

# Agile Dev Better Software DevOps **WEST**

A TECHWELL EVENT

## **BW8**

Test & QA

Wednesday, June 6th, 2018, 2:45 PM

## **Testing with AI for Agile Teams**

Presented by:

**Jason Arbon**

test.ai

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# Jason Arbon

## test.ai

Jason Arbon is the CEO of test.ai which is redefining how enterprises develop, test, and ship mobile apps with zero code and zero setup required. He was formerly the director of engineering and product at Applause.com/uTest.com, where he led product strategy to deliver crowdsourced testing via more than 250,000 community members and created the app store data analytics service. Jason previously held engineering leadership roles at Google and Microsoft and coauthored *How Google Tests Software* and *App Quality: Secrets for Agile App Teams*.

Agile Dev **WEST**

A TECHWELL EVENT

# Testing with AI For Agile Teams

Jason Arbon, CEO test.ai





Testing Neural Net Ranker



Personalized Web Search and  
Chrome Test Automation



AI for Mobile Test Automation



Speed Is King



# Outline

- User Flows
- AI to identify elements like a human
- AI to drive flows like a human
- How does this scale?

# Testers Don't (Can't) Test Anymore

Interest in "Software Testing" over time 



Note



# Testers Don't (Can't) Test Anymore

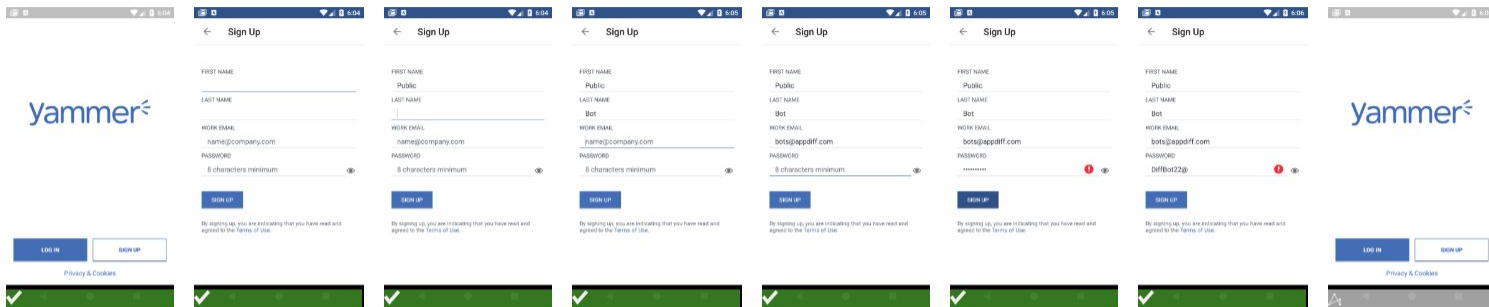
- Agile / CI / DevOps
- Barely enough time to verify software
- Little time to actually test

# User Flows

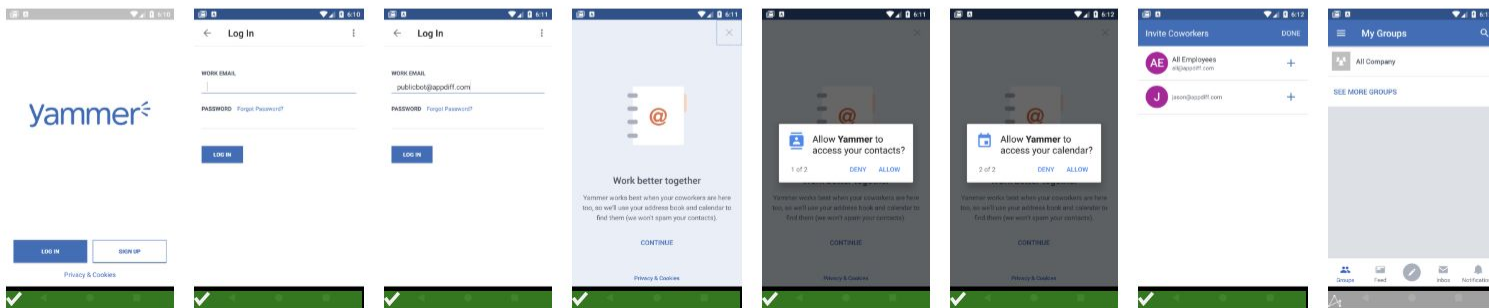
- Basic operations
- Important to Business
- Core Features
- Must work vis the User Interface for Users

# User Flows: Sign-up/Sign-in

## sign up

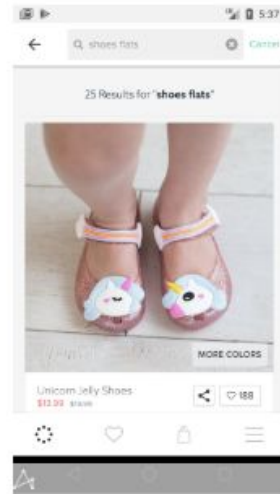
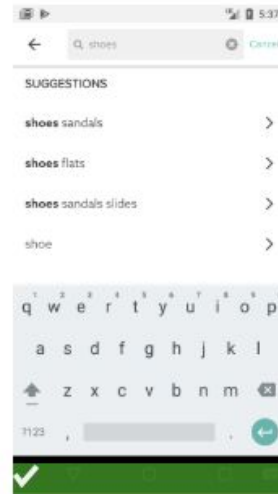
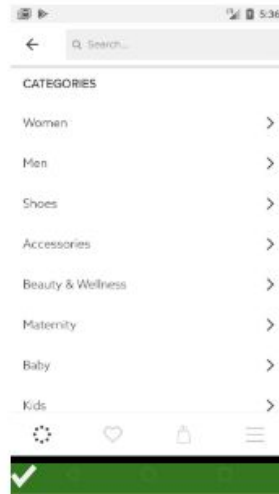
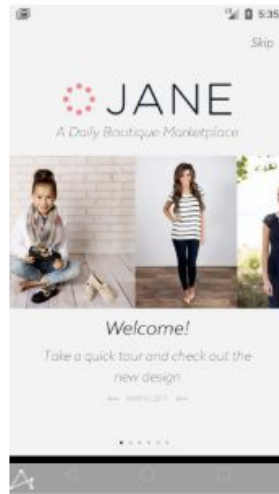


