



Next Generation of Test Automation by AI

Ronit Shamay

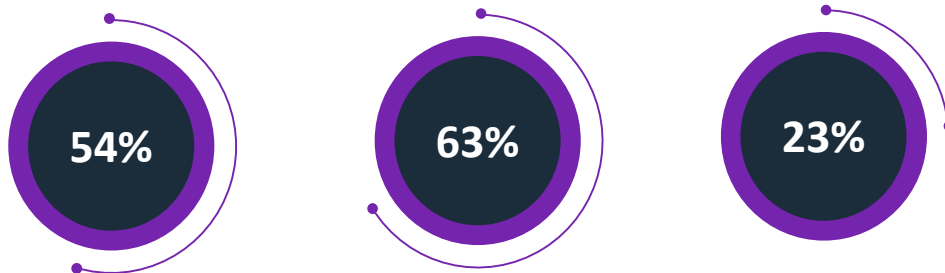
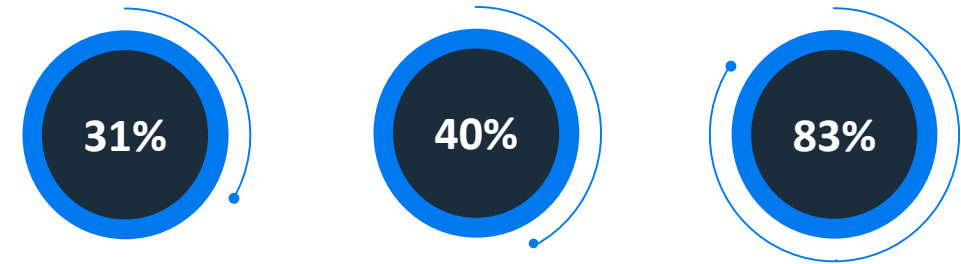
Presale

The State of AI In Business And Priorities

Businesses say AI is a strategic priority for their businesses as of today

IDC predicts 40% of digital transformation initiatives will use AI by 2019

IT professionals worldwide plan to invest in AI in the next 12 months



Businesses have incorporated AI into processes, product/service offerings today

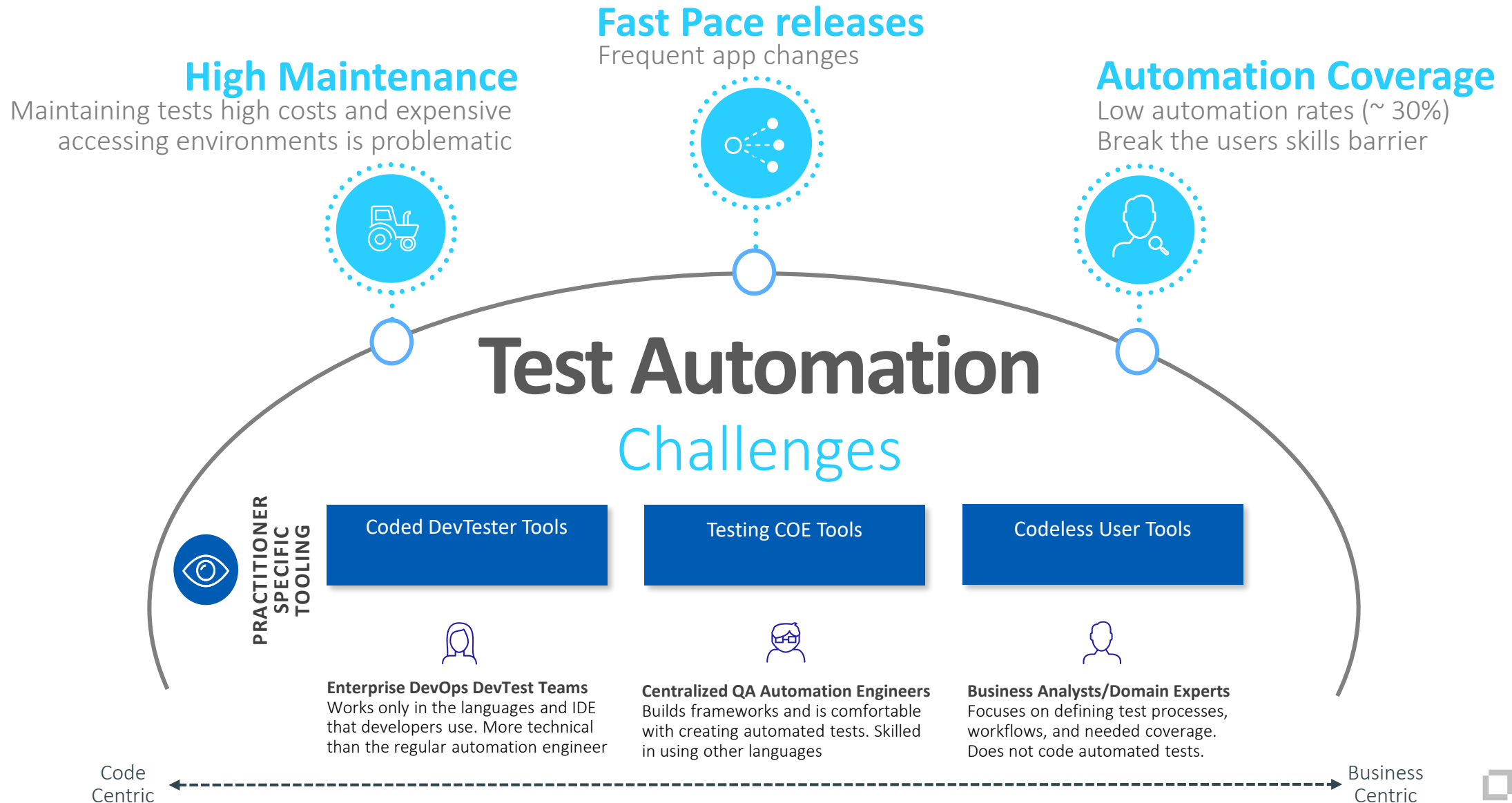
Businesses say pressure to reduce costs will require them to use AI

Executives say AI solutions implemented in their businesses have already increased productivity

But... What is AI?

- The software is 'trained' to do basic tasks with or without human instruction
- Most applications of AI are really pattern matching
- AI is a broad category of software including Machine Learning
- AI-based engines will consist of inputs and comparing the outputs to expected results
- These applications use the output of the AI training process and apply that to specific problems
 - Recognizing a stop sign and stopping a car
 - Analysing MRI scans
 - Composing conversations with hair stylists

Why AI and How Can it Help Software Automation?



