

# AN EFFICIENT KEYWORD DRIVEN TEST AUTOMATION FRAMEWORK FOR WEB APPLICATIONS

Abhishek Jain<sup>1</sup>, Sheetal Sharma<sup>2</sup>

<sup>1</sup>M.Tech Student, Department of Computer Science and Engineering, ASET, Amity University, Noida, U.P, India, [er.abhishek89@gmail.com](mailto:er.abhishek89@gmail.com)

<sup>2</sup>Assistant Professor, Department of Computer Science and Engineering, ASET, Amity University, Noida, U.P, India, [sheetal.meenu@gmail.com](mailto:sheetal.meenu@gmail.com)

## Abstract

Software development life cycle consists of many phases for the software development, testing is one of the final phases before the delivery of software product. Quality and cost of the software product mainly depends upon software testing phase. Therefore, premium methods should be follows for the software testing.

Appointing additional test engineers are not feasible long term solution, but also need to reduce overall cost of the project by adapting test automation frameworks. There are different types of automation frameworks are available for software testing. Keyword driven test automation framework ensures the three main characteristic (Quality, Time and Cost) of software testing. Keyword driven framework reduces the complex script programming knowledge problem for the automation testing. Manual testers are also being able to create test scripts simply by combining the keywords.

The main objective of this research work is to design and develop keywords. With the help of keywords it is possible to create test cases easily and quickly. A keyword driven test automation framework is used for the execution of the keywords. Framework executes these keywords on some simple web applications. Execution results can be used by test engineers as well as business users for their reporting or analysis purpose.

**Index Terms:** Software testing, Test Automation, Test Automation Frameworks, Keyword driven framework.

\*\*\*

## 1. INTRODUCTION

Quality, Time and Cost are the main characteristics for the development of the any software product. For improving the quality of the software product, there are lots of the testing methods which are adapted by the industries. Manual and Automation testing are the well known methods which are majorly used. Automation testing fulfils the Quality and Time characteristics for any software product [4].

Most of the companies move for the commercial automation tools because of the features provided by the tools. But license cost of the commercial automation software testing tools creates a big budget problem for the software product. Apart from the cost of the automation tools, skilled automation software engineers are also required who should have domain knowledge of the application as well as scrip programming knowledge. One smart solution for this problem is test automation frameworks [5, 7].

A test automation framework is the arrangement of assumptions, ideas and tools that provides some core functionality like as functioning, monitoring and reporting [2]. In the other words, Test Automation is testing of the software product with the help of other software. There is large number of approaches to test automation, and all have the different way of working [3].

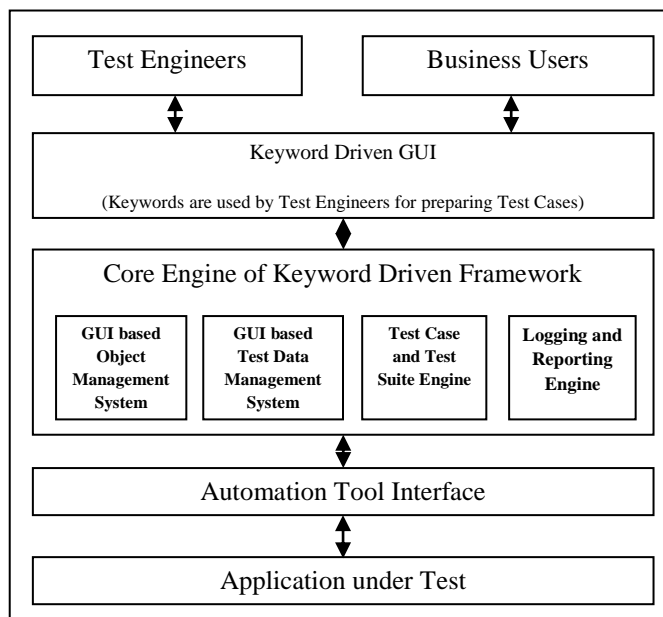
The main goal of this research work is to develop keywords and describes how test cases are designed and implemented with the help of keyword driven test automation framework. Section 2 explains the proposed architecture of keyword driven test automation framework Section 3 explains the experimental results of keyword driven framework with some sample web applications and also discuss some key benefits of the this methodology. Finally section 4 discusses conclusion and future enhancement of this research work.

## 2. PROPOSED METHODOLOGY

Keyword driven test automation framework are mainly adopted framework by lot of software industries. Keyword driven automation framework are consists of majorly three parts: Test data, Test libraries, and Test automation framework [1]. Test data contains the inputs and expected outputs. Test libraries are the interface the system under test and framework. Test automation framework reads the test data and handles the errors when these tests are under execution [7, 11].

### 2.1 Architecture of Keyword Driven Test Automation Framework:

There are several components in our keyword driven test automation framework, which are described in the architecture of the framework.



