AI – A FUTURISTIC VIEW OF MOBILE APP TESTING

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INTRODUCTION

The Software Industry is a rapidly changing world and one with immense competition too, which means that all players need to keep pace with industry innovations. Digitization which put the thrust on speed, accuracy and security, has set the ball rolling at break-neck speed. Over a period of time Manual Systems gave way to Automation, which in turn has taken rapid strides. A relatively recent innovation which greatly complements automation is Artificial Intelligence (AI) which is powering the digital world and taking speed, accuracy, and security to whole new levels.

Artificial Intelligence which encompasses simulation of human intelligence processes by machines, especially computer systems, is gaining importance in every area of modern life – be it sector-agnostic industries, workplaces, healthcare, technology, education, entertainment and even our homes! AI is manifested in various applications that include expert systems, Natural Language Processing (NLP), speech recognition, and machine vision. The combination of AI and Machine Language (ML) is indeed extremely beneficial to the software industry. While AI seeks to make smart computer systems that mimic humans in solving complex problems; ML allows machines to learn from data so that they can generate accurate output.

It's a natural corollary, that the Software Testing Industry which is driven by speed, accuracy and security, will embrace AI, as it has great potential to improve and speed up test automation. This Whitepaper, will focus on how AI has been impacting Mobile App Test Automation, and also explore how AI is expected to change the future of the Software Testing Industry in general.

ABSTRACT

AI is a fast developing field in the digital world and its impact is increasingly being seen in various walks of life. In the software testing world AI-driven automated testing, is a software testing technique in which AI and ML algorithms are used to effectively test a software product, by employing logical reasoning and problem-solving methods, to improve the overall testing process. To complement AI, there is Machine Language (ML) which is a field of computer science that uses statistical techniques to give computer systems the ability to 'learn' with data, without being explicitly programmed. With speed, accuracy, and security being non-negotiable in software testing, AI and ML offer great hope of bringing added efficiency to the testing process.

This Whitepaper seeks to view AI in Software Testing from two perspectives.

The first perspective is covered in the section named **Role of AI in Mobile App Test Automation**, putting the spotlight on the mobile app testing industry. It reviews how AI is impacting this vast and important field of testing. This section also explores the current and immediate-future expectations of AI and ML in overcoming the issues encountered in Mobile App Test Automation.

The second perspective is included in the section named **Future Trends of AI in the App Testing Industry**, which is a comprehensive view of the AI trends observed for the app testing industry as a whole. This is a holistic perspective of how AI will be a catalyst for greater efficiency in software test automation; and will additionally look at how AI will influence investment, research, and other decisions in the software testing industry.

In a nutshell, this treatise hopes to present the reader, with a broad perspective of AI's current and future impact on the Software Testing Industry as a whole and Mobile App Test Automation in particular.

ROLE OF AI IN MOBILE APP TEST AUTOMATION

In the Mobile App world, superior viewer experience is a key determinant that tilts the scales in favor of the app's success. It must be remembered, that there are various factors that contribute to enriching user experience. The app needs to be speedily tested to ensure it is quick and user friendly; accuracy is a must; it needs to be safe and secure to protect user data; and it needs to keep pace with the latest in the industry.

While test automation was a boon to mobile app testers, it came with certain conditions such as the need for adequate programming skills for generating automation test suites; the need for regular time-consuming maintenance and frequent updating of the test suites; lack of comprehensive reports in some of the automation testing tools which further necessitated programming skills or additional plugins for accurate and detailed reports; problems related to scalability when there is a surge in the number of tests, and also with increase in the number of devices and configurations to be tested. Furthermore, the "Go-to-market'' race is unavoidable and every mobile app tries to win this race to reap the first mover advantage. The race does not end with the initial app, but continues with the ever so frequent updates that have one goal in mind – providing superior viewer experience. It is in this environment that Mobile App Test Automation has been increasingly seeking the help of Artificial Intelligence (AI) to deliver apps and updates in the shortest possible time, without compromising on safety, accuracy, and security.

So how does AI help mobile app testers achieve their goals?
Briefly speaking, AI greatly enhances the problem resolution abilities of machines by enabling them to learn, adapt, perform, think and make decisions like human beings, while acting at far higher speeds, consequently achieving far more in a much shorter time. Thus AI brings enhanced speed, accuracy, and security, all of which are paramount in helping testers bring efficiency to the testing process.

For a more elaborate understanding of how AI helps mobile app testers, it is important to explore the role of AI in mobile app test automation. The remaining part of this section will therefore dwell on the vital role AI plays in the automation testing process.