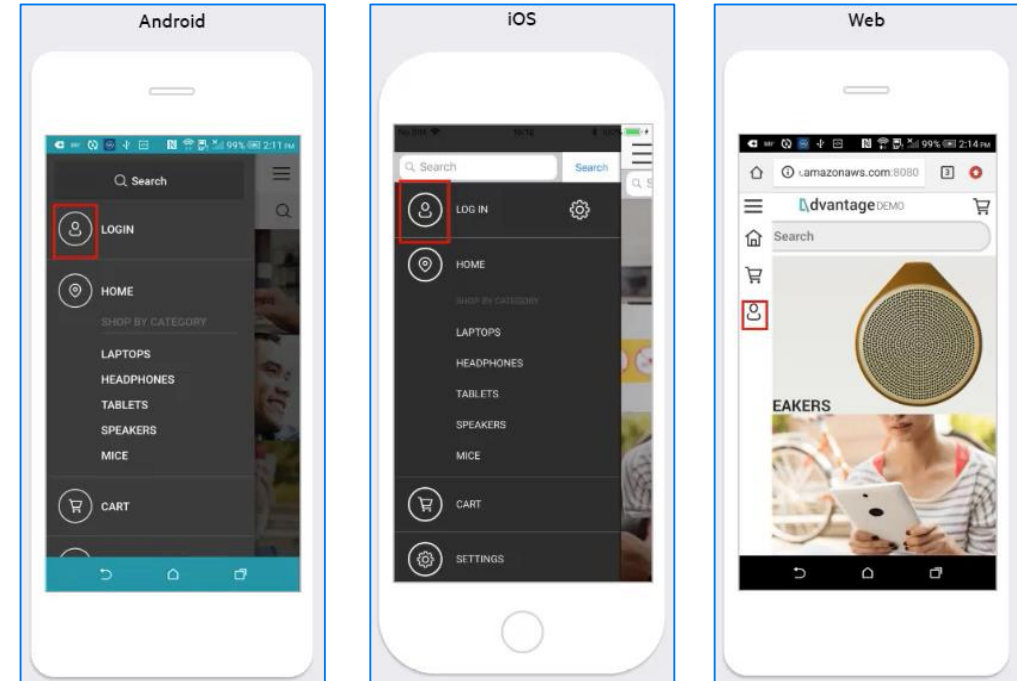
An example from today's reality...

Use Case

- Automating a business process of buying an item in an e-commerce application
- The application is available as mobile app (Android and iOS) and mobile-web

Challenges

- THREE scripts are required to automate the same flow! →
Time to market challenges
- Changes in the application break the automated script →
High maintenance → Arguable automation ROI



File Edit View Search Design Record Run Resources ALM Tools Window Help

UFT_AOS Action1 Start Page

Main

```

1 'Click the menu
2 Device("Device").App("Advantage Shopping").MobileObject("menu").Tap
3
4 'Click the profile
5 Device("Device").App("Advantage Shopping").MobileLabel("Profile").Tap
6
7 'Set 'aidemo1' into 'user name' field
8 Device("Device").App("Advantage Shopping").MobileEdit("UserName").Set
9
10 'Set 'AIdemp1' into 'password' field
11 Device("Device").App("Advantage Shopping").MobileEdit("Password").Set
12
13 'Click the 'Login' button
14 Device("Device").App("Advantage Shopping").MobileButton("LOGIN").Tap

```

Data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2															
3															
4															

Global Action1

Output Active Screen Data Errors

Ready In 10 col 12 ch 12

samsung SM-G920F

MC

Workspace: Public workspace

CONTROL PANEL

Image quality 100%
High performance High quality

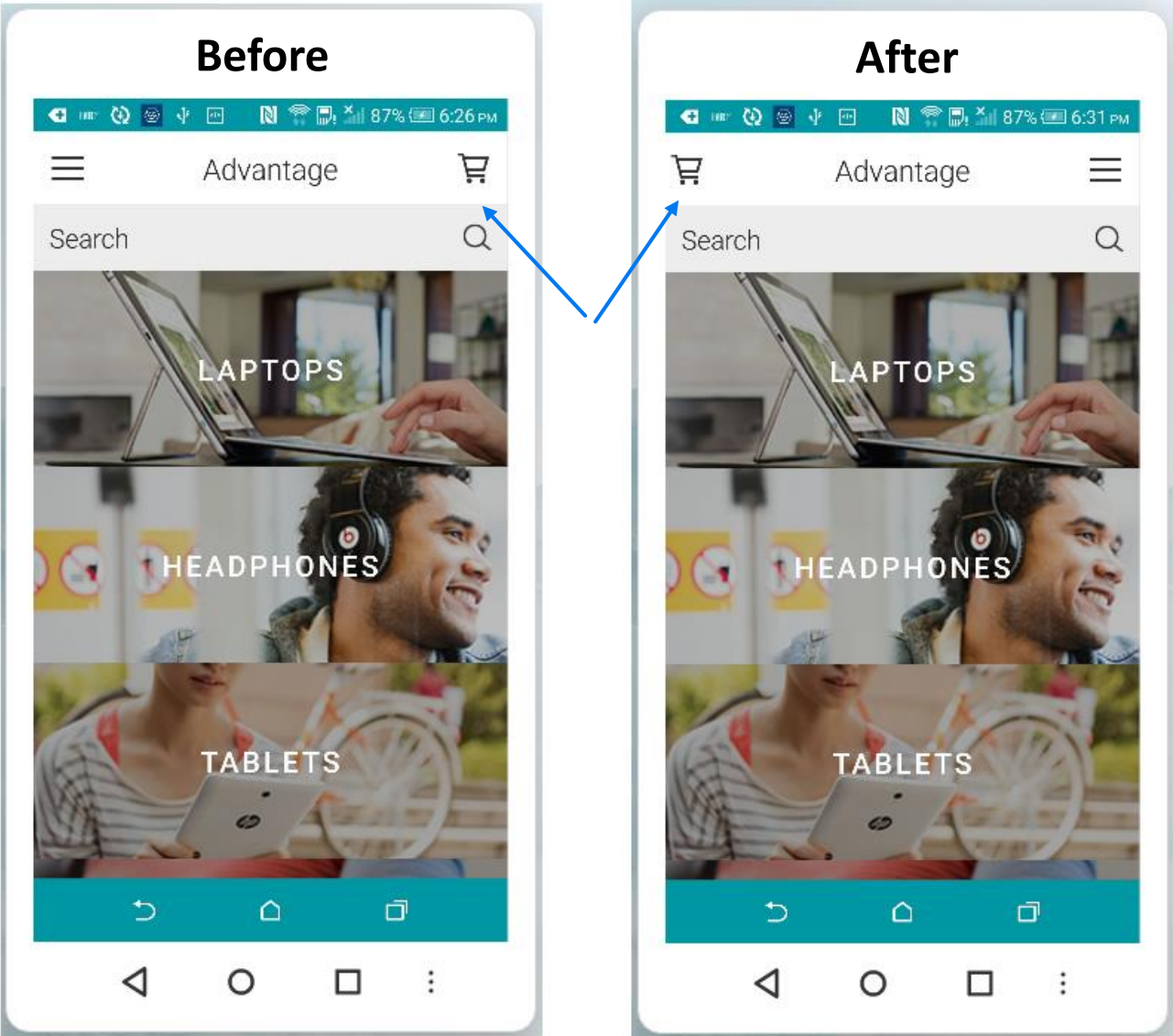
Latency 14 ms

Zoom - 100% +

Device Info

7.0
SM-G920F
samsung SM-G920F
06157df623748f2b

Let's introduce a small change to the application...



File Edit View Search Design Record Run Resources ALM Tools Window Help

UFT_AOS Action1 X Start Page

Main

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Data

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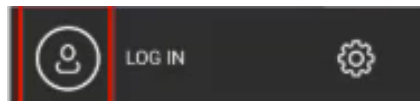
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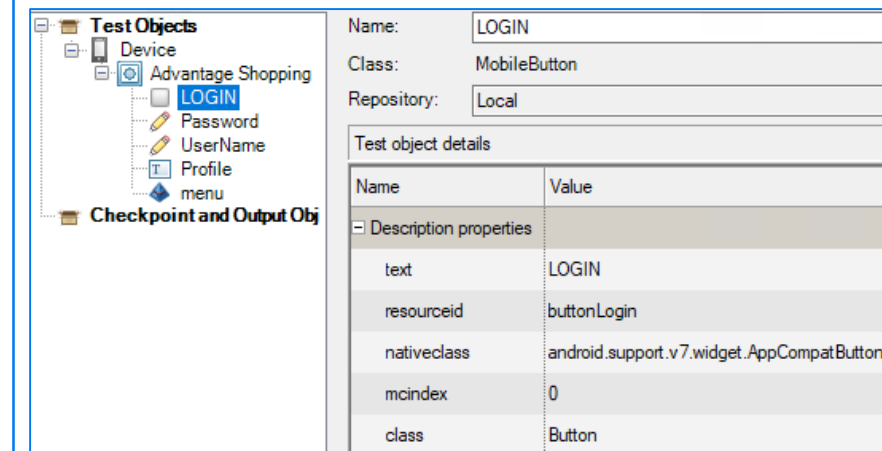
Why is it happening?