**Figure 1:** Architecture of Keyword Driven Test Automation Framework

A brief introduction of each component is given below:

- Application under Test - There should be some application for test. Here in this keyword driven framework, web application are used for the testing.
- Automation Tool Interface – For automate the test cases, there should be some automation tool. Here in this keyword driven framework, an open source tool, Selenium is used for the execution of the test cases. This automation tool interface executes the test cases with the help of the java run time environment.

- Core Engine of Keyword Driven Framework – This one is the main part of the whole framework, which is responsible for the management of the all framework. Firstly, there is a GUI based object repository which stores all the objects and their respective properties. Similarly, GUI based Data repository contains the test data which is used for the testing purpose. Test cases are created with the help of keywords which are further executed by test suites. Finally, Results are generated and corresponding test reports can be created for the analysis purpose.

- Keyword Driven GUI – Keyword Driven GUI provide the various keywords, due to which test cases are designed. There can be some arguments or values which are required for the use of keyword. Each keyword has different kind of arguments which can be a static value or can be data table value.

- Report for Test Engineers & Business Users – Finally, Results are out after the execution of the test cases and these results are used be test engineers for preparing the bug reports and pass it to software developer who creates the application, for fixing the bug and similarly these results and reports can be used by business user for the analysis purpose.

### 2.2 Proposed Keywords

A keyword is used as a reference term for the execution of some defined task regarding that keyword. Every Test Case consists of the various keywords. Keywords are written in simple English language, which are very easy to understand [10].

Some keywords are defined in the form of table which shows every keyword name with its input arguments and comments.

Keyword Name	Input Argument	Comments
openBrowser	2	To open the given URL on the given Browser name.
refreshBrowser	0	To refresh the current browser session.
fetchBrowserURL	0	To fetch and return the Url of the current open browser.
typeText	2	To type the given text in the given editbox.
typeKeys	2	To type the given keys in the given editbox.

getText	1	To Get Contents from an object
selectRadio	1	To set the given Radio
Click	1	To click on a given object
dblClick	1	To double click on given object
getProperty	2	To get the given property value of an object
Wait	1	To put up Static Wait
closeBrowser	0	To close the currently opened browser session.

Table 1: Sample Keywords used in framework

### 3. EXPERIMENTAL RESULTS

A Web Application is taken for testing the functionality of various components of a web page. Take Google (URL: www.google.co.in) as the sample web application and check the functionality of the “Google Search” Button.

Creation of Test Case with the help of keywords and following are the steps:

1. openBrowser: This keyword open the web browser with the given URL, ([www.google.co.in](http://www.google.co.in)).
2. typetext: This keyword type the given text; for example we take “ieee xplore” in the search text box.
3. Click: This keyword click on the “Google Search” button.
4. Wait: This keyword is used for wait for some time while the page is not load.
5. closeBrowser: This keyword is used for close the open web browser.

Action	Action Input	Comments
openBrowser		To open the given URL on the given Browser name.
typeText	Search_Text box	To type the given text in the given editbox.

Click	Search_But on	To click on a given object
Wait	5	To put up Static Wait
closeBrowser		To close the currently opened browser session.

Table 2: Test Case for checking functionality of “Google Search” button.

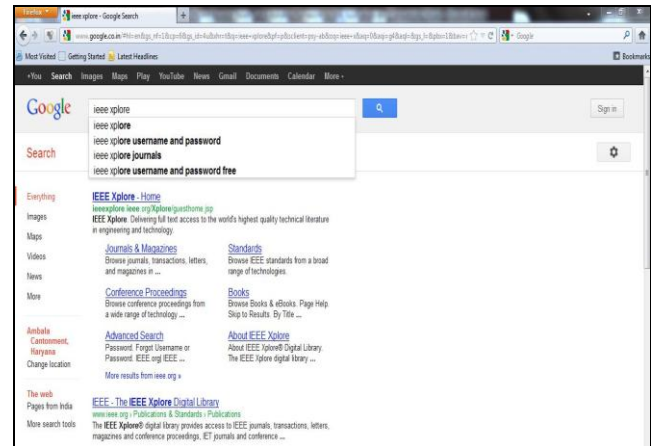


Fig3: typetext keyword types “ieee xplore” in search text box.