Role of AI in Mobile App Test Automation

01 Enhancing Testing Quality and Speed

AI efficiently takes over repetitive nerve wracking tests which are an unnecessary drain on testers' time and also cause mental fatigue and boredom, which in turn increases chances of error. AI augments testing quality and speed by identifying iterative test cases, programing regression test cases, weeding out bugs from hordes of codes, and executing time consuming tests in a fraction of the time taken otherwise. All these tremendously boost the speed and quality of the testing process by reducing human intervention and enabling testers to spend their time fruitfully on finer aspects that need human intelligence and eye for detail – like exploratory testing, validations, analysis of an identified anomalies, etc. Testers can thus harness the power of AI to deliver superior apps in a far shorter period of time.

02 Introducing Independent Testing and Removing Inter-dependencies

Prior to the AI era, tests depended on certain modules and responses for further processing and this greatly obstructed test automation, and increased its complexity. There was a lot on interdependence, and pseudo responses were developed to execute test cases successfully. AI brought with it the ability to collect and store responses from the server after a few manual tests. Furthermore responses are collected on a continuous basis ensuring that the latest and most appropriate responses are available during the testing process. This makes the testing process independent and efficient by eliminating its dependence on other modules and servers.

03 Bringing Efficiency, Regularity and Time-saving to Test Maintenance

With the introduction of test automation, test cases were automatically tested, but these test cases need to be continuously maintained and monitored manually. This is very time consuming, more so in API Testing, Unit Testing, etc. where testing frequency is quite high. Here's where AI and ML come to the tester's rescue. ML uses algorithms to automate test maintenance and AI uses the stored data to analyze and understand the routine actions of test cycles. Thus at each test execution, AI compares the new state of the product with the stored data, to identify changes that may be needed at execution and accordingly updates the test cases. This saves a lot of time as test case maintenance is much faster; is automatically done at each execution; and is also efficient as there is no human intervention

Role of AI in Mobile App Test Automation

04 / Bringing Efficiency, Regularity and Time-saving to Test Maintenance

The self-testing ability of AI makes sure that scans are run on a regular basis, reports are automatically generated and communicated and even solutions are suggested, thus providing valuable assistance to testers. Furthermore, AI processes generate ample data which is stored on an ongoing basis and used for self-healing. AI's data analysis capacity often identifies errors even before they occur and thus averts risks and saves on rectification time. By constantly updating its algorithms based on data collected, AI ensures quick and efficient testing of mobile apps and greatly reduces testing risks.

05 / Bringing Efficiency, Regularity and Time-saving to Test Maintenance

The ability of AI and ML to collect data, analyze it, learn from stored data and aptly leverage this information, goes a long way in improving test accuracy as well as test coverage. AI-driven automation testing has well-defined algorithms which are based on logical reasoning and problem solving methods and provide quick feedback. This greatly eliminates errors and enhances accuracy. AI's analytic ability also helps it decide which tests should be run after changes are made in codes and this vastly improves test coverage. AI's analytics continues even after the app's launch, analyzing and storing user actions and preferences, thus guiding the app's future improvements too.

Having explored the role of AI in Mobile App Test Automation, this Whitepaper will move on to envisage the future of AI in the automated software testing world.

FUTURE TRENDS OF AI IN THE APP TESTING INDUSTRY

The past decade has witnessed the growth of AI in software testing, which has rapidly gained importance as a specialty in its own right. The areas of focus of this developing field are currently three pronged: Developing AI tools for propelling automated software testing to greater heights; Formulating techniques for testing AI systems, and Creating software in-built with self-testing and self-healing abilities.

Where does AI in Test Automation go from here? Perhaps it wouldn't be misplaced to say that the sky is the limit! However, this paper will now venture out behind the scenes to explore some of the emerging trends of this promising field and how it will impact not just automation testing, but also investments, research, and other decisions related to this industry.

AI Trends in the Software Test Automation Industry

01 Accelerated Releases driven by Test Impact Analysis

AI and ML are driving new technologies like Test Impact Analysis which holds great promise of speeding up the test automation phase of a build. This will go a long way in ensuring quicker releases, given the remarkable impact it will have on high incidence areas like regression testing. By analyzing the call-graph of the source code, Test Impact Analysis will decide which tests should be run after changes are made in the production code, which in turn will eliminate most of the tests for code changes and accelerate release cycles.

