

**STAR** **CANADA**

A TECHWELL EVENT

**W6**

AI and Data Analytics

Wednesday, October 17th, 2018 11:30 AM

# How AI Is Transforming Software Testing

Presented by:

**Raj Subramanian**

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# Raj Subramanian

Raj Subramanian is a former developer who moved to testing to focus on his passion. Raj currently works as a Developer Evangelist for Testim.io, that provides stable self-healing AI based test automation to enterprises such as Netapp, Swisscom, Wix and Autodesk. He also provides mobile training and consulting for different clients. He actively contributes to the testing community by speaking at conferences, writing articles, blogging, making videos on his youtube channel and being directly involved in various testing-related activities. He currently resides in Chicago and can be reached at [raj@testim.io](mailto:raj@testim.io) and on twitter at [@epsilon11](https://twitter.com/epsilon11). He actively blogs on [www.testim.io](http://www.testim.io) and his website [www.rajsubra.com](http://www.rajsubra.com). His videos on testing, leadership and productivity can be found here <http://www.rajsubra.com/my-youtube-channel/>



[www.testim.io](http://www.testim.io)

# HOW AI IS TRANSFORMING SOFTWARE TESTING

Raj Subramanian [raj@testim.io](mailto:raj@testim.io)

# ABOUT ME



- Developer Evangelist at Testim.io
- Blogger, Speaker and Writer
  - <http://www.rajsubra.com/blog/>
  - <https://blog.testim.io/>
  - <http://www.rajsubra.com/publications/>
  - <http://www.rajsubra.com/presentations/>
  -
- 11+ Years of Development and Testing

Twitter: **@epsilon11**

E-mail: **raj@testim.io**

# AGENDA

CURRENT CHALLENGES

LEARN THE BASICS OF AI

HOW AI CAN SOLVE THESE  
CHALLENGES

FUTURE OF AI



**CONTEXT  
MATTERS**

# EVOLUTION OF TESTING

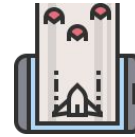
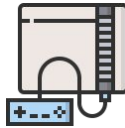
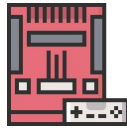
Manual Testing

Bulky  
Automation  
Tools

More Robust Automation  
tools + Open Source  
Frameworks

More about Scale

Autonomous  
Testing, Machine  
Learning and AI



1980 - 1990

Waterfall  
methodology

1990 - 2003

Experimentation with  
Different Development  
Approaches

2003 - 2010

Agile Approaches,  
faster release cycles

2010 - CURRENT

DevOps, Continuous  
Testing, CI/CD

THE FUTURE

Collaborative,  
Smart testing

# Manual Testing



**1980 - 1990**

Waterfall methodology

# TESTING

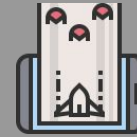
More Robust Automation tools + Open Source Frameworks