## sign in



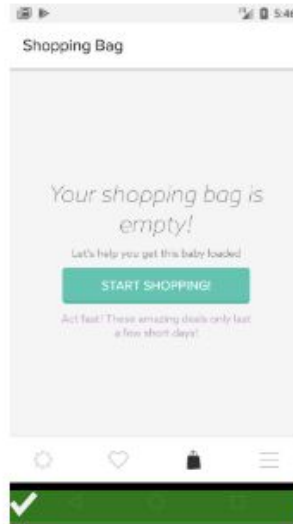
# User Flows: Search

— search



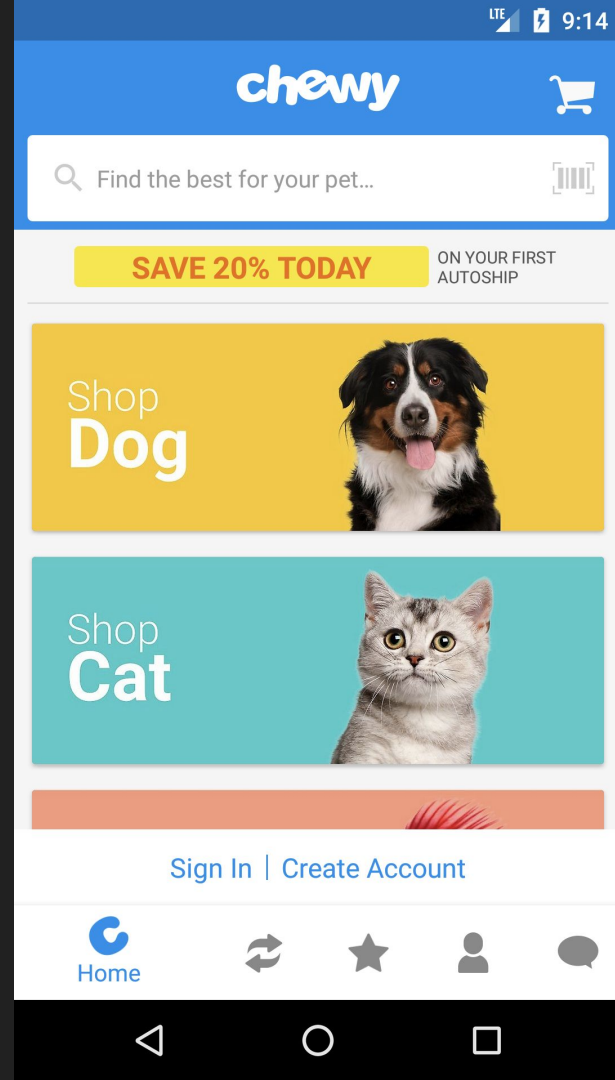
# User Flows: Cart

— cart



# Humans: Cues to 'Label'

- Seen Many Examples
- Color
- Shape
- Location
- Text
- Edges
- Context



# Perfect Problem for AI

- Apps are Similar
- reuse common elements
- reuse common designs
- reuse common patterns

