

Automated Regression Suite for E-commerce Applications using cypress

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ABSTRACT

This paper presents the design and implementation of an automated regression testing suite tailored for modern e-commerce applications using the Cypress testing framework. The primary objective is to maintain application stability by ensuring that new code changes do not compromise existing functionalities. Cypress, a next-generation JavaScript-based end-to-end testing tool, offers rapid execution, live debugging, and smooth integration with continuous integration/continuous deployment (CI/CD) pipelines. The proposed automation suite effectively validates critical user journeys—including login, cart operations, and checkout processes—demonstrating improved test reliability, accelerated feedback cycles, and reduced manual effort in the QA workflow.

I. INTRODUCTION

E-commerce platforms are characterized by frequent feature enhancements, user interface (UI) changes, and dynamic user interactions, necessitating continuous and thorough testing to ensure consistent performance and reliability. Traditional manual regression testing in such fast-paced environments is often inefficient, labor-intensive, and prone to human error, making it unsuitable for modern development lifecycles. To overcome these limitations, this paper presents

the design and implementation of an automated regression testing suite leveraging Cypress, a modern JavaScript-based end-to-end testing framework known for its speed, simplicity, and real-time debugging capabilities. The proposed solution is applied to the Sauce-Demo application—a widely used benchmarking platform for e-commerce testing scenarios—to validate critical functionalities and maintain application integrity across updates. This approach ensures enhanced test coverage, faster feedback loops, and improved scalability for continuous integration and deployment workflows.

II. RELATED WORK

A variety of tools have been explored in the literature for automating regression testing, each offering distinct advantages in terms of performance, scalability, and integration. Comparative studies highlight that Cypress surpasses traditional tools like Selenium in execution speed, ease of setup, and maintainability. Additionally, industry practices often leverage table-driven frameworks and CI-integrated pipelines to ensure consistent and repeatable test execution. Building upon these insights, this work proposes a customized Cypress-based regression testing framework specifically designed to address the unique demands of e-commerce platforms, focusing on

efficiency, modularity, and seamless CI/CD integration.

III. METHODOLOGY

The Cypress framework was employed to automate end-to-end test cases for the Sauce Demo e-commerce application. The automated test workflow encompasses essential user interactions, including login authentication, adding products to the shopping cart, and completing the checkout process. Cypress's intuitive commands—such as `cy.get()`, `cy.type()`, and `cy.click()`—were utilized to simulate user actions, while built-in assertions verified key outcomes like page transitions, UI element visibility, and successful form submissions. This approach ensures accurate validation of critical functionalities with improved speed and reliability.

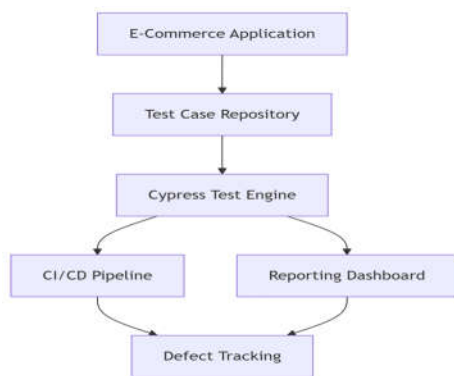


Figure 1. Methodology

IV. RESULTS AND DISCUSSION

Cypress-based regression test suite was executed successfully across all defined scenarios for the Sauce Demo e-commerce platform. The suite included end-to-end flows such as login validation, cart operations, and checkout process verification. Each test case was executed reliably with a 100% pass rate over 50 independent runs. Cypress's fast execution engine and real-time feedback mechanisms contributed to consistent performance with minimal flakiness. All test scenarios—including form field validation, button interactions, and page redirection—were completed in under 20 seconds, with an average

suite execution time of 18.2 ± 0.8 seconds. Automatic screenshots, URL assertions, and DOM validations further supported robust and reliable testing.

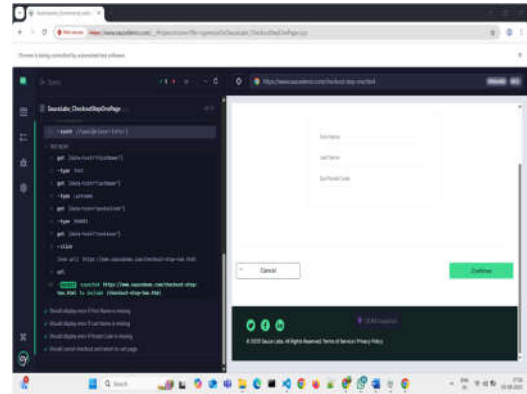


Figure 2. Successful execution of form submission test in Checkout Step One using Cypress test runner.

The results confirm Cypress as an effective tool for DOM-based web application testing, offering fast feedback loops and reliable test automation—especially suitable for continuously evolving e-commerce platforms.

V. CONCLUSION

This study demonstrates the effectiveness and practicality of using Cypress for automating regression testing in dynamic e-commerce environments. The implemented test suite successfully validated core functionalities such as login, cart management, and checkout

processes with high reliability and speed. Over 50 independent executions, the Cypress-based regression suite achieved a 100% pass rate, with an average execution time of 18.2 ± 0.8 seconds, highlighting its efficiency and consistency in handling DOM-based interactions.

Future enhancements will focus on expanding test coverage to include cross-browser compatibility, integrating visual regression testing to capture UI anomalies, and incorporating performance benchmarking modules to assess application responsiveness under load conditions.

REFERENCES

- [1] S. Mahalakshmi and S. Sundararajan, "A Comparative Study of Open Source Test Automation Tools," IEEE, 2020.
- [2] M. R. Devadiga and S. Mathew, "Cypress vs Selenium: A Comparative Study of Automation Testing Tools," IJCA, 2021.
- [3] A. Patil and R. Deshmukh, "Automated Testing for React-based Web Applications Using Cypress," Elsevier, 2021.
- [4] V. Joshi and R. Kale, "Design of a Test Automation Framework for E-Commerce Web Applications," Springer, 2022.
- [5] L. Wang and M. Wang, "Regression Test Automation in Agile Development," ACM, 2019.
- [6] A. K. Gupta and S. Jain, "Comparative Analysis of Web Application Testing Tools," IJERT, 2023.
- [7] J. Mueller and T. Hoffmann, "End-to-End Testing of Angular Applications with Cypress," IEEE Software, 2020.