**2003 - 2010**

Agile Approaches, faster release cycles

More about Scale



**2010 - CURRENT**

DevOps, Continuous Testing, CI/CD

Autonomous Testing, Machine Learning and AI



**THE FUTURE**

Collaborative, Smart testing



# EVOLUTION

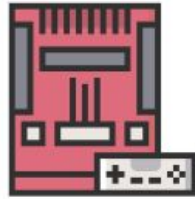
Manual Testing



1980 - 1990

Waterfall methodology

Bulky Automation Tools



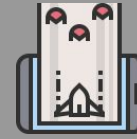
1990 - 2003

Experimentation with Different Development Approaches

Automation Source

More about Scale

Autonomous Testing, Machine Learning and AI



2010 - CURRENT

DevOps, Continuous Testing, CI/CD

THE FUTURE

Collaborative, Smart testing

# EVOLUTION OF T

Manual Testing



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1990 - 2003

Experimental Different Dev Approaches

More Robust Automation tools + Open Source Frameworks



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about Scale



- CURRENT

os, Continuous, CI/CD

Autonomous Testing, Machine Learning and AI



THE FUTURE

Collaborative, Smart testing

# EVOLUTION OF TESTING

Manual Testing



1980 - 1990

Waterfall methodology

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1990 - 2003

Experimentation with Different Development Approaches

More tools  
Fram



2003

Agile / faster

More about Scale



2010 - CURRENT

DevOps, Continuous Testing, CI/CD

Autonomous Testing, Machine Learning and AI



THE FUTURE

Collaborative, Smart testing

# EVOLUTION OF TESTING

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2010 - CURR

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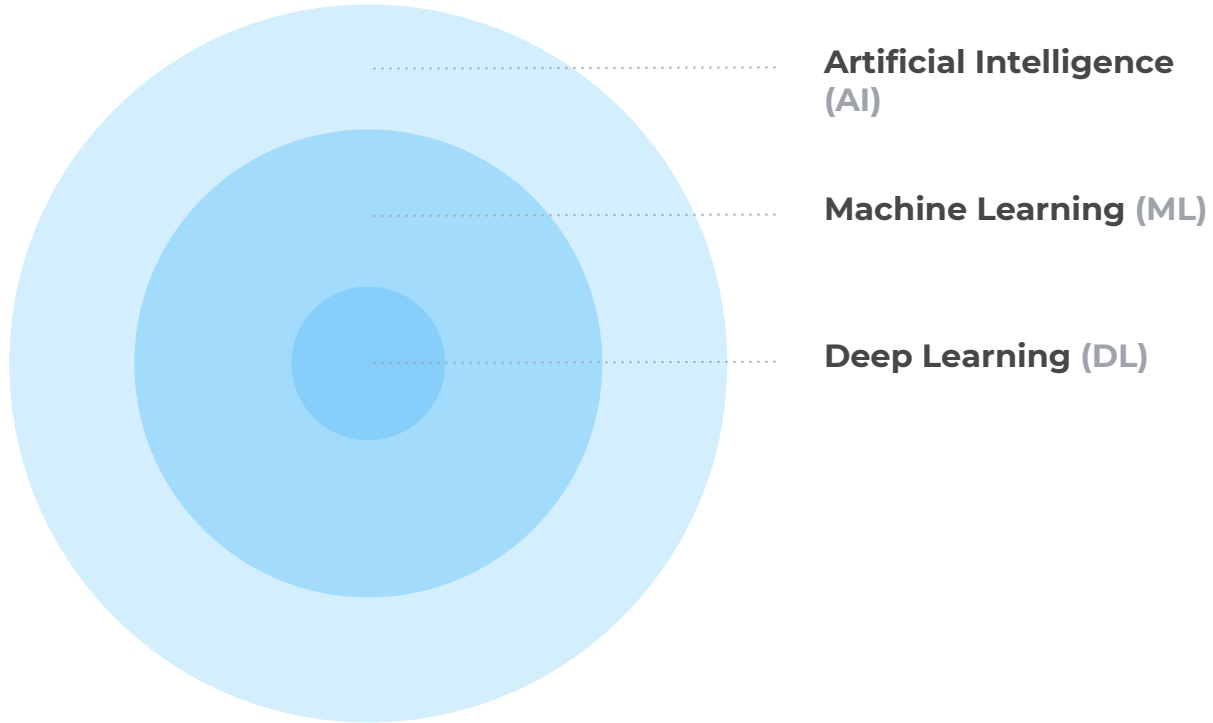
THE FUTURE

Collaborative, Smart testing

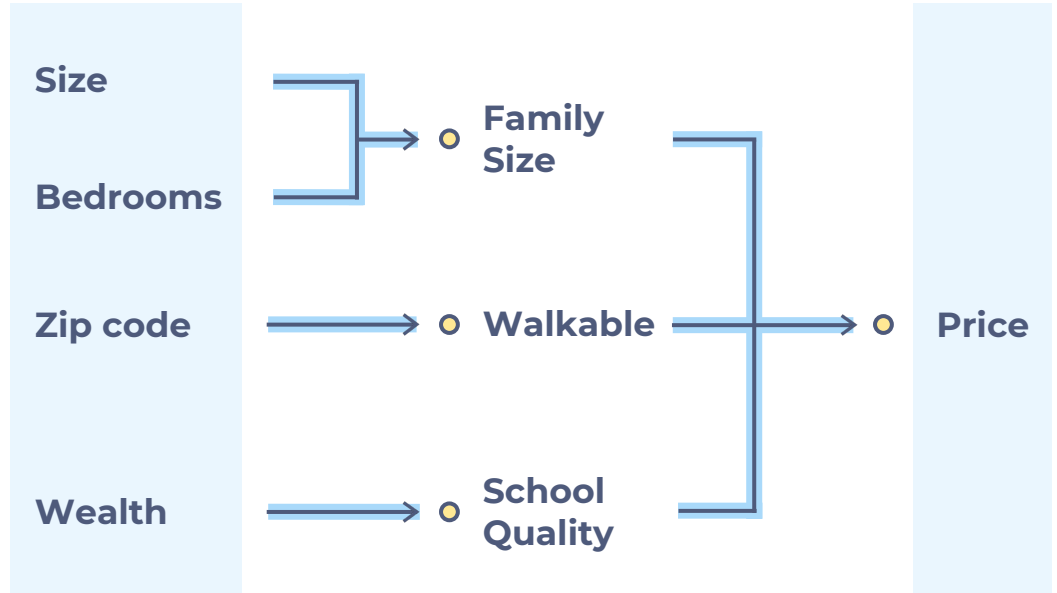


# **BASICS OF AI**

# DE-MYSTIFYING AI



# DEEP LEARNING EXAMPLE





[Courtesy of Dean Pometriac]



**DEMO: QUICK DRAW**

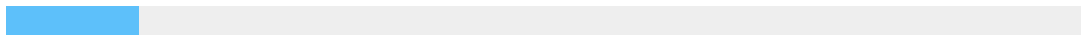


# **CURRENT CHALLENGES**

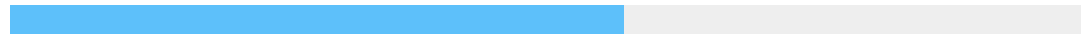
# HOW FREQUENT ARE YOUR RELEASES?