- Object Identification is based on the **physical object properties**
- Changes in the application implementation impact the **underlying** object properties → Automation is breaking

What if we could automate the business process as a **human** (vs. a machine) “sees” it?



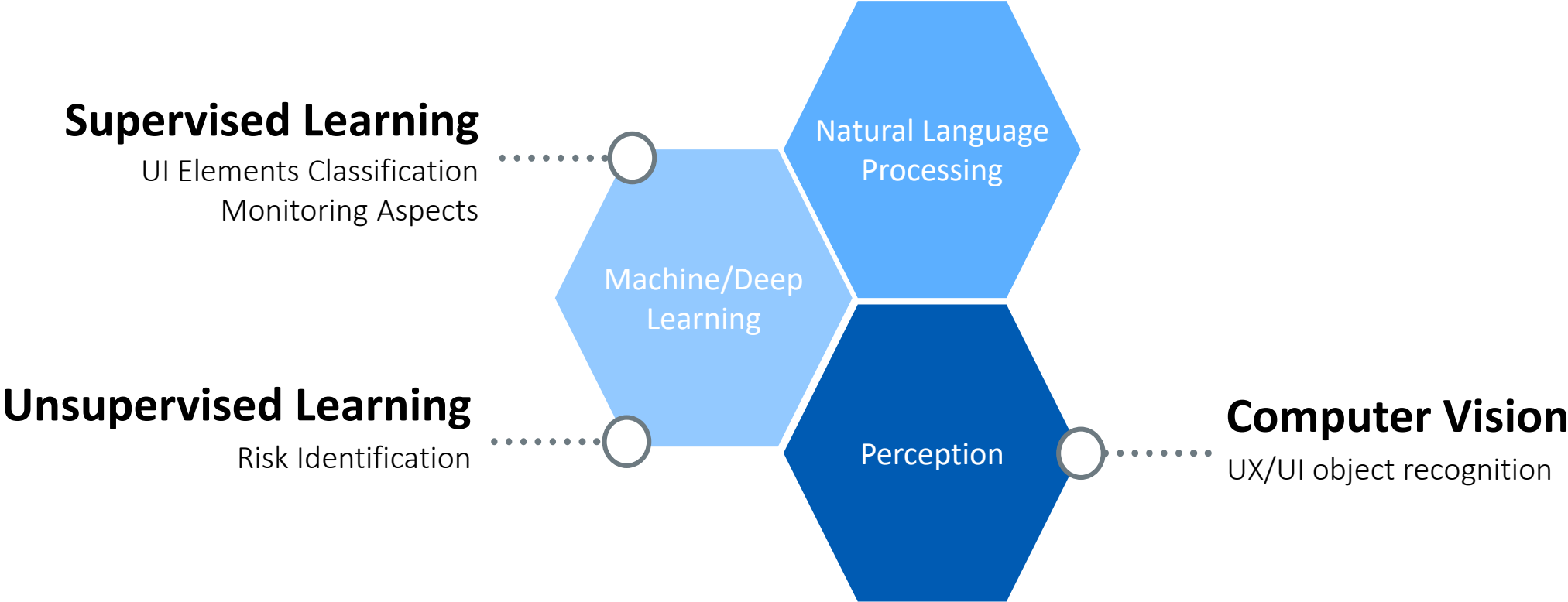
Click the 'profile' button



The screenshot shows a test object identification tool interface. On the left, a tree view under 'Test Objects' shows a hierarchy: Device > Advantage Shopping > LOGIN. The 'LOGIN' object is selected. On the right, a details panel shows the following information:

Name	Value
Test object details	
- Description properties	
text	LOGIN
resourceid	buttonLogin
nativeclass	android.support.v7.widget.AppCompatButton
mcindex	0
class	Button

Micro Focus Functional Testing AI Capabilities

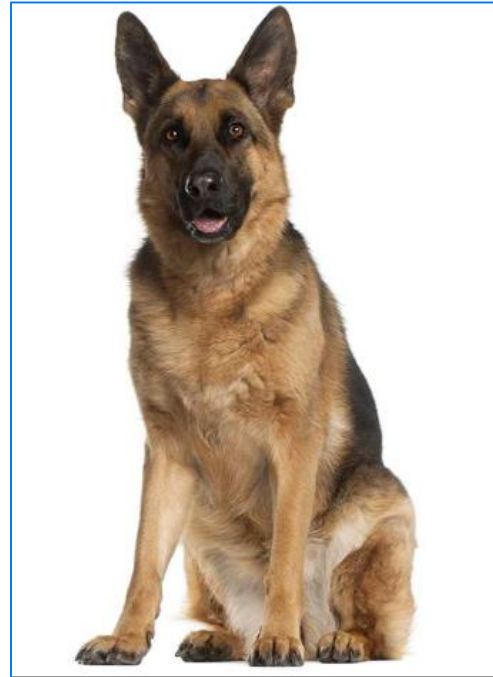


Let's Talk About Training

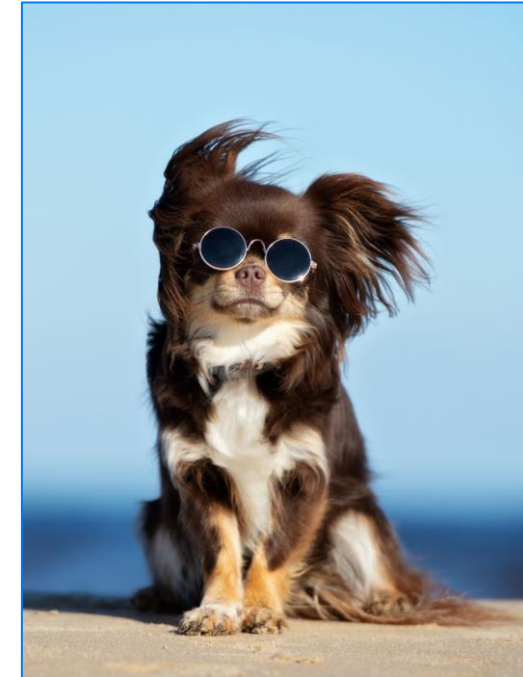
What Do You See Here?



Dog



Dog



Cool Dog

Let's Talk About Training

What Do You See Here??