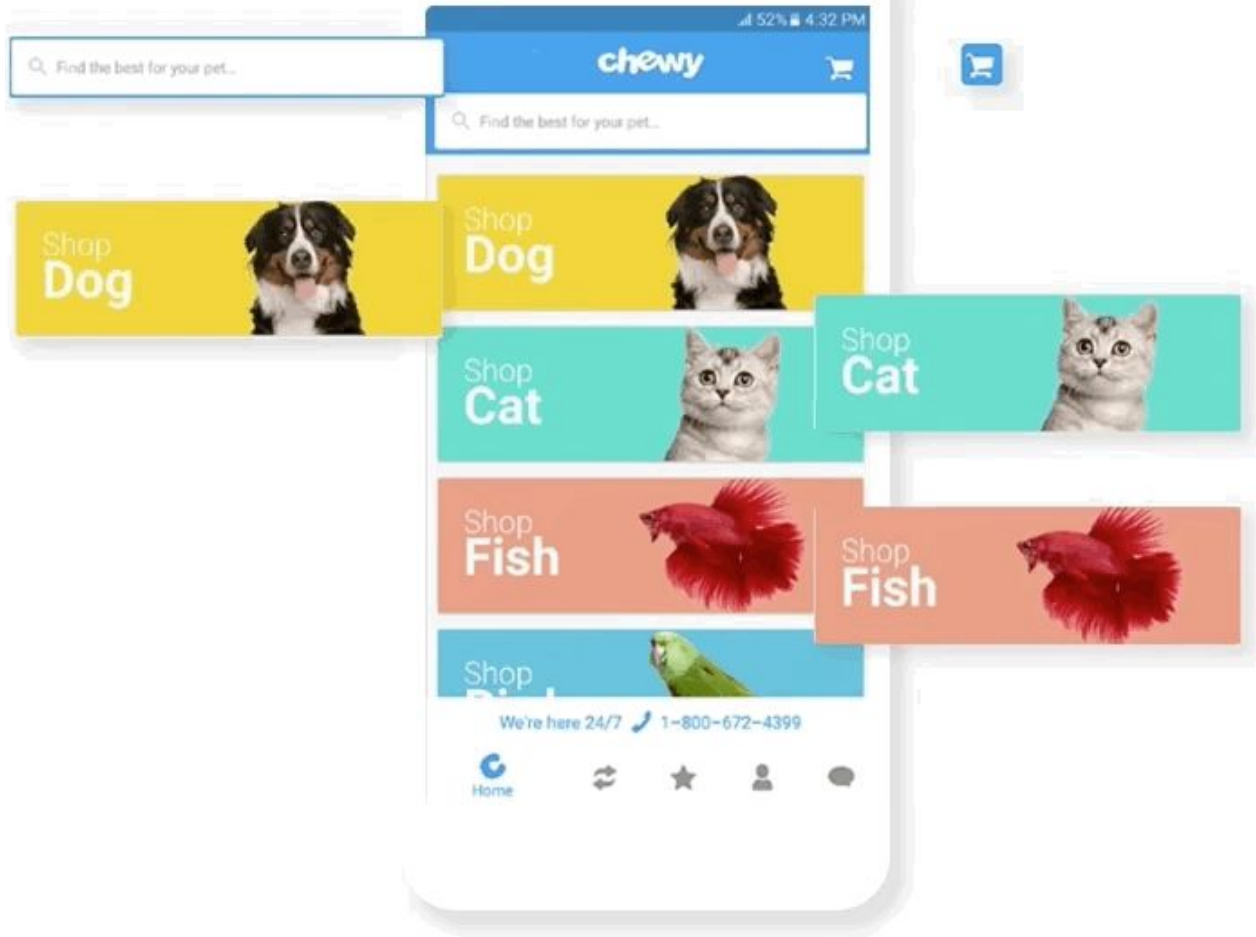


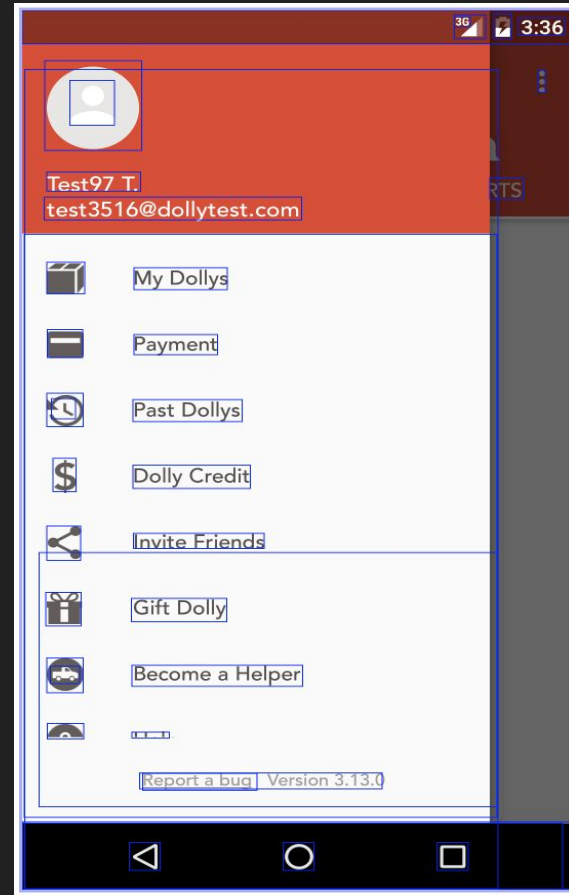
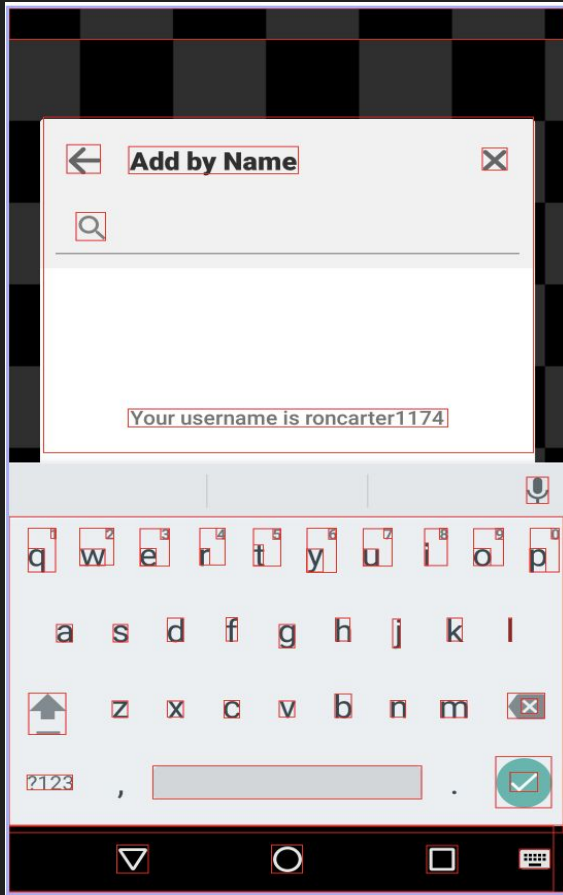
# Crawl 30k+ Apps





# Cut Screens Into Elements



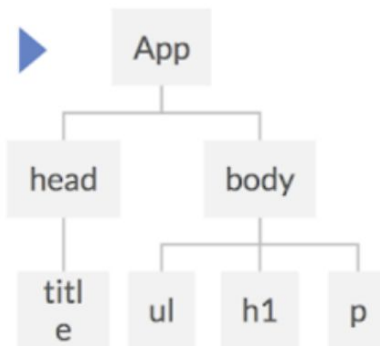


# Convert Images and DOM into Features



PERCEIVE

“What can we interact with?”