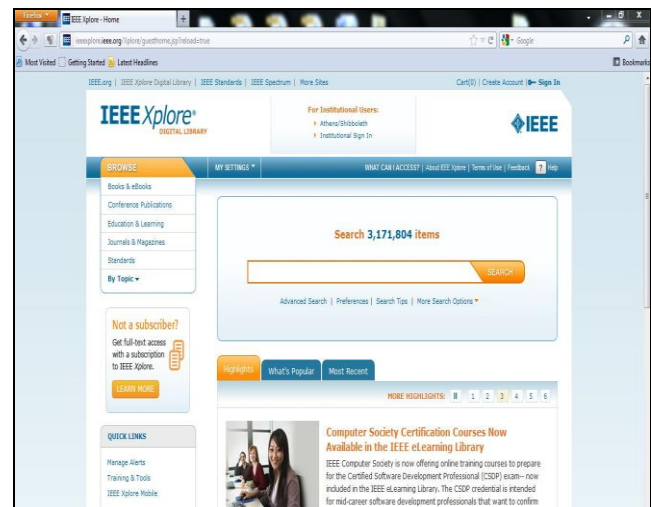


Figure 4: Click on “ieee xplore” link and open “IEEE Xplore” website.

Similarly, it is possible to create test cases with the help of keywords and execute these keywords by keyword driven framework without the knowledge of programming script language.

### 3.1 Key benefits of keyword driven test automation framework:

1. Early Automation can be possible.
2. Manual tester with zero scripting knowledge to quickly automate his test case.
3. Easy to maintenance of keywords as compare to programming scripts.
4. Overall testing process takes less time.
5. Also reduce the cost of testing by using the open source tool.
6. Business users can also analysis test execution results with the help of keyword driven test automation framework.

### CONCLUSION & FUTURE WORK

The main contribution of this paper is to study the keyword driven test automation framework. Detailed study has been conducted on the architecture and developed some sample keywords for web applications. Test result of the framework shows that keywords execution time has been low, which affects the overall testing phase.

Future work will develop the domain specific - requirement based knowledge repository. Knowledge repository contains domain specific keywords that will help in faster execution of the keywords and save lot of time and project budget.

### REFERENCES

- [1] G. A. Di Lucca, A. Fasolino, F. Faralli, and U. D. Carlini. "Testing web applications" in International Conference on Software Maintenance, 2002.
- [2] Laukkanen, Pekka, "Data-Driven and Keyword-Driven Test Automation Frameworks", Master's Thesis, Software Business and Engineering Institute, Department of Computer Science and Engineering, Helsinki University of Technology, 2006.
- [3] Edward Kit, "Integrated, Effective Test Design and Automation", February 1999.
- [4] Burnstein, Ilene, Practical Software Testing: a process-oriented approach. 709, Springer, New York, 2003.
- [5] Pettichord, "Seven steps to test automation success" in Proceedings of the Software Testing, Analysis & Review Conference (STAR), 1999.
- [6] R Mugridge & W Cunningham, "Fit for Developing Software: Framework for Integrated Tests", Prentice Hall PTR, 2005.
- [7] M. J. Harrold, "Testing: a roadmap" In Proceedings of ICSE, pages 61-72, 2000.
- [8] Eun Ha Kim; Jong Chae Na; Seok Moon Ryoo, "Implementing an Effective Test Automation Framework" in Proceedings of COMPSAC '09. 33rd Annual IEEE International on volume 2 pages no 534-538, 2009.
- [9] Hamill, Unit Test Frameworks, O'Reilly Publications, 2004.
- [10] Pajunen, T.; Takala, T.; Katara, M. "Model-Based Testing with a General Purpose Keyword-Driven Test Automation Framework" in Software Testing, Verification and Validation Workshops (ICSTW) on page no. 242-251, 2011.
- [11] Craig and S. Jaskiel. Systematic Software Testing. Artech House Publishers, 2002.
- [12] M. Grindal, J. Offutt, and S. F. Andler "Combination Testing Strategies: a Survey", Software Testing, Verification and Reliability, Vol. 15, No. 3, pp. 167-199., 2005.
- [13] I. Pinkster and Buwalda, D. Janssen, "Integrated Test Design and Automation: Using the Test frame Method". Addison-Wesley, 2002.
- [14] B. Pettichord and Kaner, J. Bach, "Lessons Learned in Software Testing: AContext-Driven Approach", John Wiley & Sons, Inc., 2001.
- [15] Michael Kelly, "Choose a test automation framework", QA, Liberty Mutual, Web URL: <http://www.ibm.com/developerworks/rational/library/591.html>, 20 Nov 2003
- [16] B Liskov, "A Framework for Automated System Testing", WebURL: "dSPACE.mit.edu/bitstream/handle/1721.1/40188/35334586.pdf", 1996.
- [17] B. Posey and Mosley, "Just Enough Software Test Automation", Prentice Hall PTR, 2002.

**BIOGRAPHIES**

**Abhishek Jain** received his B.Tech degree from Kurukshetra University, Haryana and currently pursuing M.Tech in Computer Science and Engineering from Amity University, Noida. His Research area includes Software Testing, Software Engineering, Data Mining and Wireless networks.



**Sheetal Sharma** received her M.Tech degree from GGSIP University, Delhi. Her Research area includes Software testing, Software engineering, Software Project Management, DBMS.