Cat



Cat

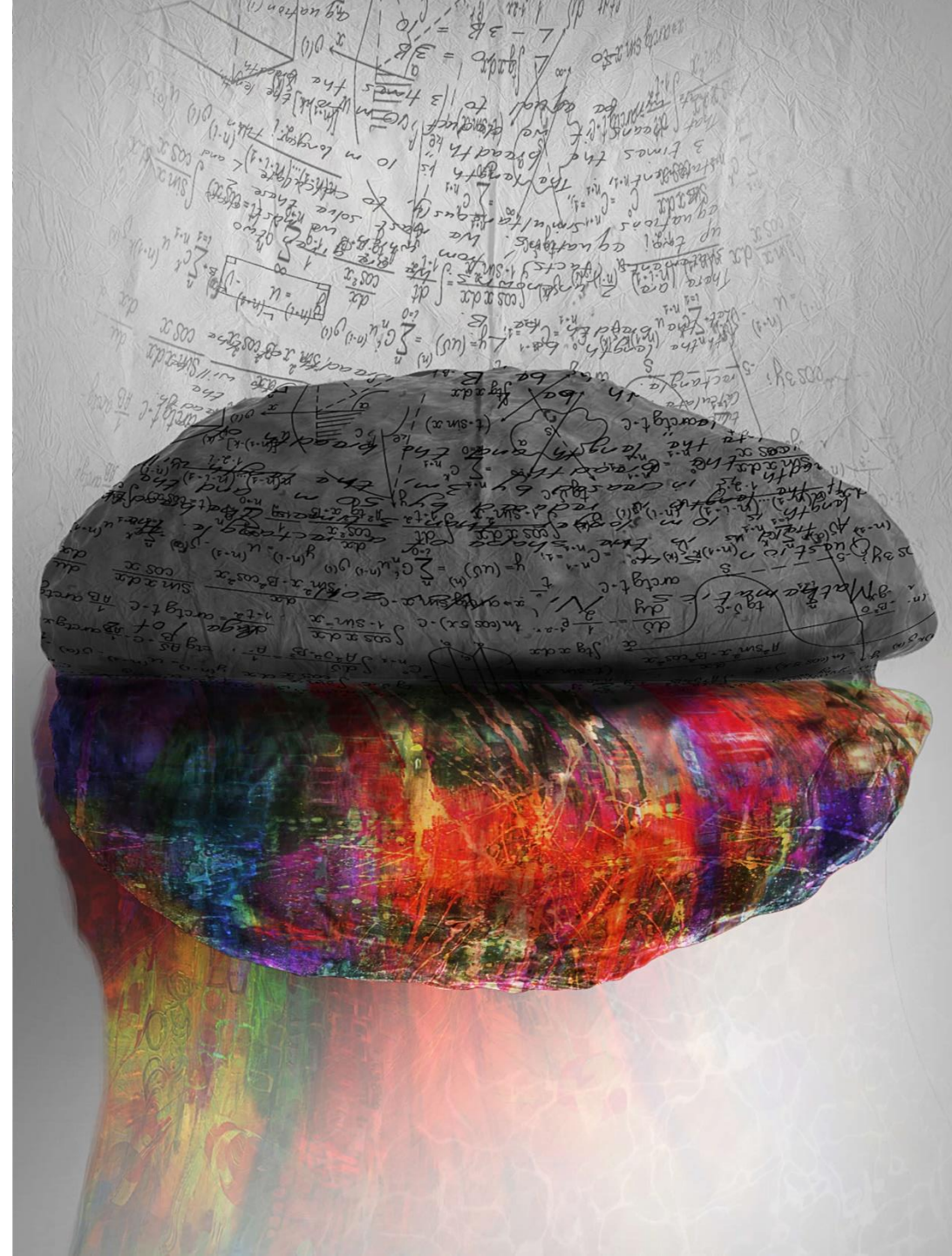


Cool Cat

Did You Ever Wonder How This Magic Happened ?

- Seeing a picture
- Being able to identify it
- Classifying it, and giving it the right name

It's because the human brain has the “power”.... or in other words, we all have neural networks (NN) and this is their main “job” on a daily basis.



But, How are Neural Networks Created?



A newborn baby cannot distinguish between a cat and a dog

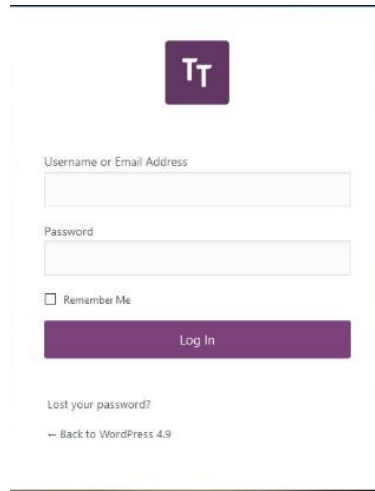


Roughly when they are one year old... they know how to do this task

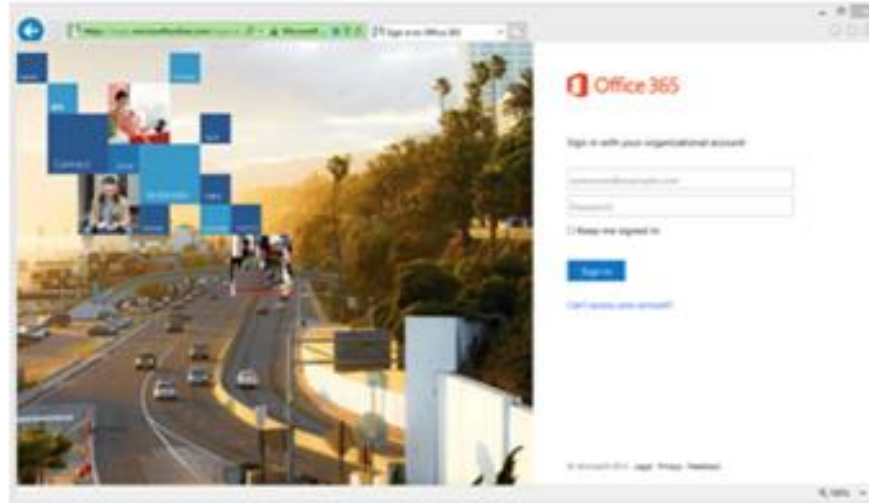


Mom and Dad, in other words, the “Supervisors”, teach by example until the brain is “equipped” with NN to do this task

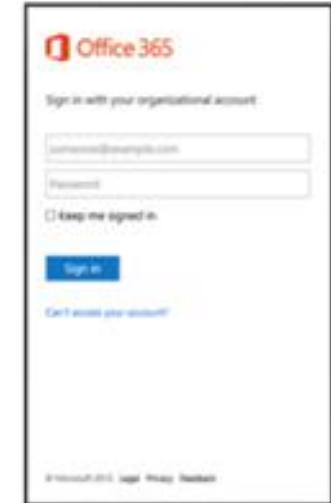
One More Example -



What is this?



What is this?

