



AI en Software Testing op de lange termijn



“Is het een appel?”

Traditioneel programmeren

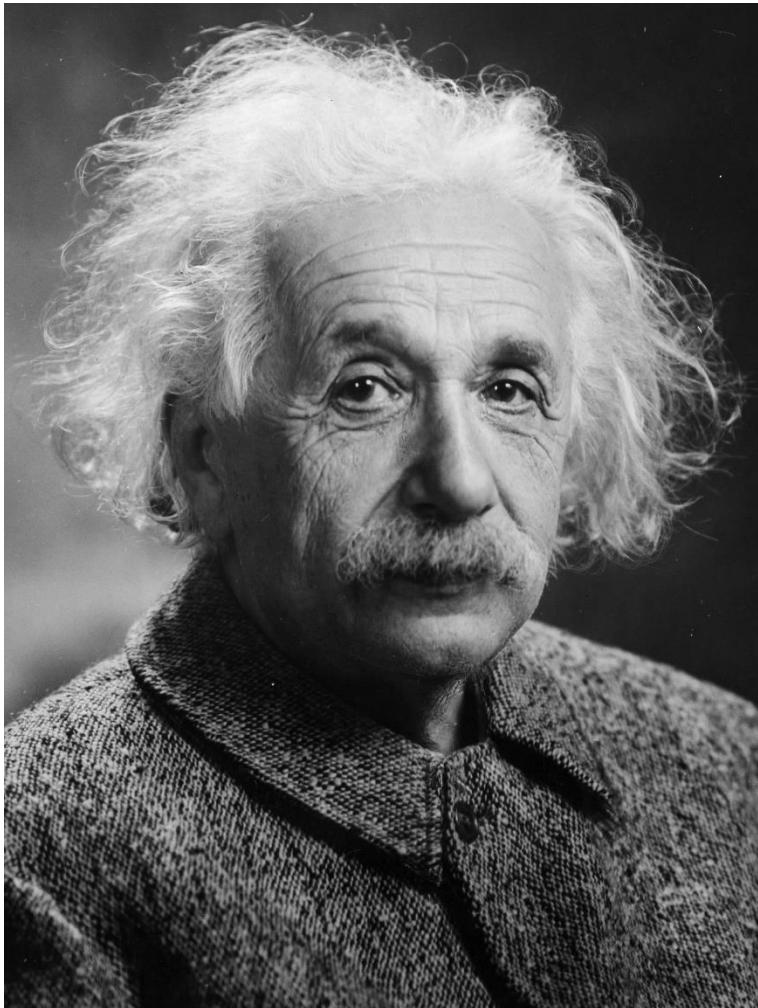
Kleur = rood, groen, geel

