistical test in the black box test.
The License Choices of SMEs doing Business with Open Source Software: Empirical Evidence on Italian Firms
[www.igi-global.com/article/license-choices-smes-doing-business/75521?camid=4v1a](www.igi-global.com/article/license-choices-smes-doing-business/75521?camid=4v1a)

Open Source vs. Proprietary Collaborative Virtual Learning Environments
[www.igi-global.com/chapter/open-source-vs-proprietary-collaborative-virtual-learning-environments/120927?camid=4v1a](www.igi-global.com/chapter/open-source-vs-proprietary-collaborative-virtual-learning-environments/120927?camid=4v1a)