



Software Development and Test Environment Automation Based on Android Platform

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Abstract. With the advent of the mobile Internet era, the quality of Android application software and the level of user experience have become the key factors that determine the success or failure of market competition. The construction of software development and testing environment is an important part of the whole software development process. It is imperative to use machines instead of manpower to complete complicated tests that require precision. The concept of automated testing arises at the historic moment. The construction of software development and testing environment is an important link in the whole software development process. Different versions of operating systems, databases, network servers and application services, combined with different system architectures, make the types of software testing environments to be constructed various. The opening of Android system makes the development of Android Software easier. Any developer, whether a professional company or an individual, can develop their own applications. The combination of automated testing and manual testing makes up for the shortcomings found in automated testing, which requires a lot of initial investment and special personnel to maintain.

Keywords: Software development · Android · Automation

1 Introduction

The construction of software development and testing environment is an important part of the whole software development process. The combination of different versions of operating systems, databases, network servers and application services make the types of software testing environments to be built different [1]. At present, the mobile Internet is in a period of rapid development. No one expected its growth rate. Android, as a smart phone platform, is developing rapidly because of its openness, rich hardware selection, unlimited by operators and developers. With the diversity of software operating environment, the complexity of configuring various related parameters and the compatibility of testing software, the construction of software development and testing environment becomes more complex and frequent [2]. Application software is indispensable in the use of mobile phones. Especially today, smart phones have become an indispensable part of the development of mobile phones. Most software development environments are reusable, but often different software development and testing environments need to alternate [3]. The opening of the Android system makes Android software development

easy. Any developer, whether a professional company or an individual, can develop their own applications and share them with others.

With the increasing demand for various aspects of the software operating environment, the complexity of configuring various related parameters, and the compatibility of testing software, the work of building a software development and testing environment has become more complicated and frequent [4]. The cost of software testing needs to account for nearly half of the total cost of software development, and the required test work time is generally more than 50% of the software development cycle. This illustrates the complexity and complexity of software testing. With the rapid development of application software, the update of the Android system, the rapid popularization of intelligent terminals and the continuous progress of testing technology, past testing work has exposed more and more problems and deficiencies, including old test terminals [5]. After entering the testing phase, test engineers need to perform system-level testing, including functional testing, performance testing, stability testing, etc. For each different version of the software, it is also necessary to verify the existence of version regression in the test [6]. Testers should realize that software testing is not only a process to ensure the quality of software products, but also integrated into the whole company's software development process to supplement and promote software development..

2 Software Development Test Environment Based on Virtualization Architecture

Except for the operating environment of various mobile phone systems, the other is the same as the traditional software. However, in the development phase, the same tests as normal software testing methods are still required. In the test process, according to the actual situation, the tester cannot list all the test cases. A few representative cases can only be selected from a large number of test cases to represent other values not listed in this category. Software quality must be improved, and software testing is an important and effective means to ensure software quality. Each product can be encapsulated into a class, and its base class can encapsulate the common attributes of each product [7]. For mobile phones, the memory information to be recorded includes the total memory of the mobile phone, the remaining memory currently available and the memory occupied by the software to be tested. A large number of errors in the test occur at the boundary of the input and output ranges, rather than inside the input and output ranges [8–10]. Then, we need to focus on writing test cases for boundary conditions.

Each test program contains one or more test cases for specific types of components, where the test methods are specifically defined. At the same time, we should study the current standards and specifications, and check whether the product specifications are applicable to the correct standards, whether they conflict with the standards and specifications, and whether there are any omissions [11–13]. Android platform is carrying more and more traffic. The research on the security and stability of Android platform is becoming more and more important. Figure 1 shows the relationship between name node size and data node size.