# Connect Training Data to Network



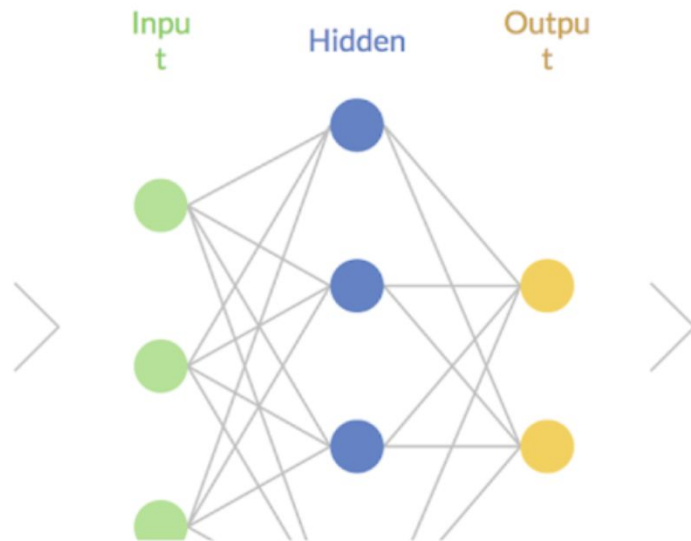
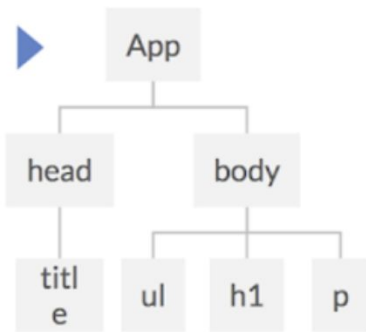
PERCEIVE

“What can we interact with?”



ACT

Neural network determines what action to take



# “Teach” Using Training Set



## PERCEIVE

“What can we interact with?”



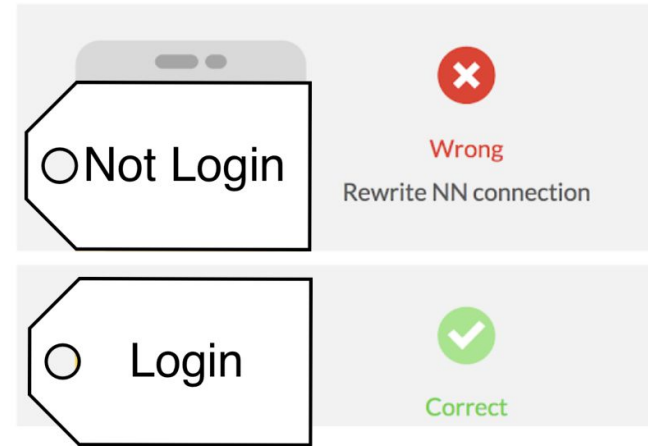
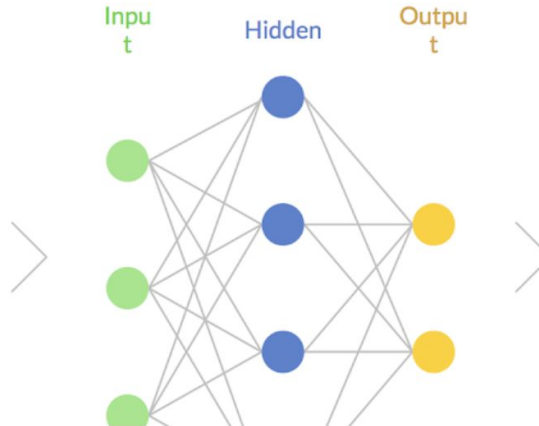
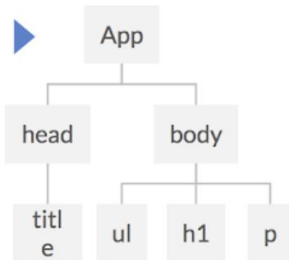
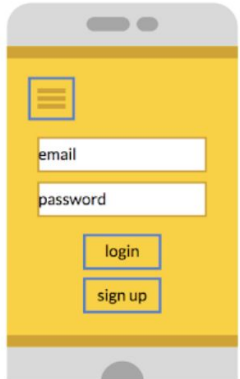
## ACT