FROM A RECENT SURVEY TESTIM COMPLETED

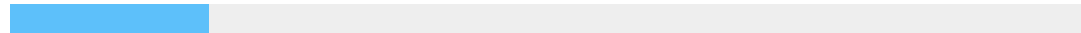
Not at all, we test last, we test quality into the product **13%**



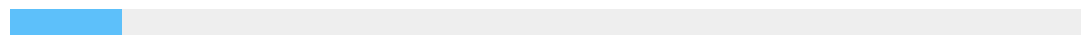
Testing involved early, but still have an extended test phase before release **57%**



We could probably release after every sprint **19%**



We could ship daily if we wanted to **10%**



We could deploy any minute of any day **2%**



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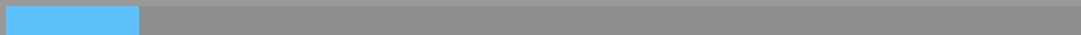
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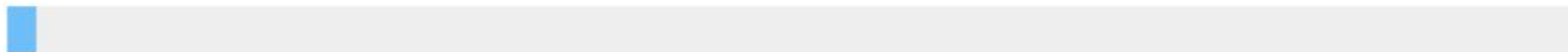
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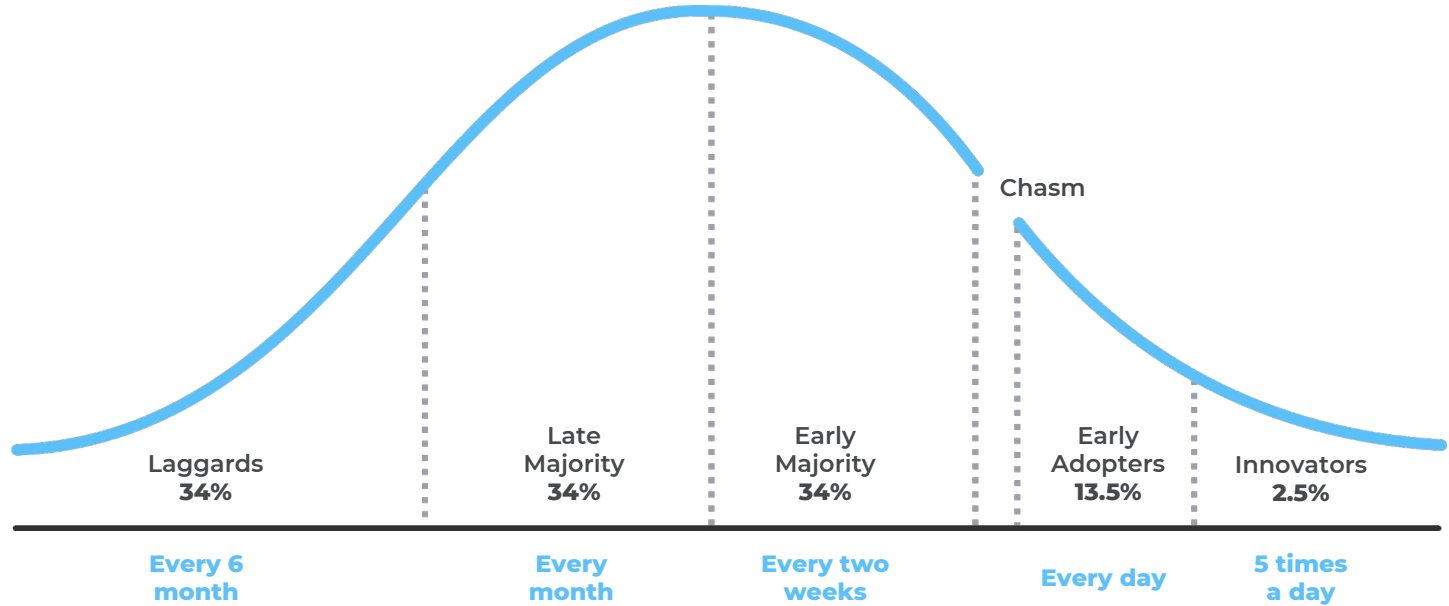
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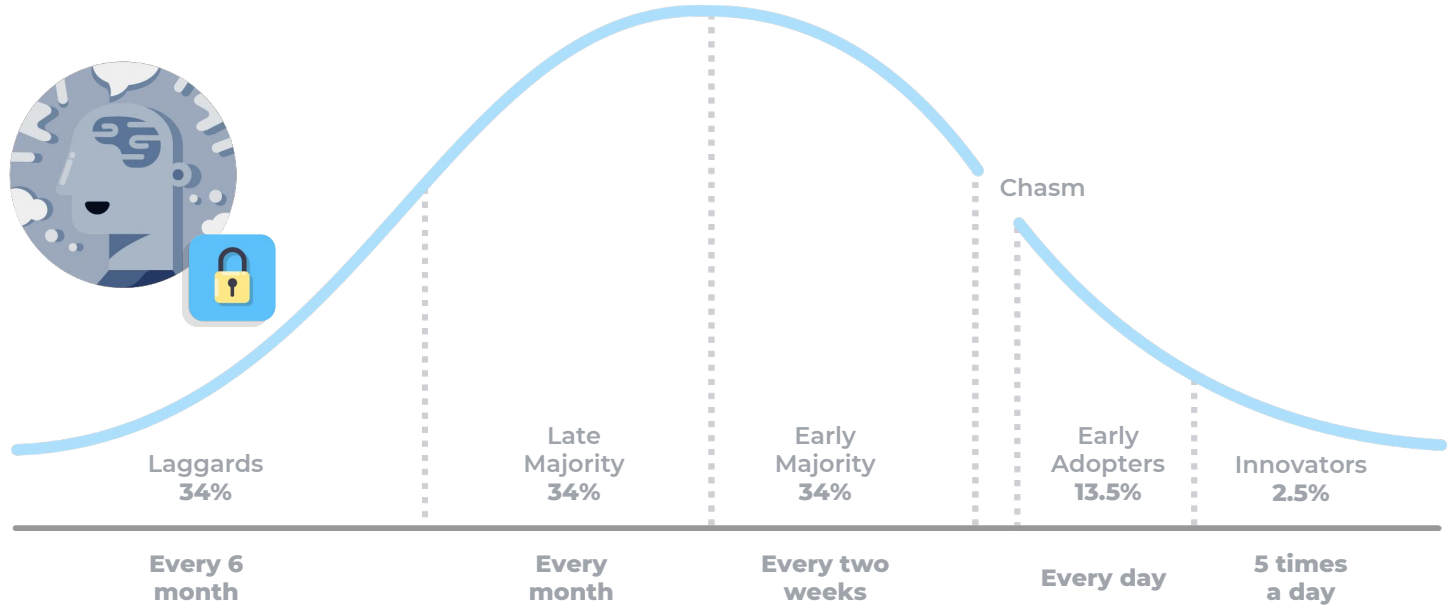
We could deploy any minute of any day **2%**



