Of Machines and Men

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E2E Tests Automation – the biggest automation challenge

1. End-to-End System Level Tests have been a challenge for QAs since the beginning of testing. They are hard to setup and execute even manually
2. AI-based automation tools promise: easy to create tests, low maintenance and no code
3. Will AI-based test tools solve the most challenging automating tasks?

Levels of Test Automation Autonomy

Level 0	Manual	No AI/ML
Level 1	Traditional Scripting	No AI/ML
Level 2	Codeless script generation	No AI/ML Required, Supervised Learning
Level 3	Self-healing scripts and bots	Supervised Learning
Level 4	Automatic generation of scripts with no human intervention	Unsupervised Learning algorithms
Level 5	Fully self-generating tests	Reinforcement Learning and Deep Learning

AI Automation tools market overview

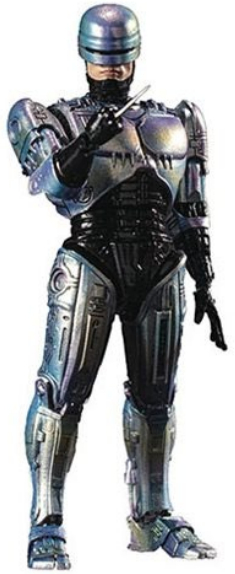
- AI only in promotion materials
- AI/ML in a supporting role – most of tools available on the market
- Level 5 Autonomy Testing Tools – only couple of AI-based automation tools have Level 5 features

AI-based tools: Time-Saving features

- **Codeless script generation**: test recording
- **Self-healing**: collecting a data about elements and application itself
- **Converting test documentation to automation**: Natural Language Processing

AI-based tools: Robocop features

- **Autonomous building of test cases** - using production data and knowledge about the system
- **Visual Testing** – visual output vs design
- **Audio/Video Quality Testing**: subjective perception to objective metrics



Field Study: POC in multiple tools

- Testim(https://www.testim.io/) testim
- Mabl (https://www.mabl.com/) mabl
- TestCraft (https://www.testcraft.io/) test craft by Perforce

Field Study: Promises Delivered

- **Quick Start**: easy to use, can be used by non-technical part of the team
- **Codeless Script Generation (recording)** – implemented almost in all tools, helps to create initial set of automated cases quickly
- **Decrease of maintenance time**: easier to fix using recording. Auto-fix for small changes

Field Study: Challenges and obstacles

- **Codeless script generation**:
  - Record and play does not work for complex scenarios
  - Adding custom object names, dates – challenging in most of the cases
  - Does not solve automation problems like maintainability, test design and test data management

Field Study: Challenges and obstacles

- **Self-healing feature** is a double-sided sword
  - Collecting multiple data points improves robustness
  - You still need to review changes
  - You need to design tests with self-healing in mind

Field Study: Challenges and obstacles

- **Self-generated tests**: improve the test coverage, what about quality:
  - Generating tests from production data is not possible for new applications, challenge for b2b business
  - Link crawlers – working links != working application
  - Cover only what easily can be tested
  - False feel of security
  - 100% coverage?

AI tools comparison table

		Testim	Mabl	Appvance	Functionize	Test Craft
1	Codeless Script Generation/Recording	+	+	+	+	+
2	Autonomously Generated Scripts	-	-	+	+	-
3	Visual Testing	*Integration with Applitools and Test Rail	+	-	+	
4	Auto-healing	+	+	+	+	+
5	Mobile Testing	-	-	+	+	-
6	Code Snippets	+	+	+	+	+
7	Test Plans written in Simple English to Automated tests	-	-	-	+	-

AI tools comparison table. Part 2

		Testim	Mabl	Appvance	Functionize	Test Craft
8	Support of cross browser tests	***Integration with Browsestack, SauseLabs**	+	+	+	+
9	Performance and Load Testing	-	-	+	+	-
10	Security Testing	-	-	+	-	-
11	API steps	+	+	+	+	+
12	VCS	GitHub Bitbucket	GitHub Bitbucket	Git repositories	Github	Gitlab
13	IDE	JetBrains, Visual Studio				

AI tools comparison table. Part 3

		Testim	Mabl	Appvance	Functionize	Test Craft
14	CI tools	Jenkins Circeci TeamCity Travis Ci Codeship	Bamboo Jenkins CodeShip Azure Pipelines	Circeci Bamboo Hudson Jenkins	Bamboo CircleCI Jenkins Travis CI Spinnaker Go AWS CodePipeline Heroku TeamCity	Jenkins Visual Studio Team Services TeamSity
15	Collaboration Tools	Trello Jira Github issues Slack Email	Jira Slack	Rally Chef	Jira PagerDuty	Jira Slack
16	Big Data		BigQuery			

AI-based testing tools: future of automation

- Almost every automation testing tools has or claims that it has some **AI-based functionality**
- AI-based tools are great for **mundane, boring tasks**
- AI-based tools **can do what people cannot**
- AI based tools are **not mature enough. Yet**

Will human QA be replaced by AI?

- Test Architecture(Design, Data) still requires human involvement
- Clicks, Keystrokes!= Testing
- Testing will change. We will need to adapt
- Side-kick, not a killer.

Q&A