Neural network determines what action to take



## LEARN

Each action contributes to training brain





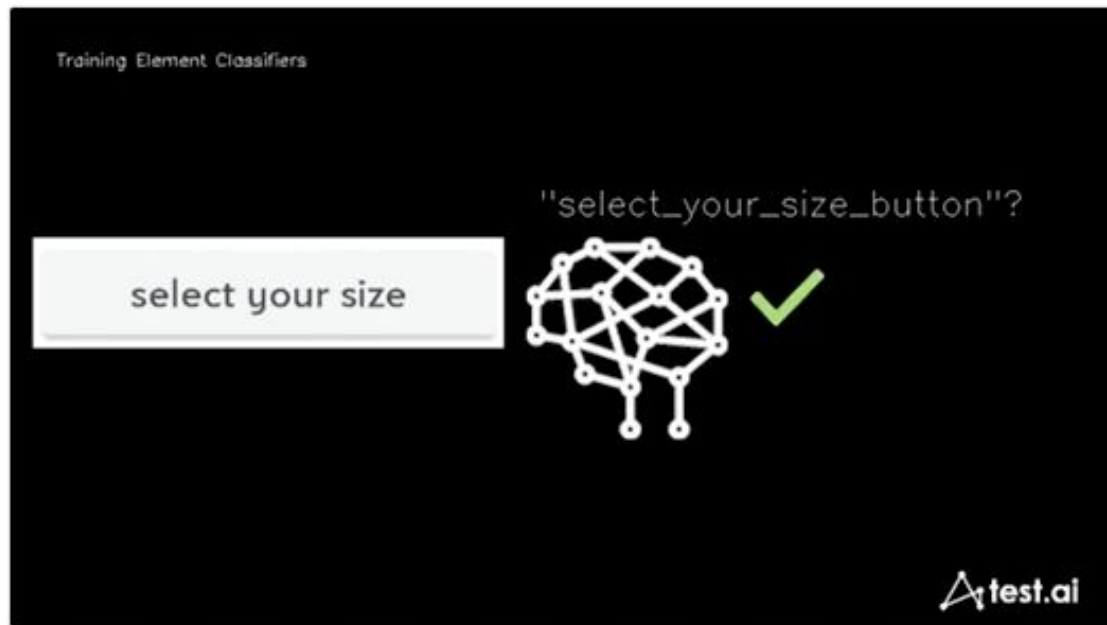
**Jason Arbon**

CEO @ test.ai

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Updated 'Test AI' Training video thanks to feedback!



25 Likes · 1 Comment · 1,300 Views

Like Comment Share

1,300 views of your video

# Like Humans: Robust to Changes

- Networks know many examples of login buttons
- Networks know what aren't login buttons
- Networks know if a login button moves, changes size, position, color, etc.
- “Sees and Thinks like a User”