# CURRENT CHALLENGES RAPID RELEASE CYCLES



# THE CHALLENGE: #1 SKILL SET



# THE CHALLENGE: #1 SKILL SET



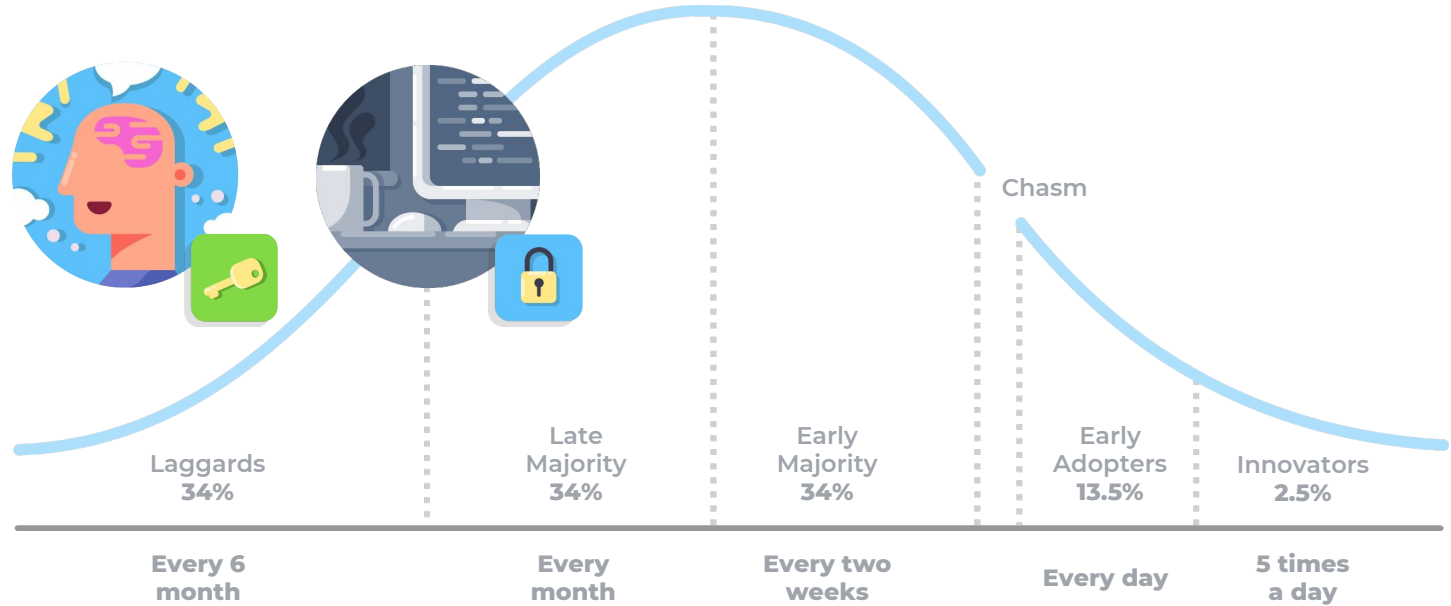
Source: <http://dilbert.com/>



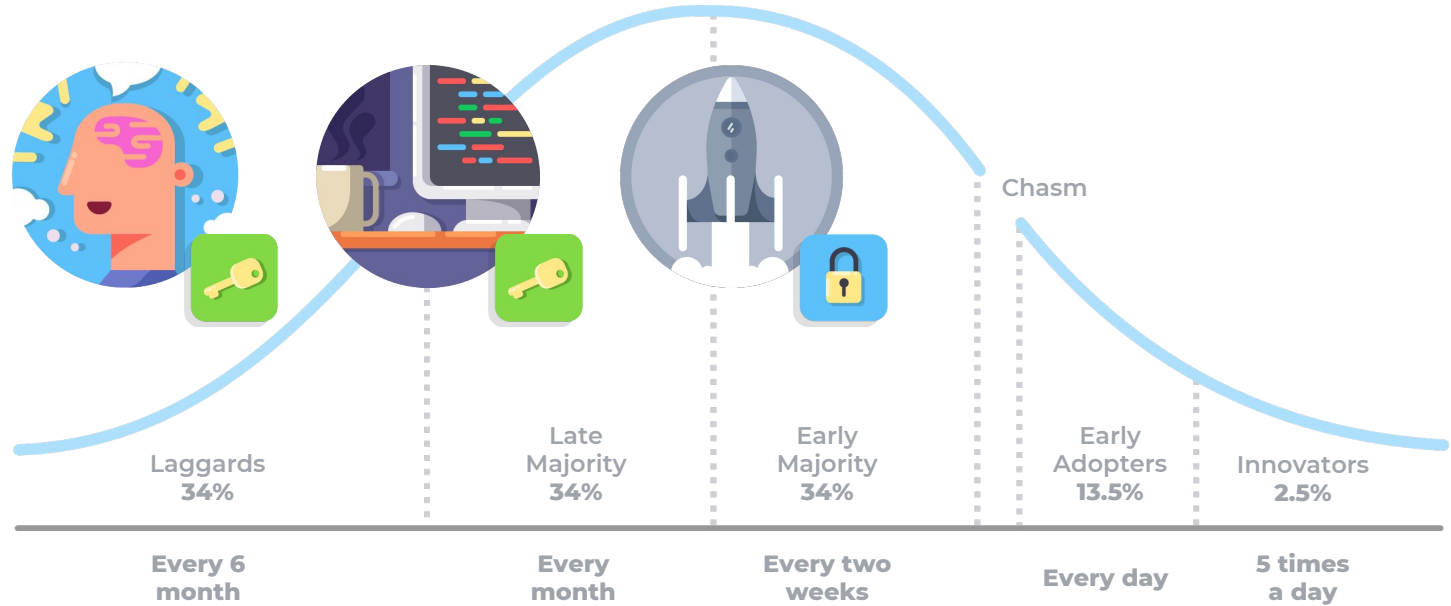
# THE CHALLENGE: #1 SKILL SET



# THE CHALLENGE: #2 AUTHORIZING



# THE CHALLENGE: #3 INITIALIZATION





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Prime ▾



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## Shopping Cart

Price

Quantity

BLACK+DECKER GH900 Gh900 String Trimmer, was removed from Shopping Cart.

**Subtotal (0 items): \$0.00**

### Books You May Like



Cowboy Fairytales Books...

> Lacy Williams

★★★★☆ 68

Paperback

**\$12.99** ✓prime

Add to Cart



NEW & INTERESTING FINDS ON AMAZON

EXPLORE



amazon prime

All ▾



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Departments ▾

Your Pickup Location



Hello, Carlene

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Items still present in the cart

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Current Total:	\$ 49.99
<b>Savings:</b>	<b>- \$ 70.00</b>
<b>Cost After Savings:</b>	<b>\$ 0.00</b>
<b>Savings Remaining:</b>	<b>\$ 20.01</b>

Apply now

Subtotal (1 item): **\$49.99**

This order contains a gift

Proceed to checkout

or

Sign in to turn on 1-Click ordering.

## Shopping Cart



**BLACK+DECKER GH900 Gh900 String Trimmer,**

In Stock  
✓prime

This is a gift [Learn more](#)

Delete | Save for later

Price

**\$49.99**

Quantity

1 ▾

Subtotal (1 item): **\$49.99**

### Books You May Like



Cowboy Fairytales Books...

