

# **A Comparative Analysis of GUI Testing For Dynamic Web Application Between Automation Testing (Record and Playback Approach) and Exploratory Testing: Administration of Sundawenang App**

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## **Abstract**

Software testing is one of the most important stages of the Software Development Life Cycle. There are various software testing approaches that are often used and useful in finding errors in software, two of them are Automation Testing and Exploratory Testing. Graphic User Interfaces (GUI) is one area of Automation Testing and Exploratory Testing. GUI testing involves the execution of widget-related events. Dynamic web pages are a type of web page that is currently used by most web developers and has a complex GUI. GUI testing needs to be done on dynamic web pages, and complex GUI structures will be a challenge for the tester to find the right way to test dynamic web pages. To solve the problem, this Thesis does a comparative analysis between two methods, Automation Testing and Exploratory Testing. Those methods are chosen because the two methods have different emphases but both are fully compatible. The analysis is done by calculating the average execution time and defect density from the two methods carried out. The result of the analysis shows that automation testing has the same good ability to detect defects. But, automation testing is the faster method than exploratory testing.

**Keywords:** Software Testing, GUI Testing, Dynamic Web, Automation Testing, Exploratory Testing.

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## **1. Introduction**

### **Background**

Software testing is needed in today's digital era. Software testing is one of the most important stages of the Software Development Life Cycle. Software testing is a process to confirm that the software produced by programmers is a quality product and to ensure that the manufactured product works according to the specifications and satisfies the needs of the customer [1]. Software testing aims to detect defect of the software meanwhile the defect can be repaired. Software testing is also used to test the software for other quality factors such as reliability, usability, integrity, security, capability, efficiency, portability, maintenance, compatibility, etc [1].

There are various software testing approaches that are often used and useful in finding errors in software, two of them are Automation Testing and Exploratory Testing. Automation testing is a testing method for software that is run automatically. Exploratory testing is a testing style that emphasizes the individual tester's personal freedom and responsibility to optimize the quality of his or her work by treating test design, test execution, test result interpretation and learning as mutually supportive activities that continue in parallel throughout the project [2].

Graphic User Interfaces (GUI) is one area of Automation Testing and Exploratory Testing. GUI account for half or more of the amount of source code in modern software systems [3]. GUI testing consists in the execution of events associated to widgets and in the monitorization of the resulting changes in the program state [4]. Some of failures can only be found when testing through the GUI, and the failures that can be found during GUI testing are visible for the end users too [5]. GUI-based bugs have a significant impact on users. 60% of defects can be traced to code in the GUI, and 65% of GUI defects resulted in a loss of functionality [6]. But, the process of GUI testing takes long time. According to the QA estimation statistic, testing of an application with GUI takes 30-35% of its development time and testing of a distributed application with GUI takes 35-50% of its development time [7].

Dynamic web pages are a kind of web page that is presently broadly utilized by web engineers and has a perplexing GUI. Dynamic web pages are composed by content and layouts that are rich in information in them [8]. Contents and layout of a dynamic web page are changed and updated every time that page is requested by user [8]. However, there are still many dynamic web pages that have failure and are not functional dependable as they should. Recent studies and reports showed that 29 of 40 leading e-commerce sites as well as 28 of 41 government sites showed evidence of defect when used by web users [8]. Thus, dynamic web pages really need to be done GUI testing and complex GUI structures will be a challenge for the tester to find the right method of doing these tests against dynamic web pages.

Testing through GUI of dynamic web can be done with various techniques, such as Manual, Model-Based, Automation, Exploratory, etc. This Thesis will conduct a comparative study between the two GUI testing methods, namely Automation Testing and Exploratory Testing because the two methods have different emphases