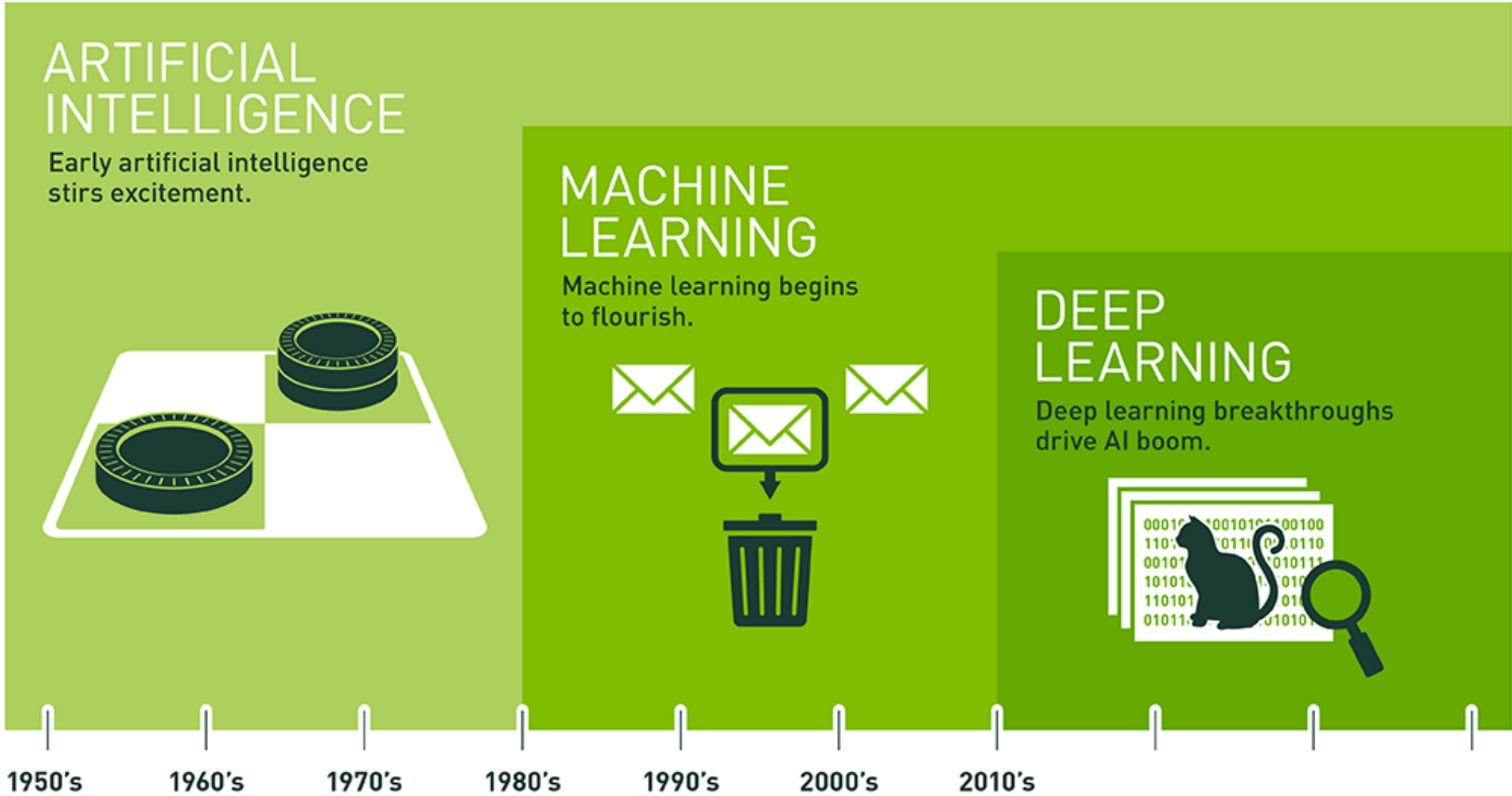


What is this?

They are all login pages, right?

So... if a human brain can identify it, why not computers?

Deep Learning on the Rise



The Deep Learning Revolution



Data

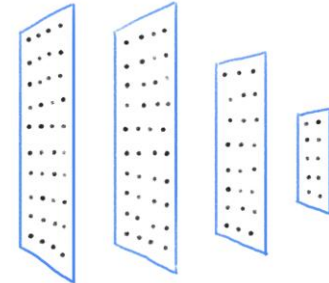


CAT



(Labeled
PHOTOS)

DOG



OUTPUT



Deep Neural Networks

Program



Computing Power



Functional Automation Testing Powered by AI/ML

```

1  'Get the device and start the application (taken from the data
2  Device("Device").App("Advantage Shopping").Launch DoNotInstall
3
4  'Set the context for the AIUtil - Context is the device itself
5  AIUtil.SetContext Device("Device")
6
7  'Click the menu
8  AIUtil("hamburger menu").click
9
10 'Click the profile
11 AIUtil("profile").click
12
13 'Set 'aidemo' into 'user name' field
14 AIUtil("input", "user nam").set "aidemo"
15
16 'Set 'AIdemo1' into 'password' field
17 AIUtil("input", "password").set "AIdemo1"
18
19 'Click the 'login' button
20 AIUtil("button", "login").click
21
22 'Search for 17t
23 AIUtil("search").Search "17t"

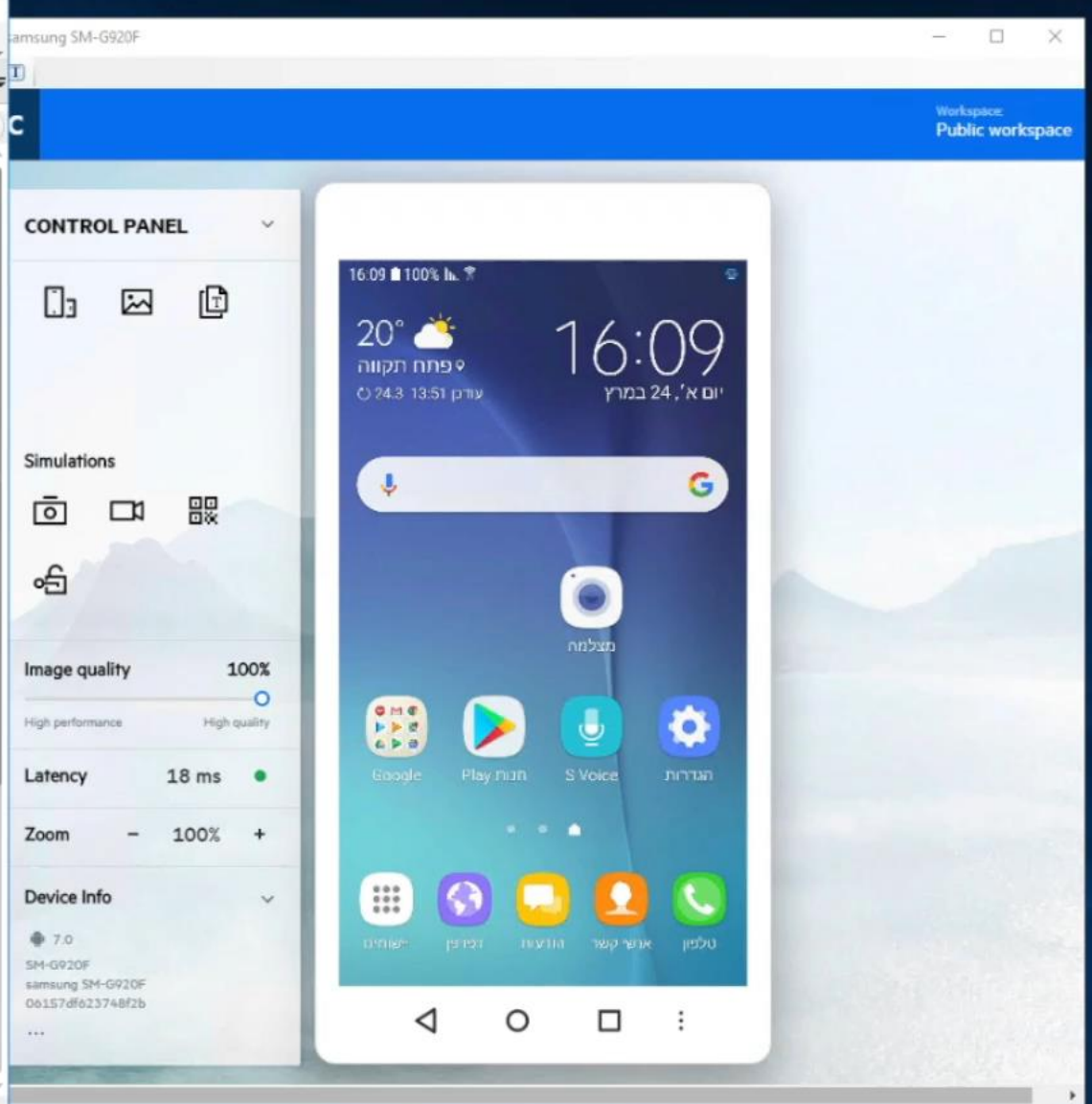
```