e.g. No CSS selectors or XPath breaks

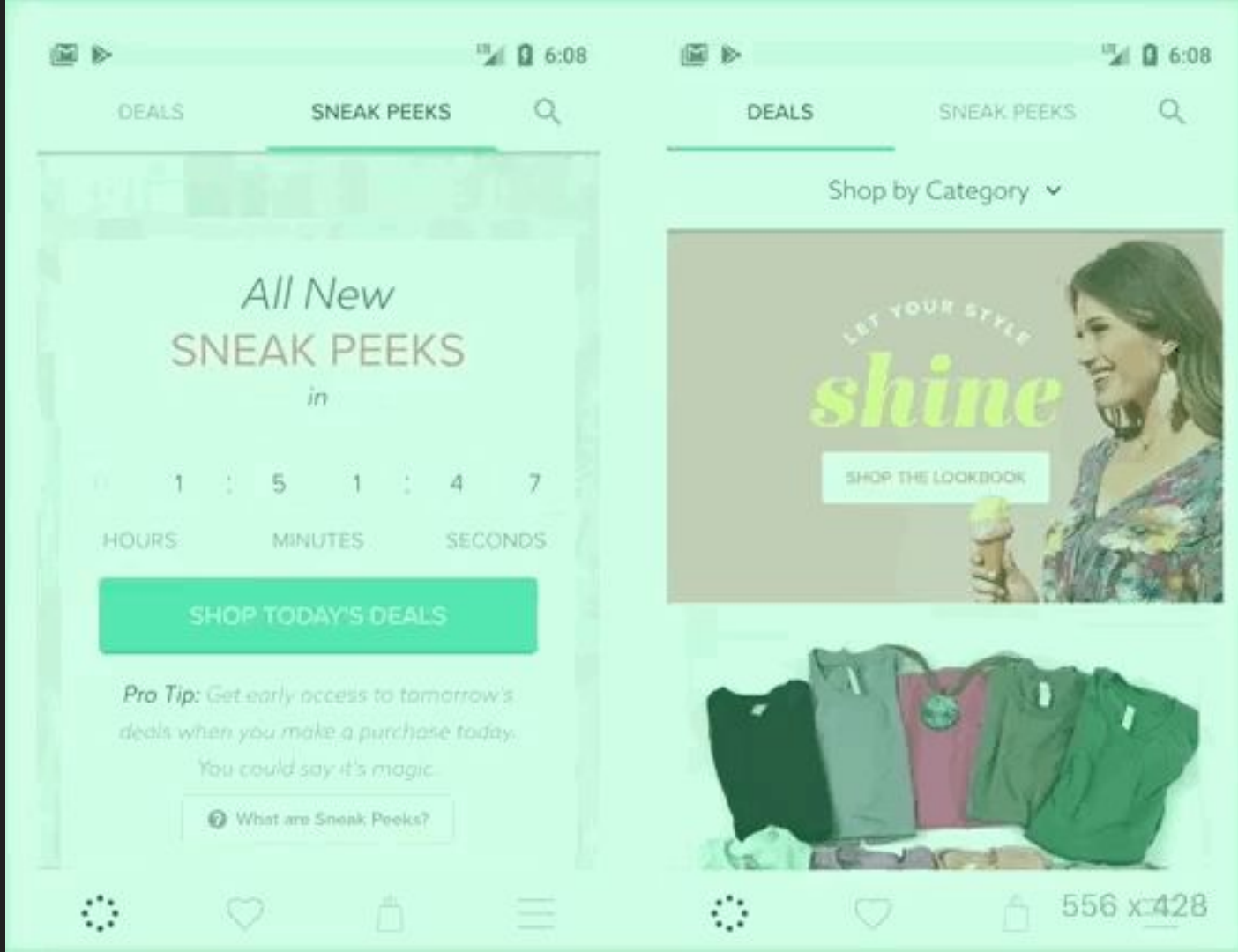
Time To Identify Elements

Minutes -> Seconds



# Humans

- “Go To Cart”
- Get Past
  - Irrelevant
  - Random
  - Dynamic

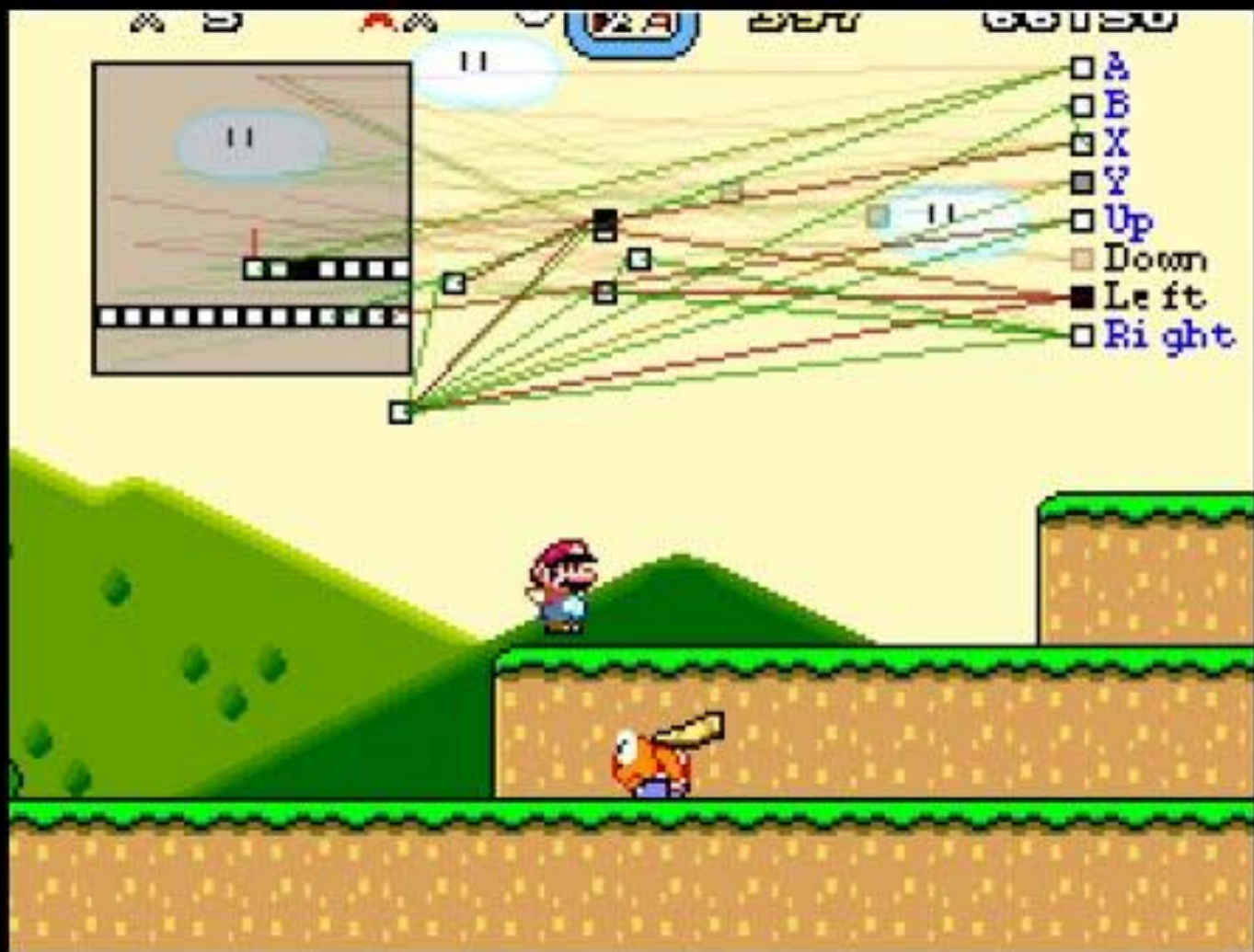


# Humans: User Flows

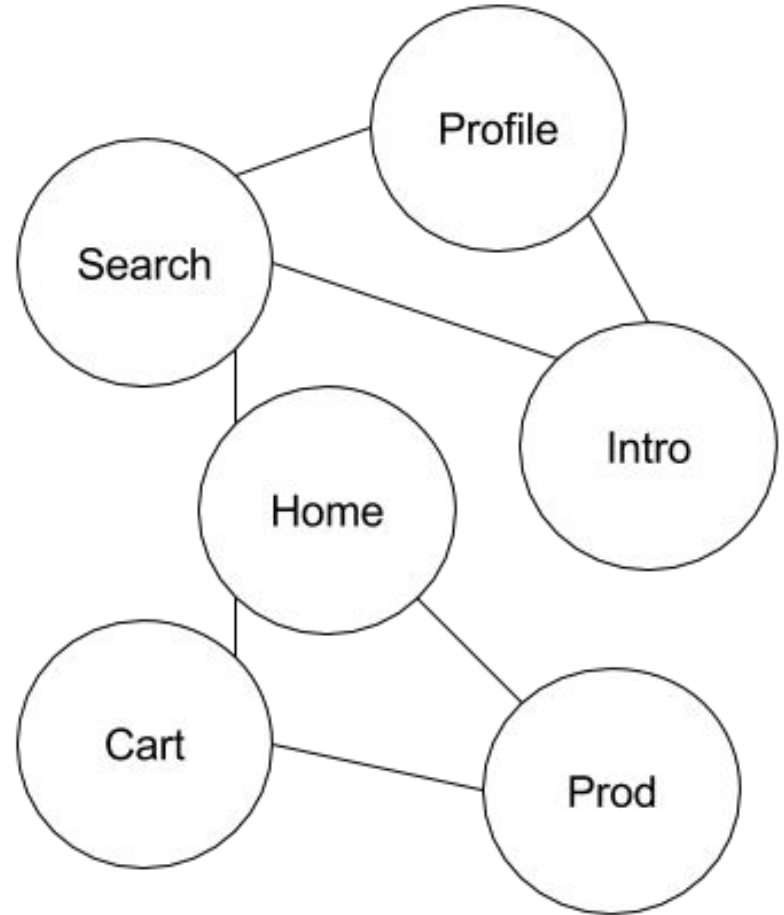
- “Go To Cart”
- Never seen app
- Look for something like a ‘shopping cart icon’