> Lacy Williams

★★★★☆ 68

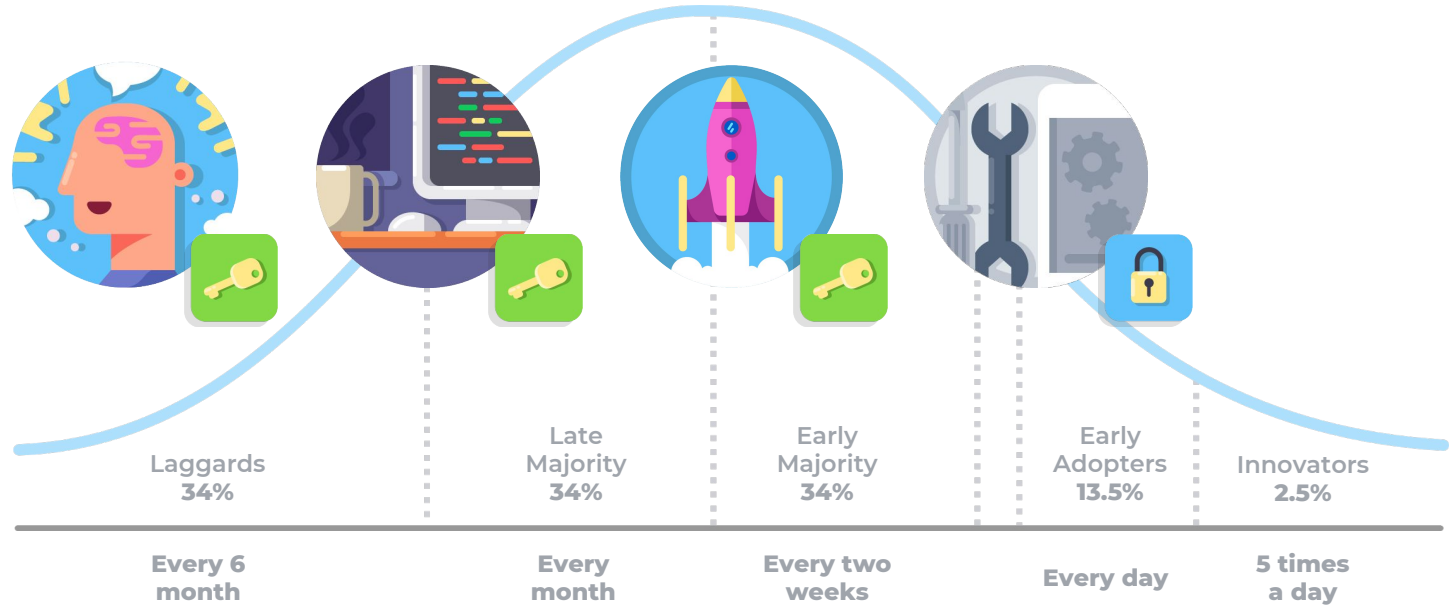
Paperback

**\$12.99** ✓prime

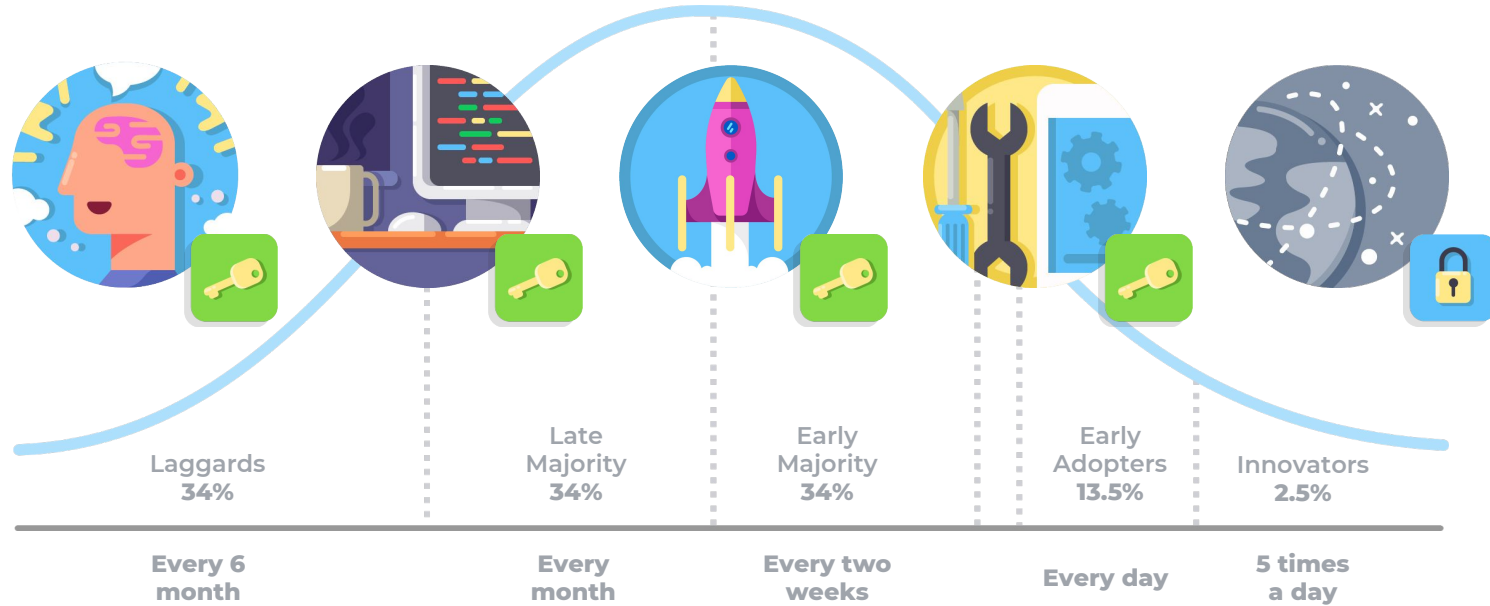
Add to Cart

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# THE CHALLENGE: #4 MAINTENANCE