Data

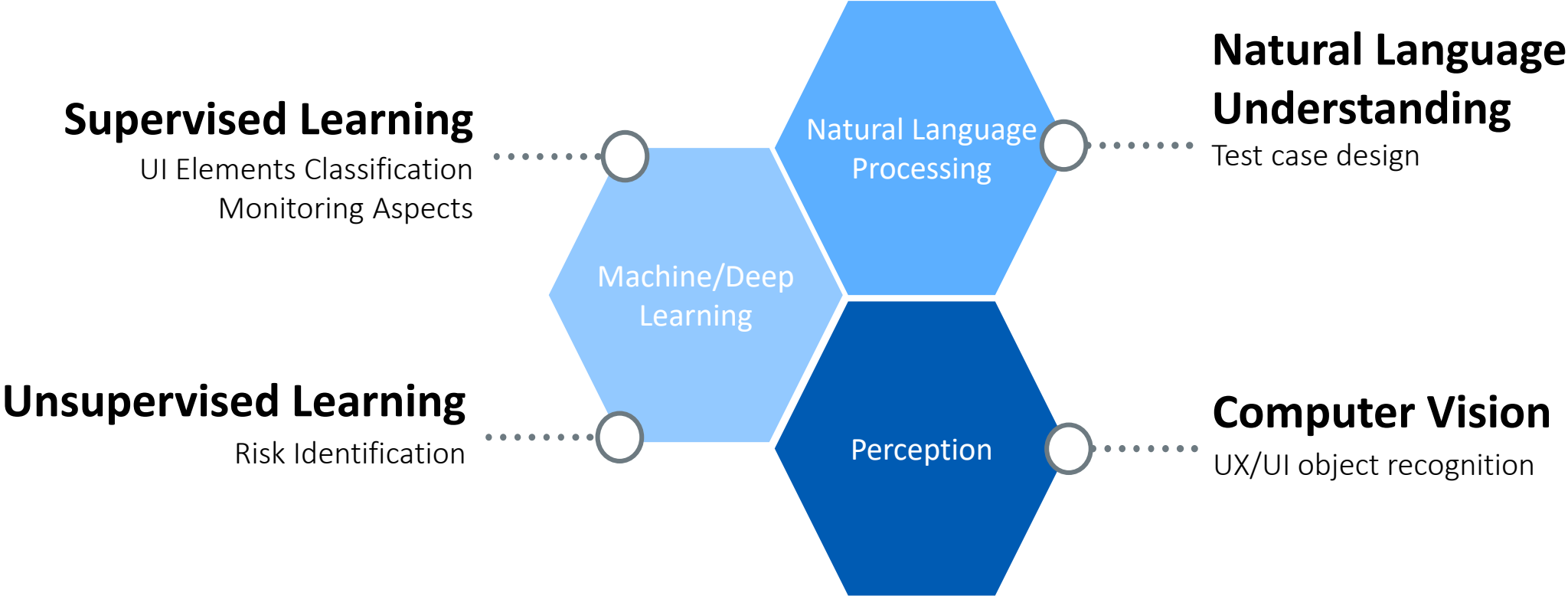
D1	ANDROID									
	device_id	app_identifier	app_instrumented	ostype	E	F	G	H	I	
1	06157df6237482b	com.Advantage aShoppin	TRUE	ANDROID						
2	9509cefd90aed32a74edd3f662ece245a2e8cd1	com.mf.iShopping	TRUE	IOS						
3	c006e07b	com.Advantage aShoppin	TRUE	ANDROID						
4										

Global Action1

Output Active Screen Data Errors



Micro Focus Functional Testing AI Capabilities



“Roadmaps are subject to change and are therefore not a commitment to deliver a software product, code or functionality or to meet any specific timetable”

Natural Language Processing in a nutshell

Let's think about this simple task

Can you please search for a dog in google?

Steps to be performed

1. Open Browser
2. Navigate to Google.com
3. Enter dog in the search text input field
4. Click on the search button
5. Explore results

What if there was an option to “talk” to the “testing tool” in the same way and instead of having 4±6 script lines, having only one simple natural explanation of the required action??

FLOW

click ser search

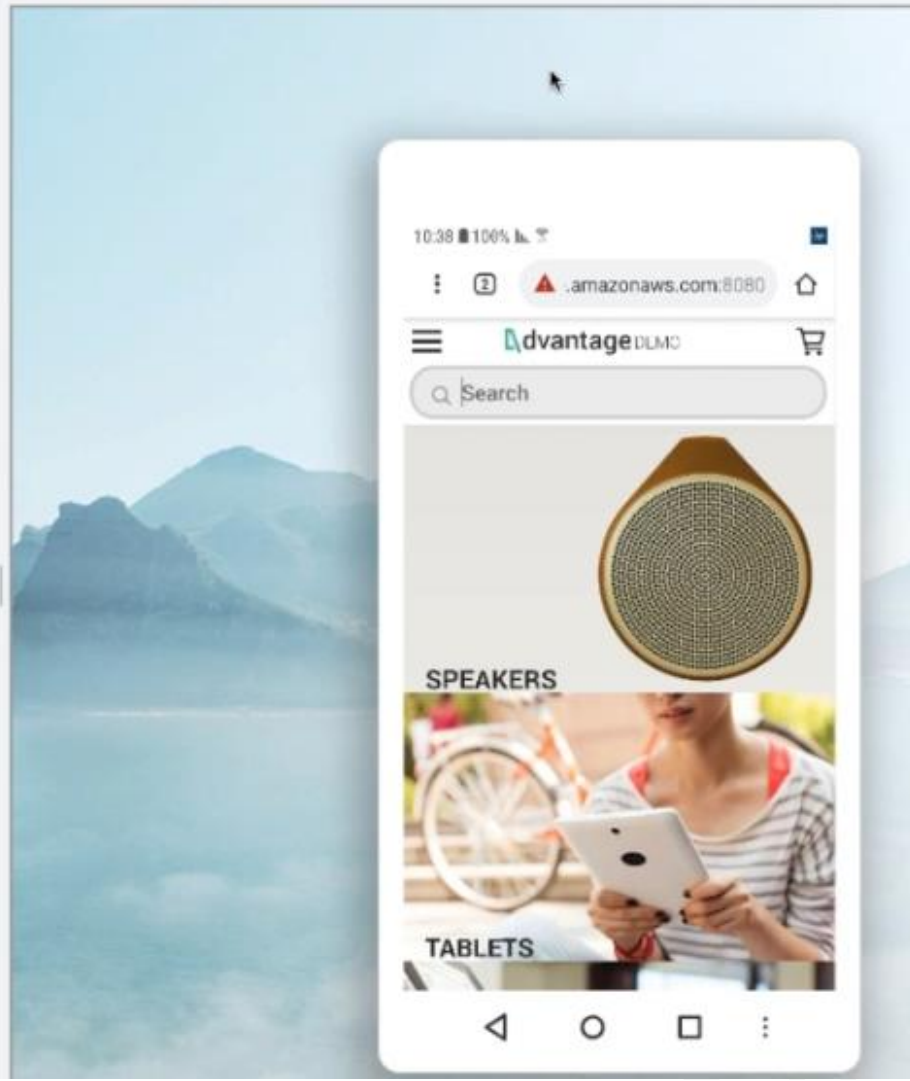
- 1 Click the menu
- 2 Click the profile
- 3 Set 'aidemol' into 'user name' field
- 4 Set 'AIdemol' into 'password' field
- 5 Click the 'login' button
- 6 search for '17t'
- 7 Click the '\$' text
- 8 Click the 'Add to cart' button
- 9 Click the cart

✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	🔄
✓	✓	
✓	✓	
✓	✓	

RELEASE DEVICE

INSPECT

LIVE DEVICE AI VIEW



Running on Web...