02   Insightful Quality Risk Analysis

Yet another trending sphere relates to the valuable Quality Risk Analysis that AI provides for various stages of the testing process. This analysis may relate to the risks of release based on defined parameters, risk of merging codes, data related to whether a certain aspect has been tested, and whether it is used in production. In short, AI's insightful analysis forewarns the tester of the quality risks of proposed actions. This wealth of data that AI provides will be a great guide for testers in deciding their course of action and avoiding risk related activities.

03   Inclination towards Customized AI Testing Tools

With the advancement of AI, there is a trend to shift from Open Source Testing Tools to AI-driven Customized Automation Testing Tools that come at a cost, but are proving to be more productive and providing value for money.

04   Increasing Investment in Bots

We are already witnessing the trend towards Chat Bots to help and guide users with their app related queries and app maneuvers. Many apps at present have these AI & ML driven Virtual Assistants in place and the future is likely to see many more apps following suit. Bots are proving to be more economical, hence the future will see larger investments in Bots for various areas of interaction, be it with customers, or even for communication and testing within the QA community and with other stakeholders. A natural consequence is that the testing world will have yet another area to train in and develop novel skills – something that testers need to watch out for.

05   Research for De-biasing AI

There's a growing awareness of AI's biases caused by various factors such as human bias, lack of comprehensive demographic training data, lack of diversity among AI professionals etc. This has resulted in embarrassing goof-ups like Google's search engine mistakenly labeling pictures of dark-skinned people as gorillas, or largely showing images of black women in searches for unprofessional hairstyles; Recruitment apps presenting predominantly male candidates' CVs for Senior Management roles; and hordes of other such biases. De-biasing AI is difficult and enhanced research is expected in this field. This is another area that testers need to be aware of, as apps cannot afford to be biased in any way – be it racial, cultural, religious, or gender based biases.

06 Research for De-biasing AI

The speed at which the software industry keeps changing and updating, makes the development and testing process extremely complex and strained. Hence there will be a trend to address these issues through development of AIOps and TestOps. AIOps refer to AI based IT activities that will help IT Ops, DevOps, and SRE teams work smarter and faster, so that they can detect digital service issues early in the SDLC and rapidly resolve them, before business operations and customers are impacted. TestOps goes beyond automating tests, and moves on to focus attention on automating test operations. It is the discipline of managing and scaling test automation people, processes, and tests to maximize efficiency, delivery speed, and application quality. The future also holds great hope for Robotic Process Automation (RPA), with Bots taking over a majority of the current manual processes. RPA is another area that tester's will need to train in and also update their knowledge on an ongoing basis.

The foregoing discourse highlights the fact that AI is going to influence business decisions in a big way in future. With money being spent on AI and ML research, there will be great developments on a continuous basis and this is going to positively impact the way software development and testing are done. The software world is moving ahead at great speed, mandating testers and software stakeholders to keep abreast with the latest in their industry.

With AI-driven automation testing soon becoming a norm in the testing world, there will be many AI-driven software testing platforms mushrooming. However, it is essential to carefully assess the available AI-driven testing tools and evaluate what each is actually capable of doing. Apart from upgrading knowledge, it helps to have clarity on what one expects from the AI-driven automated testing tool. Companies generally provide a free trial option and it is important to leverage this to check that promises are actually being delivered, before putting down hard-earned money.

CONCLUSION

AI and ML are here to stay and it is therefore important for all software stakeholders to upgrade their knowledge and skills in this expanding sphere. In the software testing space, AI and ML have greatly enhanced speed, accuracy and security; and have additionally brought independence, increased test coverage, self-testing, self-healing and risk mitigation to the testing process. Another boon is the speed and efficiency AI brings to test case maintenance.

The recent trends observed expect AI-driven automation testing to bring faster releases, and far better risk analysis to QA teams. There is also a growing trend towards investment in Bots for interaction with users and other areas too. Technologies like AIOps, TestOps, and RPA hold great promise for the future of software testing. The industry is also seeing a trend towards ensuring neutral and unbiased search options, as AI's biases have caused a stir world-wide.

AI-drive Automated Testing is where the future of software testing lies, and therefore to be ahead in the testing race, quick adaptation to AI-based Test Automation is important. However, the choice of an AI-driven automated testing tool must be a well-informed one, based on sound knowledge of this emergent technology, as well as a hands-on test trial of the testing tool.

For Mobile App Testing, BOTm is a good comprehensive AI-driven testing tool which brings efficiency to the entire spectrum of mobile app testing. Visit www.botmtesting.com to assess the true potential of this truly AI-driven Automated Mobile App Testing Platform. Sign up and take advantage of the Free Trial that awaits you.

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