# MarI/O



# QLearning: AppGraph



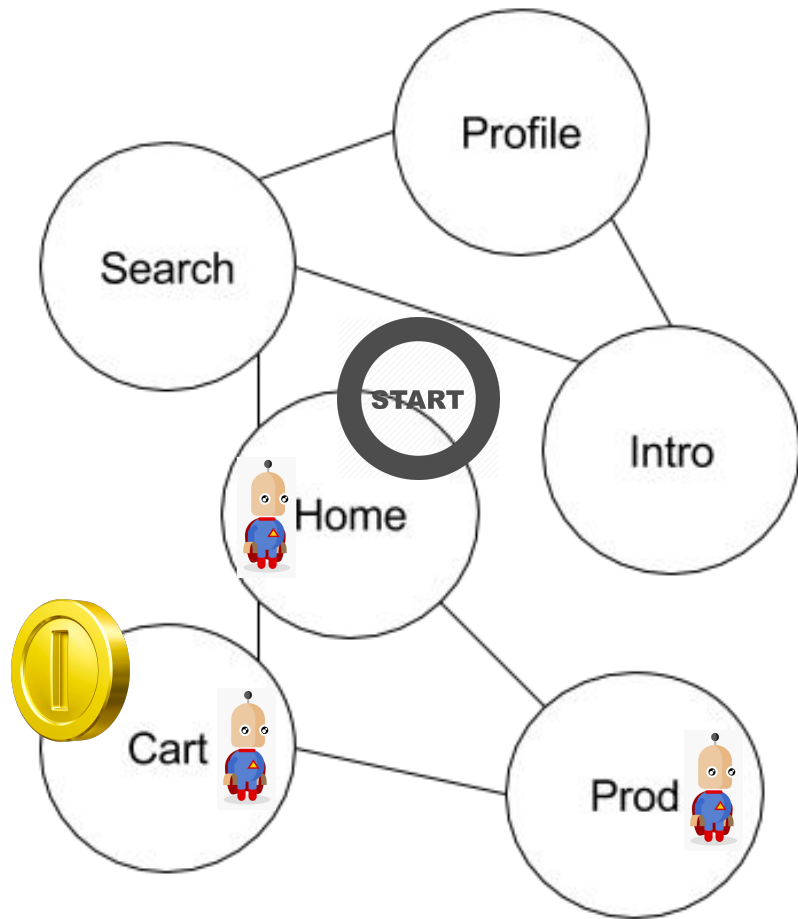
# QLearning: AppGraph

~~090~~

(+100)

Found better  
path

Hit the goal!



# QLearning: AppGraph

- Give Rewards for finding the shopping Cart
- Penalize for steps that don't find the shopping Cart
- Iterate 10k times X N Apps
- QLearn Brain/Matrix remembers the intuition of how to get to shopping carts



↓

	Action					
State	0	1	2	3	4	5
0	-1	-1	-1	-1	0	-1
1	-1	-1	-1	0	-1	100
2	-1	-1	-1	0	-1	-1
3	-1	0	0	-1	0	-1
4	0	-1	-1	0	-1	100
5	-1	0	-1	-1	0	100