# THE CHALLENGE: #5 SCALE





# HOW AI CAN SOLVE THESE CHALLENGES

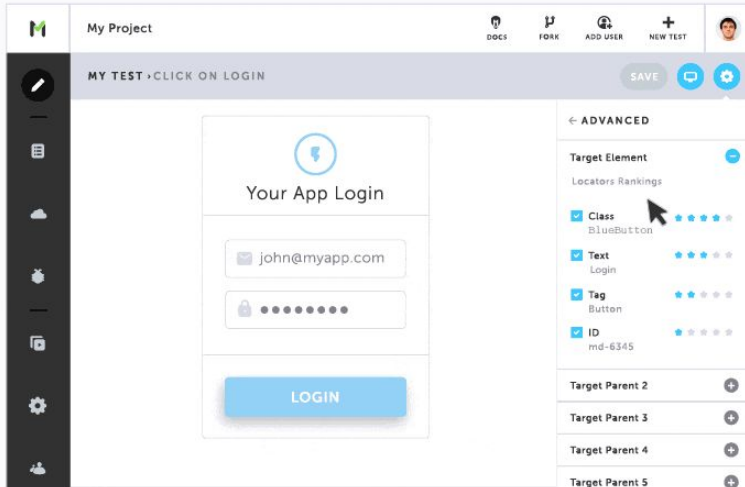




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# TESTIM.IO

## AI Based Locators



### ■ MULTIPLE ATTRIBUTES VS. SINGLE ONE

Hundreds of attributes used to identify elements  
A few changes don't break the test

### ■ LOW MAINTENANCE

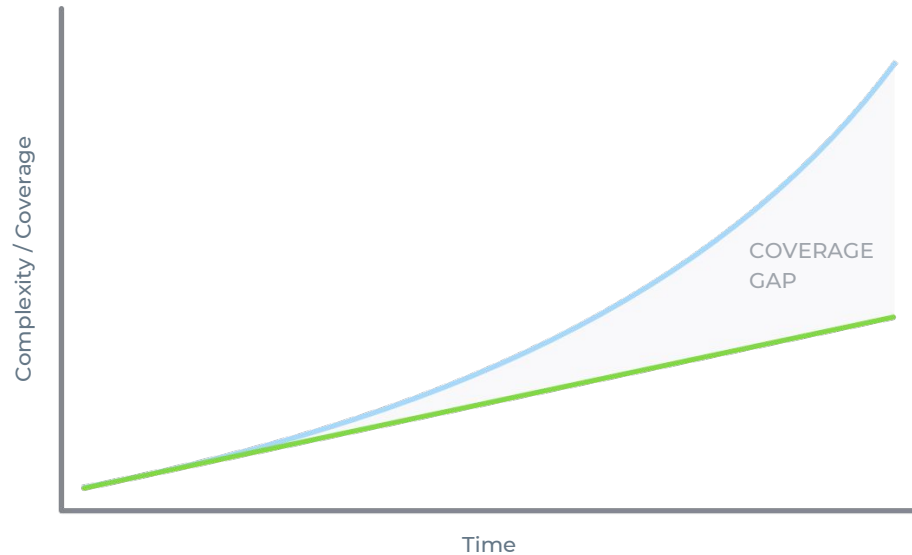
No need to (tediously) update locators

### ■ MORE EXECUTIONS => MORE STABLE

With each execution we learn the changes to  
the application and optimize scores



# THE COVERAGE GAP IN SOFTWARE TESTING




## FEATURES

Complexity increases exponentially as new features and states interact with existing features

## TESTS

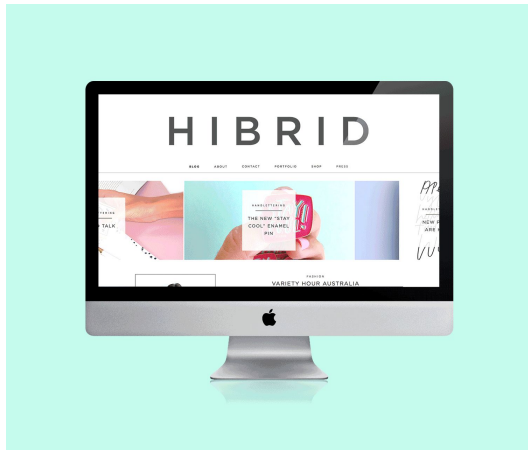
Test coverage grows linearly because they can only be added one at a time