Why AI and How Can it Help Software Automation?

Reduced High Maintenance

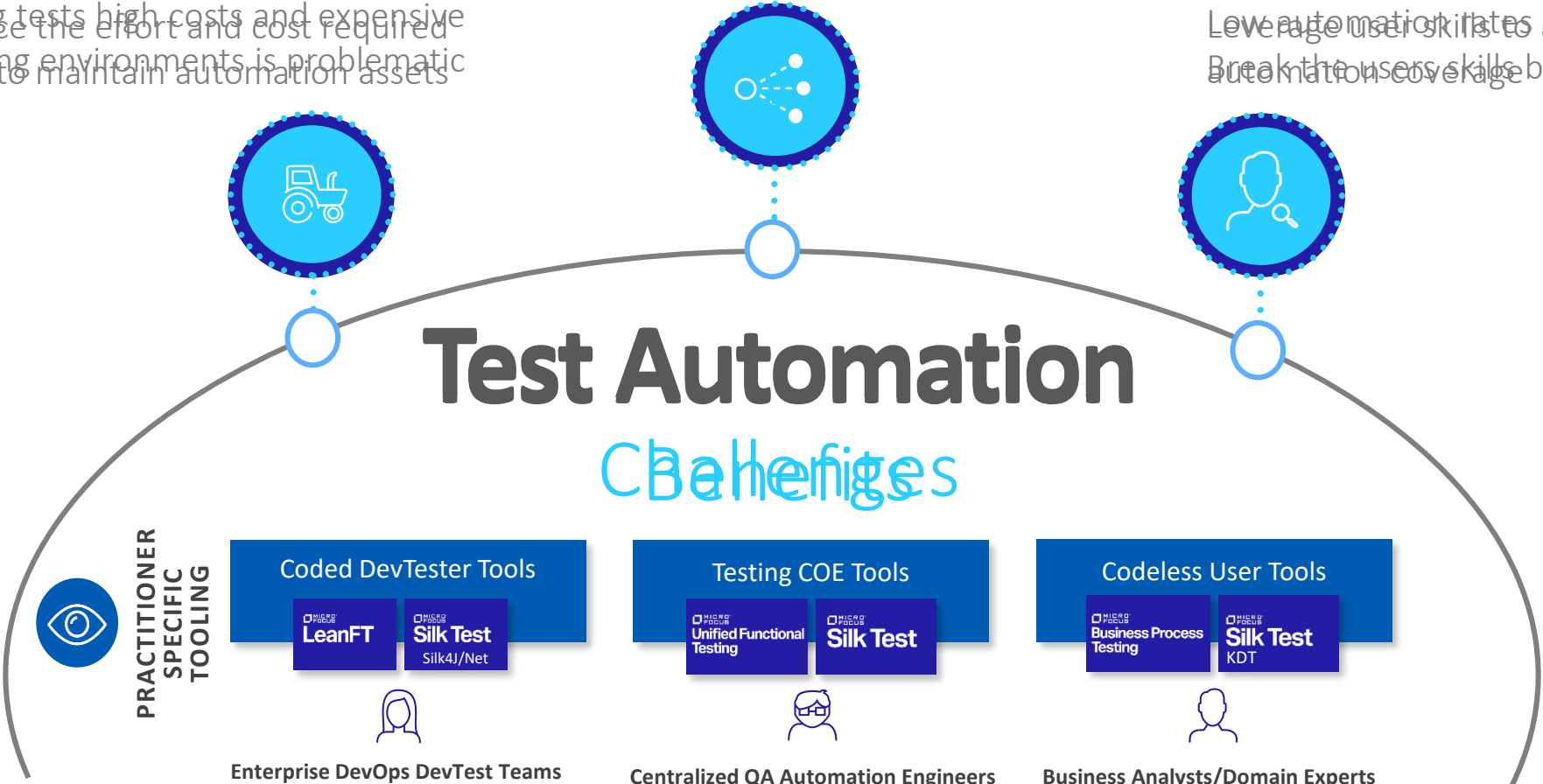
Maintaining tests high costs and expensive
 Reduce the effort and cost required
 accessing environments is problematic
 to maintain automation assets

Increase Reliability

Fast Pace releases
 Create more automation and
 intelligence overcome application changes
 frequent app changes

Automation Skill Gaps

Low automation skills (~20%)
 Break the users skills barrier
 automation coverage



Test Automation

Challenges



PRACTITIONER
 SPECIFIC
 TOOLING

Coded DevTester Tools

LeanFT | Silk Test
 Silk4J/.Net



Enterprise DevOps DevTest Teams
 Works only in the languages and IDE
 that developers use. More technical
 than the regular automation engineer

Testing COE Tools

Unified Functional
 Testing | Silk Test



Centralized QA Automation Engineers
 Builds frameworks and is comfortable
 with creating automated tests. Skilled
 in using other languages

Codeless User Tools

Business Process
 Testing | Silk Test
 KDT



Business Analysts/Domain Experts
 Focuses on defining test processes,
 workflows, and needed coverage.
 Does not code automated tests.

Code
 Centric



Business
 Centric

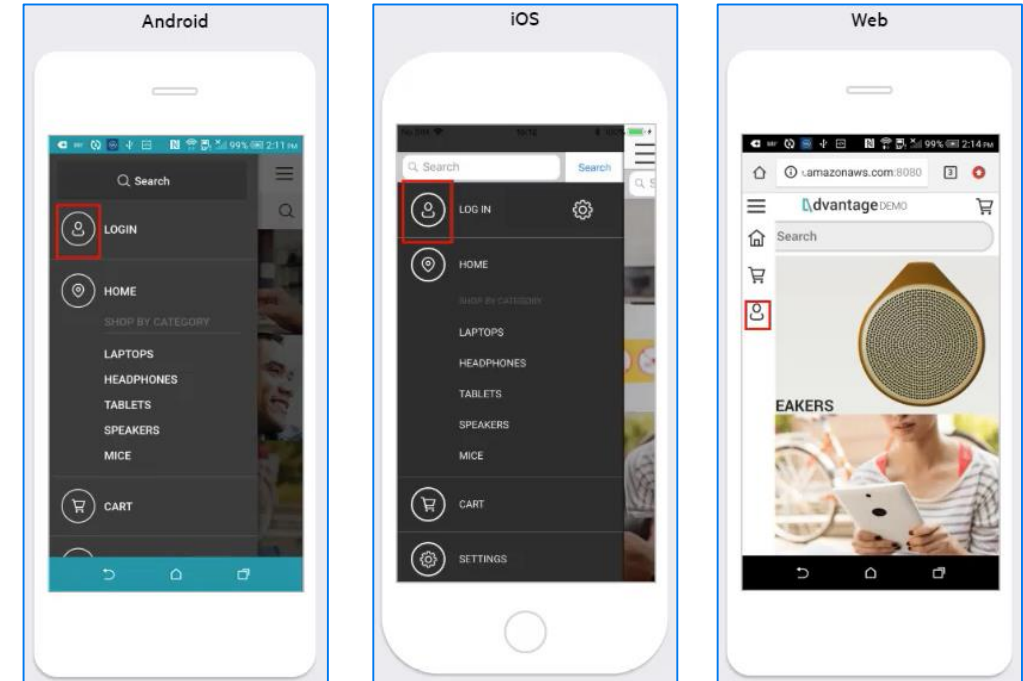
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The NEW Reality

