Emerging Importance of Artificial Intelligence in Software Testing

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Abstract: *Artificial Intelligence is defined as the "study of intelligent agent: any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals." AI in software testing tools make the software development life cycle easier by the use of reasoning, problem solving and in some cases machine learning. AI can reduce the amount of tedious task in testing. Applying AI will reduce the involvement of tester in most mundane tasks. AI also reduces failure rate and shortens software development process.*

Background*: In 1980′s the major model used in software development was waterfall model and testing was completely manual. Then in 1990′s tester uses bulky automation tools which were highly unstable and expensive. In 2000′s testers uses agile testing and XP, Scrum, Kamban became a standard process in SDLC. In 2010′s crowd and cloud testing started and testers also had DevOps, continuous testing and CI/CD integration but future of software testing which mainly includes autonomous testing using machine learning and Artificial Intelligence.*

Artificial Intelligence Tools: *Tools of AI can overcome many of the common hurdles of automated software testing. Some of the tools are Testim, Applitools, Funtionize, Test-Craft, Mabl, TensorFlow, Uipath Test Suite etc.*

Result: *Using AI in software testing results in enhanced accuracy, greater test coverage, saves time and money, improve speed of business etc.*

Conclusion: *Use of AI in software testing will make the entire software testing process faster, easier, clearer and economical and not only this, AI also bring in human-like decision making abilities which helps in releasing high quality software more efficiently and accurately.*

Key Word: *Testim; Applitools; Test-Craft; Funtionize; Mabl*

I.   Introduction

Latest trend used in software testing is artificial intelligence as it speeds up the altering, execution and maintenance of the tests. AI can be used to validate the alterations by scanning of any overlap that may otherwise difficult in manual testing. AI can detect bugs and errors much faster and more efficiently without human intervention.[1]

Artificial Intelligence is a branch of computer science that has become an essential part of the technology industry as it aims to create intelligent machine. AI algorithms can tackle perception, problem solving, logical reasoning and learning. Five major AI tools in software testing are:[1, 2]

1.   Testim: It allows users to create resilient end to end test that can either be codded or codeless.
2.   Applitools: These are best for the application that involves visual testing.
3.   Test-Craft: It monitors web applications and it is also a test automation platform for regression and continuous testing. Testers can visually create automated, selenium based test.
4.   Funtionize: It is a cloud-based automated testing technology which lets anyone create end-to-end test in minutes.
5.   Mabl: It creates robust automated tests that are codeless and script less.

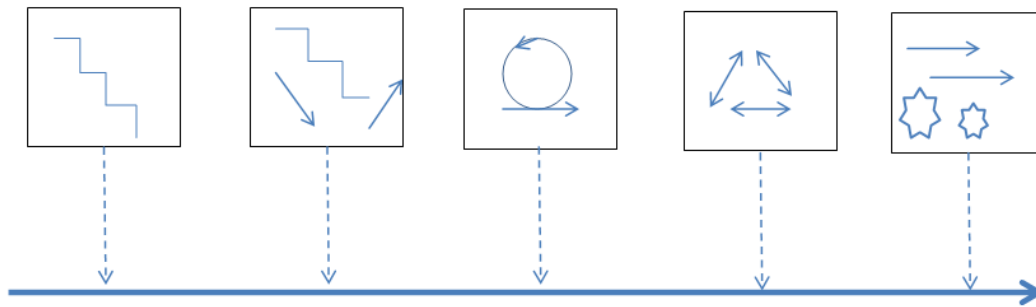## II.   Emergence of Techniques in Software Testing

Figure no 1: Emergence of Techniques in Software Testing

III.   Advantages of Artificial Intelligence in Software Testing

AI is very important in software testing as it[4, 5, 6]

1.   Improve reliability
2.   Accuracy is enhanced
3.   Save time and money
4.   More test coverage
5.   Enhanced Defect Tracing
6.   Regression tests are improved
7.   Conduct visual testing
8.   Automated API test generation
9.   Selenium test involves self-repair
10.   Prognostic Analysis
11.   Writing of test cases automatically are enhanced
12.   Evolving and emerging Bots
13.   Automating visual validation
14.   Reduce User Interface based esting

IV.   Different AI Testing Tools

1.   Testim: Testim enables fast authoring of AI-stabilized UI and end-to-end tests. It is an AI-based software testing platform that allows user to create resilient end-to-end test that are either coded or codeless or both. It will expand test coverage, reduce maintenance, increase test agility and testing is finally made scalable and aligned with the way we work.[2, 3]

2.   Applitools: Applitools find bugs that are missed by functional test as it provides end-to-end software testing platform powered by visual AI. Applitools can speed up visual testing and reduce errors that occur with manual verification. Applitools platform integrates with all modern test frameworks and works with many existing testing tools like selenium, appium, cypress etc. [2, 3]

3.   Test-Craft: With test craft, testers can visually create automated, selenium-based test using a drag and drop interface that allows fasters test creation. Combining test craft with selenium completely eliminates the main drawback of selenium. Best thing about test craft is that testers can run test on multiple browsers and work environments simultaneously as no coding skills is required. [2, 3]

4.   Functionize: It combines the power of human insights with machine learning and other AI based technologies that will reduce the time and cost of software testing. Funtionize is an intelligent approach to automated software testing that brings various benefits like: [2, 3]

➤   Testing is accessible to non-experts.
➤   Velocity of test creation is increased.
➤   Thousands of tests will execute parallel by using Functionize test-cloud.
➤   Need for test maintenance will be removed

5.   Mabl: Mabl is the leading intelligent, low-code test automation solution that generates auto-healing tests which can adapt to user interface changes without intervention. Some of the advantages of Mabl are[2, 3]

➤ 90% increase in test coverage
➤ 300% faster test creation
➤ 40% fewer bugs released into production

V.   Conclusion

Artificial Intelligence makes the software testing process smooth and AI tools are used for logical reasoning and testing algorithm to improve overall testing process. Some advantages of using AI in software testing are as follows:[7]

 i.   It improves accuracy
 ii.   With AI there are lesser defects or errors
 iii.   It saves time, money and human efforts

So, we can say that AI will enhance the framework and tools for testing specific problem. In future AI will take over the automation tasks that allow organizations to transform their processes and make progress. AI seems to be the key to change.

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