# Flow Tests are Just Sequences of Goals

## # Demo AIT Test Definition

**Test Name:** Remove Beanie Baby from item from cart

**Description:** Make sure we can remove an item from the shopping cart.

**Tags:** cart, remove

**Step:** Search for Beanie Baby

**Context:** SCREENNAME "Search"

**Input:** ACTION SEARCH "Beanie Babies"

**Step:** Add Item

**#Step:** Add Item Any item will do.

**Context:** SCREENNAME "Product" and HASWORD "Beanie Baby"

**Input:** ACTION ADDTOCART

**Step:** Remove Item

**Context:** Cart and HASWORD "Beanie Baby"

**Input:** Remove Item

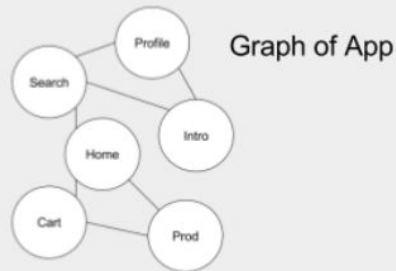
**Step:** Verify Item Removed

**Context:** SCREENNAME Cart and NOTHASWORD "Beanie Baby"

Time To Create Flow Test Sequences

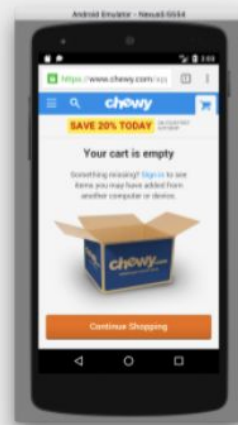
Hours/Days -> Minutes



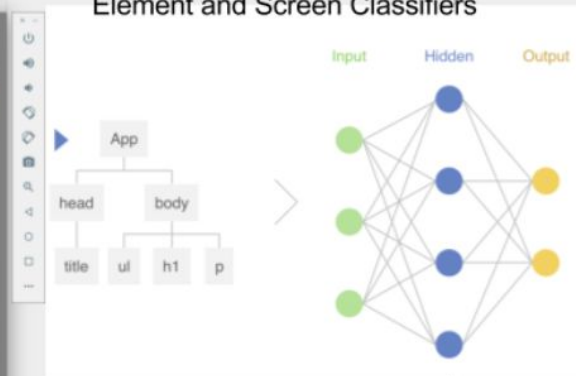


QLearn Brain

	Action					
State	0	1	2	3	4	5
0	-1	-1	-1	-1	0	-1
1	-1	-1	-1	0	-1	100
2	-1	-1	-1	0	-1	-1
3	-1	0	0	-1	0	-1
4	0	-1	-1	0	-1	100
5	-1	0	-1	-1	0	100



Element and Screen Classifiers



AIT Test Case

```

"Product then Empty Cart" {
  "description": "Make sure prod list is there, then verify steps" {
    {
      "description": "Find Product Listing Page",
      "grap": "",
      "labels": {
        "product_list"
      }
    },
    {
      "description": "Find cart page, verify empty.",
      "grap": "empty",
      "labels": {
        "cart"
      }
    }
  },
  "title": "Product then Cart"
}
  
```

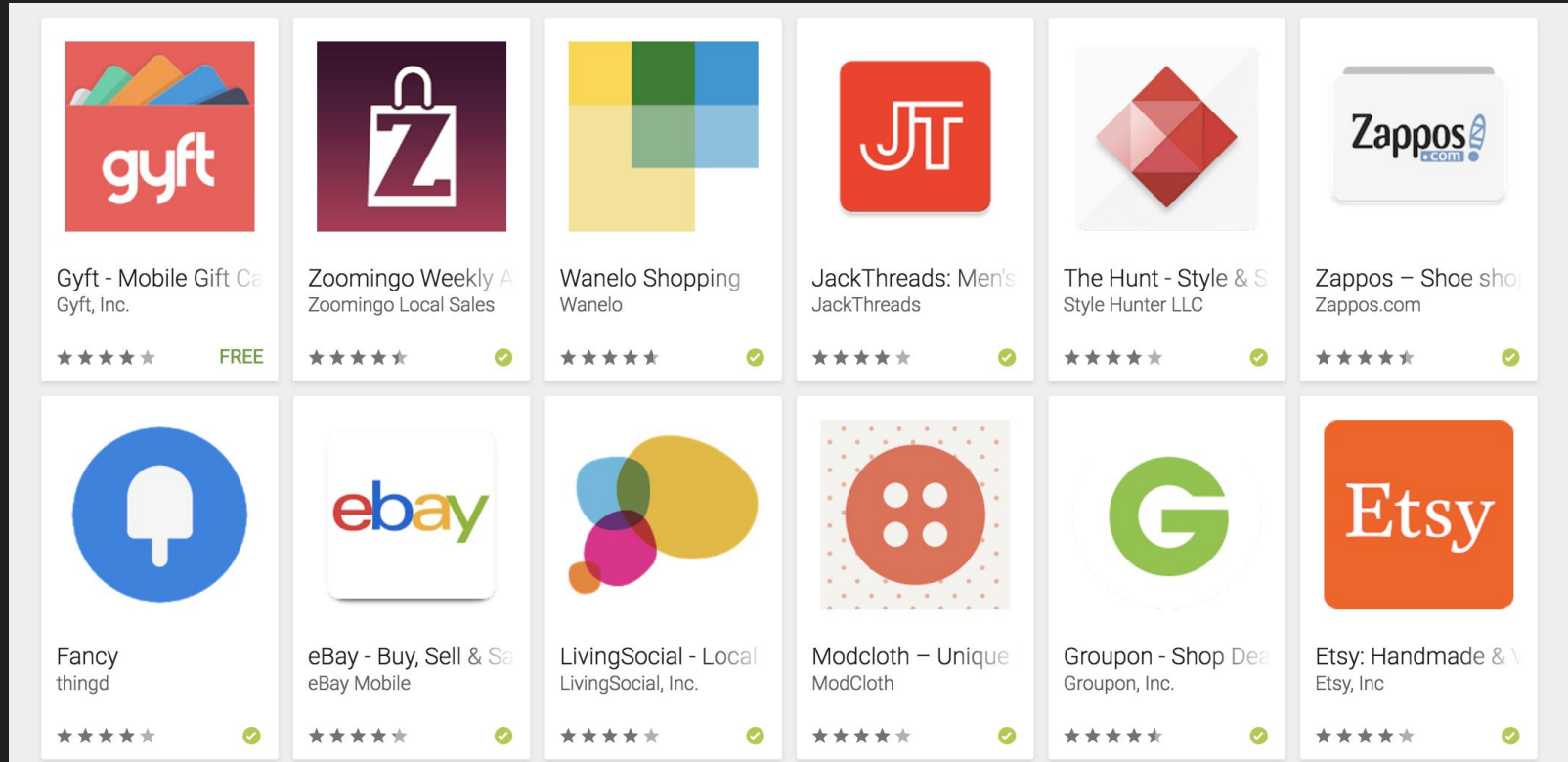
Step Actions + Verifications

## Like Humans: Robust to Flow Changes

- AI Verifies the INTENT of the flow “Go To Cart”
- AI deals with changes in flow, just like Humans do
- Tests still verify that User Flows work, even under rapid app design changes.

e.g. No hard-coded test steps

# Cross-Application!



Time To Test

Zero! Instant Test Automation

# Global Brain of Reusable Tests



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**jason@test.ai**