Use Case

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Solution

- **AI testing tool** equipped with OOtB “human readable language”, using **NLP** services
- Create **ONE script** for all Web & Mobile platforms!
- Execution (either sequential or parallel) using built in AI model
- Reduced **Maintenance** due to AI model
Flexibility & Resiliency



Thank You

UFT 14.53 AI

UFT > DVD

Name

- Additional Components
- AI
- ALMPlugin
- Dat
- Extensibility and Tool...
- LeanFT
- prerequisites
- RunResultsViewer
- Unified Functional Te...
- autorun.inf
- Readme.htm
- setup.exe

Options

General GUI Testing API Testing BPT Testing Coding Text Editor

General AI active

Test Runs

Text Recognition

Folders

Active Screen

Screen Capture

Insight

AI

Mobile

Selenium Functional

Remote Connection

Windows Applications

Web

Terminal Emulator

Changes made in this pane will only take effect after you click - CAGUITest2

Object Spy

Hover mode

Adds objects in the selected repository

GUI Test2\Action1\Local

Object hierarchy:

Properties | Operations

Native Identification

Properties	Values

AI Identification View

By Object By Text

Drag & Drop identified elements into your test

```
1 AIUtil.SetContext Device("device")
2 AIUtil("hamburger_menu").Click
3 AIUtil("profile").Click
4 AIUtil("left_triangle").Click
5 AIUtil.FindText("LAPTOPS").Click
6 AIUtil.FindText("D Chromebook14").Click
7 AIUtil.FindText("QUANTITY").Click
8 AIUtil("plus").Click
9 AIUtil.FindText("APPLY").Click
10 AIUtil.FindText("ADD TO CART").Click
11
12
```

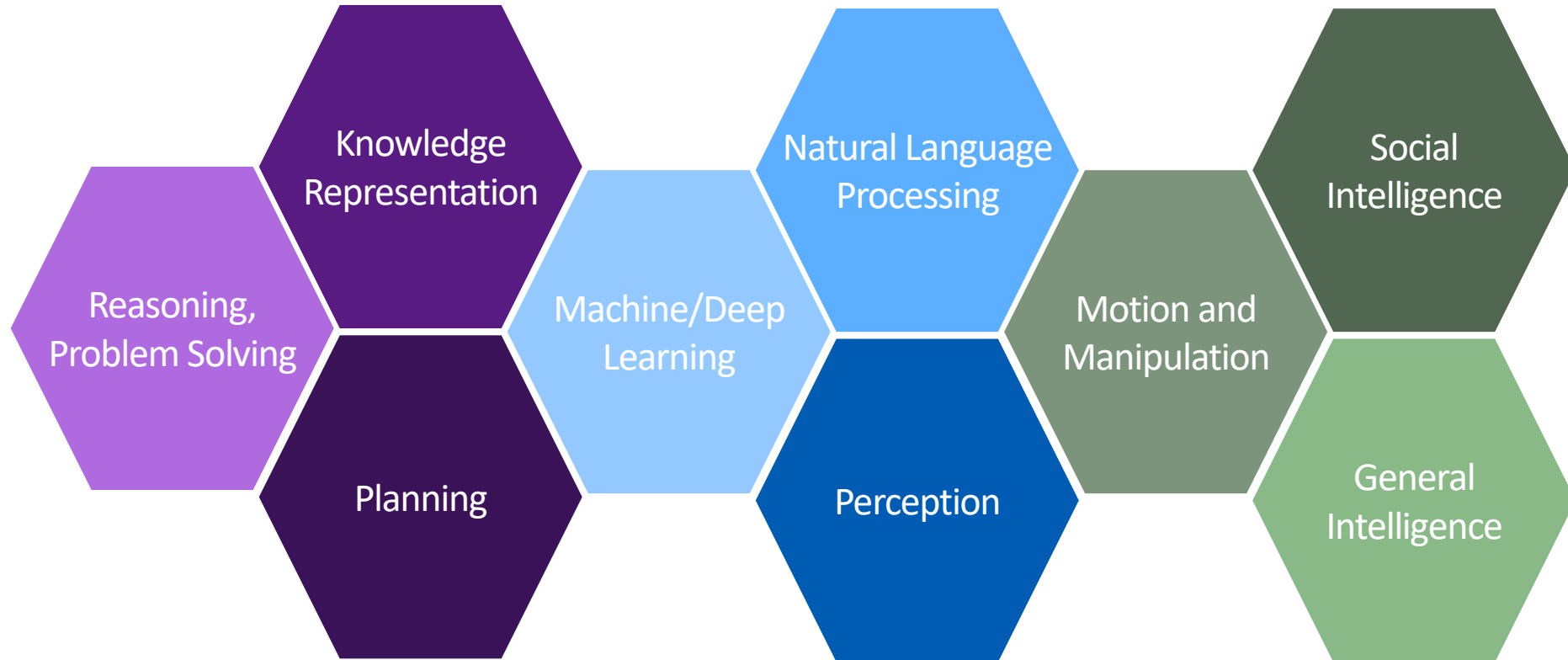
HP ELITEPAD 1000 G2 TABLET \$1009.0

QUANTITY 1 COLOR DETAILS

ADD TO CART



AI Major Research Areas





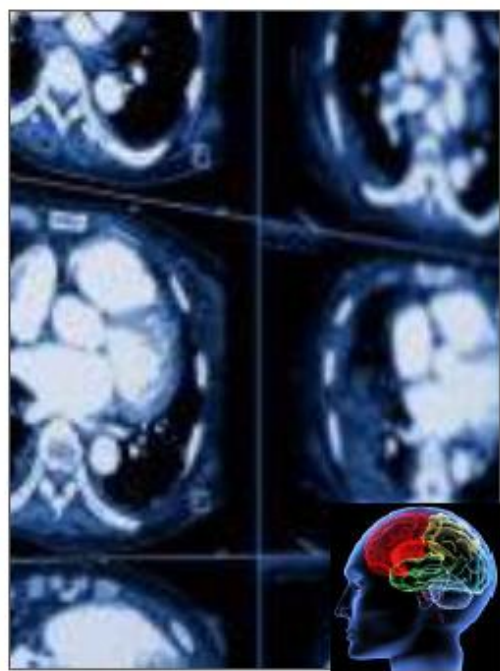
DEEP LEARNING IS SWEEPING ACROSS INDUSTRIES

INTERNET SERVICES



Image/Video classification
Speech recognition
Natural language processing

MEDICINE



Cancer cell detection
Diabetic grading
Drug discovery

MEDIA & ENTERTAINMENT



Video captioning
Content based search
Real time translation

SECURITY & DEFENSE



Face recognition
Video surveillance
Cyber security

AUTONOMOUS MACHINES



Pedestrian detection
Lane tracking
Recognize traffic signs



AIVA

The Artificial Intelligence composing emotional soundtrack music