With the rapid development of software testing, automated testing is becoming a very noticeable trend and trend in the field of software testing. In the product line

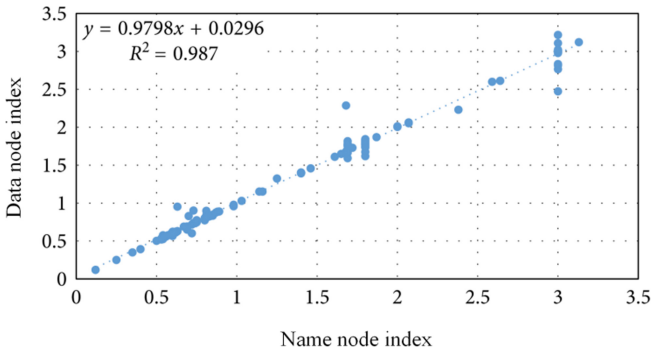


Fig. 1. Relationship between the size of the name node and the size of the data node

of the same product supplier, each product usually has the same characteristics and functions, and each product has its own unique attributes and functions [14–16]. Due to the characteristics of Android system, processes that are not displayed in the foreground are in the suspend phase, and a part of memory will be released. The memory occupied by the background display is not actually running, so the data in the running state must be recorded to correctly reflect the information of the software. The testing speed is far behind the release speed of the product. In this case, if there is no automated testing to help, manual testing can only sigh. One application program implementing the control device executes part of the test case while the other part operates another application program of the device. For example, a message containing photos taken by a camera application as attachments is sent.

3 Design Requirements of Android Software Automated Test Platform

In order to standardize the workflow and ensure the development quality of automated test cases. The quality of software products has certain special characteristics, which is very different from the quality inspection of other products, and computer hardware products in the same field are also different. The quality measurement of software products cannot be directly detected. The client of mobile application testing system is the module that truly realizes testing behavior. It is responsible for analyzing testing scripts, executing testing tasks, realizing testing cases, reporting testing results, and recording testing logs [17]. The client program in the test framework passes the test cases to the server program. After the server program executes, the test result is returned to the client program, which saves the result locally as an object. The computer software codes according to the test rules, executes in the computer environment, and automatically verifies the response and behavior of the tested program [18]. The management tool processes all the events input by the user interface through the built-in command parser, and converts these events into understandable forms and passes them to the appropriate modules. The test management platform is responsible for communication with the central management platform and management drives the overall test system. The test management platform makes a good test task schedule according to the test frequency and time requirements of the test plan.

Since most of the errors come from the requirement analysis stage, the correctness and accuracy of the requirement analysis is crucial to the future process. According to the test requirement analysis report, design test cases to fully cover the test requirements for each test requirement point. Most software testing is based on manual testing, but with the development of software industry, the complexity of software testing is also increasing. If the test plan does not exist or the auxiliary plan contained therein does not have corresponding test station information, the operation will fail in the initialization phase. At the same time, the demand side or users have higher and higher requirements for the software, so we should pay attention to the readability and maintainability of the script in the writing process. Test scripts play a key role in the automated testing process [19]. For software testing, which scripting technology to use is not the most important, and it is the most important to consider the test case system supported by scripts. As a test of software product quality, these related factors should be covered as much as possible to obtain a comprehensive evaluation of software product quality.

4 Conclusion

The combination of automated testing and manual testing not only makes up for the deficiencies found in automated testing, but also solves the shortcomings of low efficiency and large duplication of work in manual testing. Equipment suppliers and software development companies have already used some system automation testing tools. However, these tools are not perfect and have many restrictions on use, not systems. With the increasing complexity of software, the problems of low efficiency and low accuracy of manual testing are gradually exposed. Software testing automation can not only save human resources, but also, more importantly, it can discover the functional defects and user experience related problems of application software faster and earlier and shorten the improvement period. This paper studies a new type of automatic testing system, which not only meets the requirements of cross application and cross equipment testing, but also does not judge the test results according to the graphical interface. To some extent, the software developed based on Android system has the complexity of PC software, so in order to ensure the quality of such software, efficient testing is very important. During Android testing, the screenshot is obtained and transmitted to the server, and the similarity comparison of the images is completed at the server, and the completion of the test is given by comparing the screenshot sequence of the operation.

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