Dissertation Title:
Characteristic of Good Test Automation Framework & its Design

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Abstract

Key Words: Software Test Framework, Automation, Design Pattern, Page Object Model.

Customers frequently ask for complicated business logic to be implemented in software programs. Because of this, the testing team is under more pressure to provide the product in a short amount of time while maintaining good quality. In terms of both time and human resources, manual testing is not appropriate for essential and sophisticated applications. Therefore, there is a critical need to suggest an automated testing framework that might shorten the time required for software testing as a whole. To solve the issues with manual testing, automation testing has been created. The goal of this dissertation is to provide a new automated testing framework for web applications that improves the automation process. A test automation framework is an organized set of concepts, abstract notions, presumptions, and implementations that supports software testers in automating software testing. It can also be described as a collection of integrated functions that facilitate the automation process as a whole. Additionally, to enhance the reusability of the automated tests, this project work greatly aid in regulating and monitoring the execution of business test scenarios. The current available framework does not fulfill all the testing needs due to less feature availability.

Our suggested Software Test Automation framework gets over the drawbacks of conventional automation methods.by incorporating all testing jobs within the automation. The well-organized test case stages are converted into reusable, programable test scripts, which are then read by the open-source Selenium API and executed within a web browser. Since the framework's primary role is source code creation, little programming experience is necessary to automate web applications. Only the produced testing steps will be updated or added by the tester. By doing this, the work of starting from scratch with automation initiatives is eliminated. The suggested framework's primary goal is to lower the overall cost of the test automation process.

Contents

Problem Statement: There is not a single framework either paid or free available in the market which fulfill all the automation requirement be it backend or frontend services, some are keyword driven few are data driven, some provide either recording facility or reporting facility only. Hence, we decided to implement hybrid, robust, reusable, stable, and consistent framework having good reporting and logging features available.

Background: The importance of software testing cannot be denied in the process of developing high-quality systems and applications. The scope of software testing is growing rapidly as the complexity of application increases. Testing is needed because we human made mistakes while developing the system or application, some mistakes are not important but some need to be corrected immediately.

Therefore, issues need to be identified, fixed, and validated in the application to reduce the development cost and delivery time. Software testing can be done manually but the agile process of development where requirements change very frequently. It is difficult to test all scenarios in short sprint cycle. In the current development process continuous delivery is a standard practice, it helps in faster release, along with stable and reliable operations.

Hence automation here allows us to facilitate this requirement, track the progress of each pipeline steps and alert the system for any failure, It improves accuracy and consistency in the test results, able to execute more test cases in less time in turn save cost and reduce product launch time.

So we are going to propose the design of Testing Automation framework which will include most of the modern framework features like ease of use, scalability, Traceability, Maintainability, Compatibility, Minimal manual intervention and so on.

Objective: Development of POM (Page Object Model) based design framework using Python coding language and selenium as web interacting library and html reporting engine for dashboard data visualization.

- Literature review of existing Test Automation Framework used in the testing
- Incremental design of flexible and reusable Automation Framework
- Use Page Object Model Design Pattern
- Framework should support Data Driven type of testing
- Should have reporting feature integrated
- Framework should be flexible enough to extend and support to new features
- Framework should support screenshot capture in case of test case failure.
- Feasible to integrate with CICD pipeline and schedule the test case based on condition.

Scope of Work:

An automation framework is set of abstract concepts process procedure and environments in which automated test are designed. A test automation framework provides certain core

functionality like logging and reporting along with testing capabilities of the features. The new screen automation should be extended by adding new libraries. Scope of work to Develop (Page Object Model) based Test Automation framework for the web Application testing. Crete a folder hierarchical structure used for logical interaction between different components. Generate sample code scripts and sample templates for code structure which will be extended to new features.

Benefit to the Organization:

- Improve test case execution efficiency and provide more test case coverage.
- Greater test result accuracy with detailed report and monitoring.
- Help in running the automated test cases through CICD git lab pipeline

Software Resource Needed:

1. Python
2. Pytest
3. Selenium
4. HTML Report
5. Git Hub
6. Jenkins Integration

Plan of Work:

Expected Date	**Work Plan**
11-01-2023 to 20-01-2023	Outline report preparation, Analyze the data and gather details from different sources.
20-01-2023 to 05-02-2023	Literature review, different type of automation framework available in the market and their pros and cons and its documentation.
05-02-2023 to 10-03-2023	Building Framework implementation by creating libraries, helper files, utility, packages, writing testing script for different pages model, creating test suites, configure and installation of ci/cd tools like Jenkins and git hub, creating configuration file to run the test cases from ci/cd pipeline. Scheduling the pipeline generating test automation report. Analyze the failure and add logging facility in the script. Apply best practices and standard in the code and evaluation
10-03-2023 to 20-03-2023	Testing and debugging the framework & Mid Sem report submission
21-03-2023 to 01-04-2023	Complete pending tasks, Final Project Report work & Presentation submission

Literature References

To work on research and implementation project, it is necessary to explore latest research and new development going on this field. In this project literature review is more inclined towards design of automation framework which includes latest patterns and domain specific framework. The following references considered for literature review.

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Remarks of the Supervisor

The project chosen for dissertation is very much relevant to the scope of the industry current operation and working. This will help the student to enhance his knowledge in understanding of framework complexity and implementation details, the literature review included in the domain of research relevant and justified the level of dissertation for master studies. The outcome of this project helps the organization to take judicious decisions in test case automation together with implementation based on the requirement of the project and market needs.

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE,
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WORK INTEGRATED LEARNING PROGRAMMES (WILP) DIVISION
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