Source: Jason Arbon

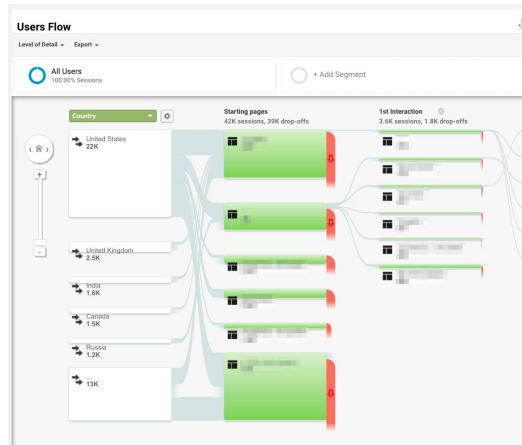


# FUTURE OF AI

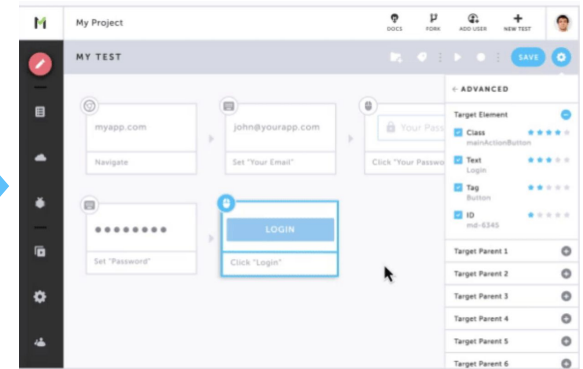
# AUTONOMOUS TESTING



LEARN BY  
OBSERVATION  
(PRODUCTION)

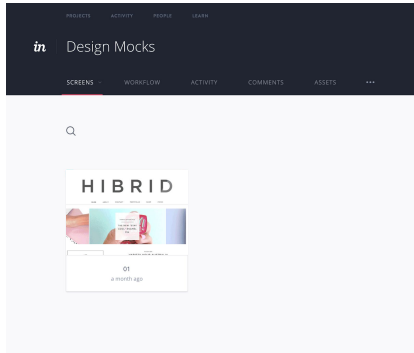


AGGREGATE USER  
ACTIONS INTO FLOWS

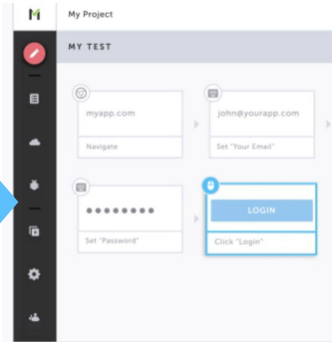


TEST PRODUCED  
FROM FLOWS

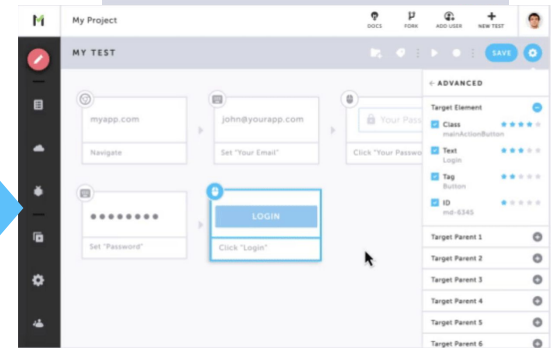
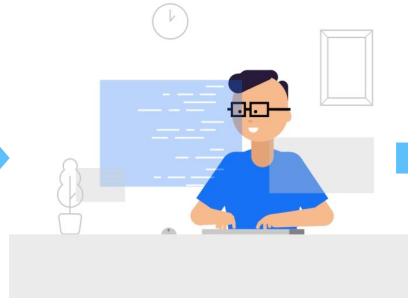
# AUTHOR FASTER VIA UI TDD



USE DESIGN MOCKS  
TO AUTHOR (IMAGE BASED)



RUN DURING  
DEVELOPMENT



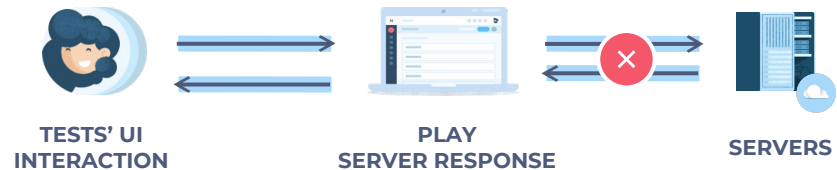
UPDATE ON FIRST GREEN TEST  
(MULTIPLE LOCATORS)

# AUTOMATIC RESPONSE

## 1 CALL TO SERVER ARE RECORDED



## 2 RESPOND WITH MOCKS



# HOW TESTIM IS PAVING THE FUTURE





# AUTONOMOUS TESTING ELIMINATES THE QUALITY/VELOCITY DILEMMA

## QUALITY

- Easier for QA to maximize user coverage
- Take a risk based approach with true data driven decisions
- Prevent bugs as opposed to fixing them

## VELOCITY

- Create much more scenarios in a shorter period of time
- Deploy resources much more effectively create the tests proactively
- Dev/QA friction is minimized root cause analysis

**IT'S A  
WRAP**

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# TALK SUMMARY

<https://blog.testim.io/summary-blog-how-ai-is-transforming-software-testing/>

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