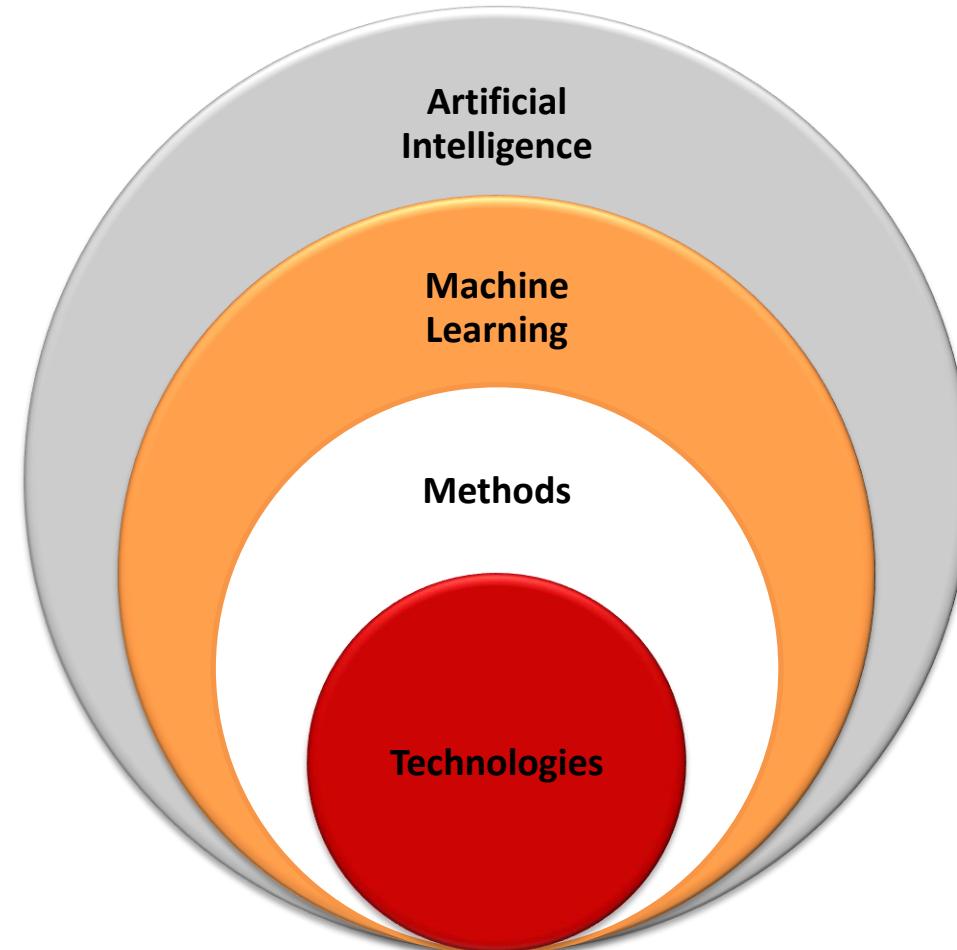
Vorm = rond

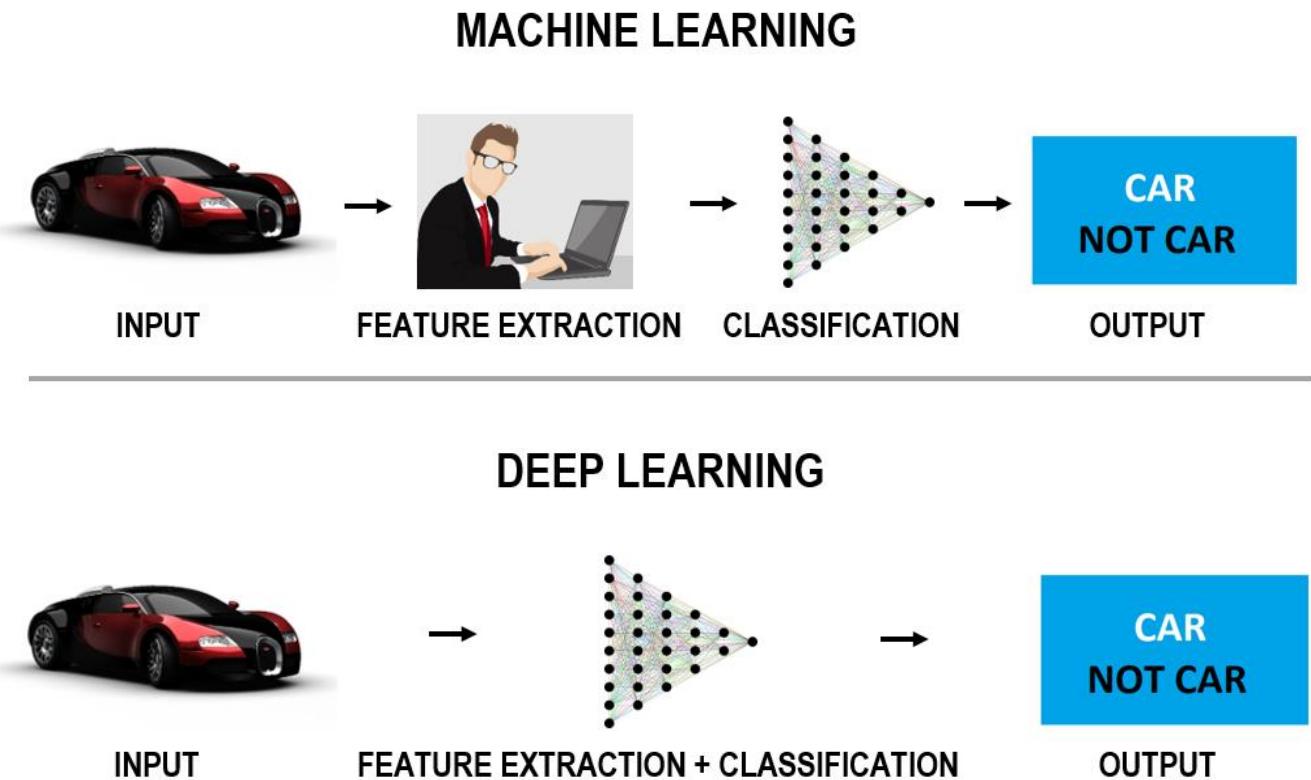
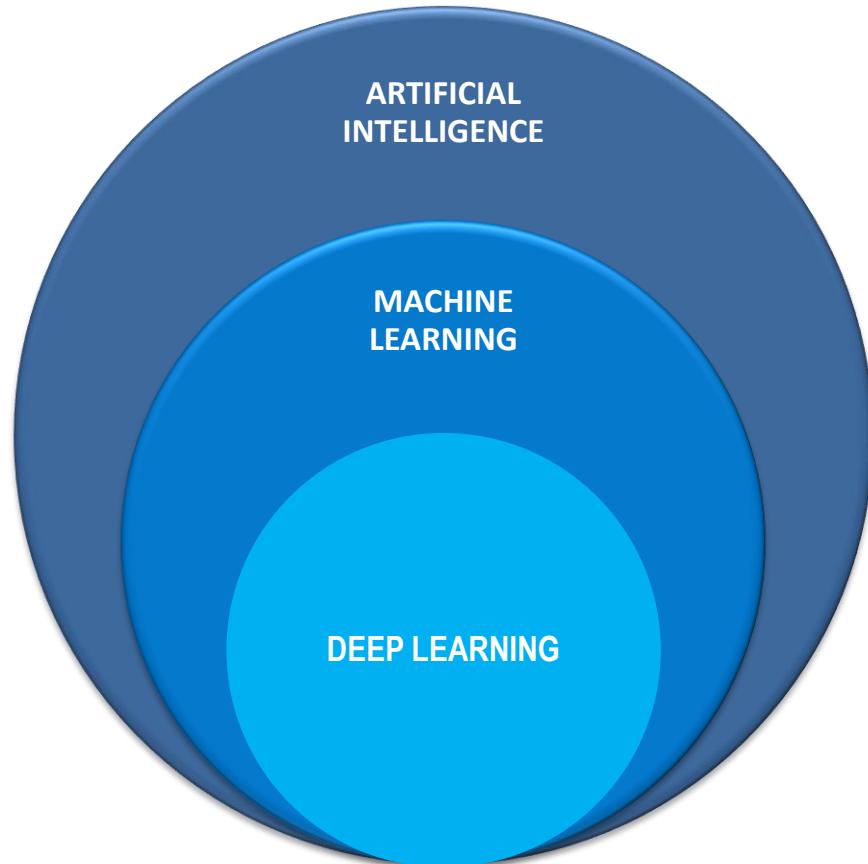
Textuur = glad

AI





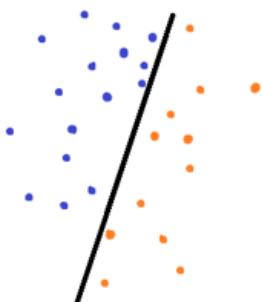




Configuratie van het systeem door middel van training

Verschillende soorten trainingen:

Supervised

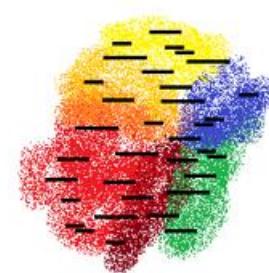


Learning

Known

Patterns

Unsupervised



Learning

Unknown

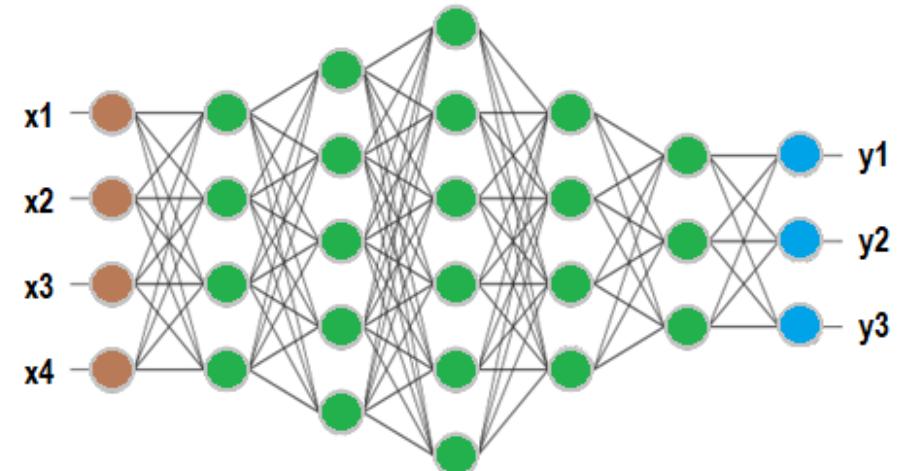
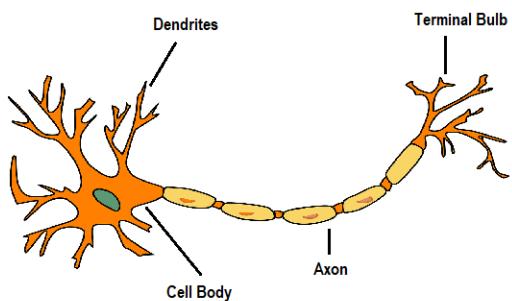
Patterns

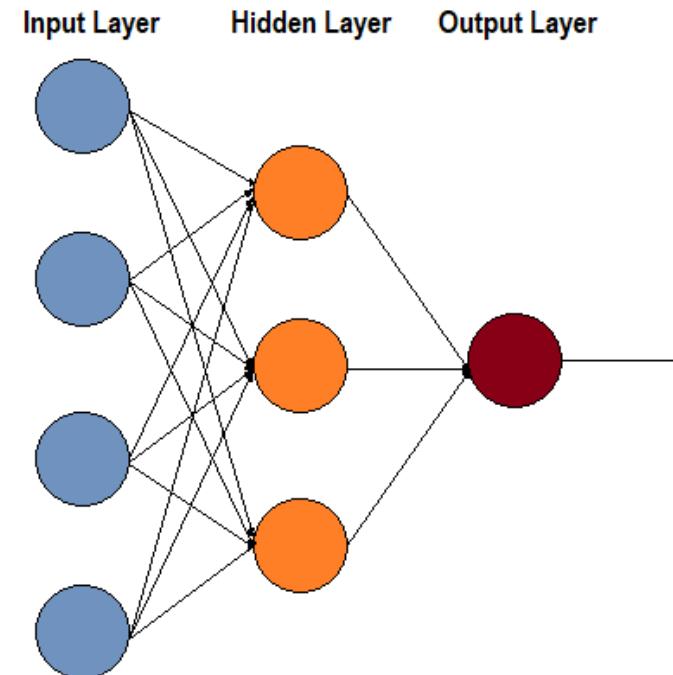
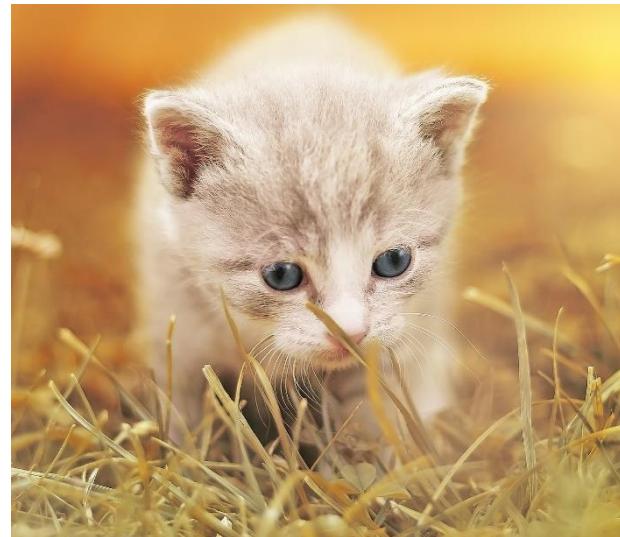
Reinforcement



Generating Data

Learning Patterns





Label:

1 = Het is een kat
0 = Het is geen kat



64 x 64 pixels



Blue channel

Green channel

Red channel

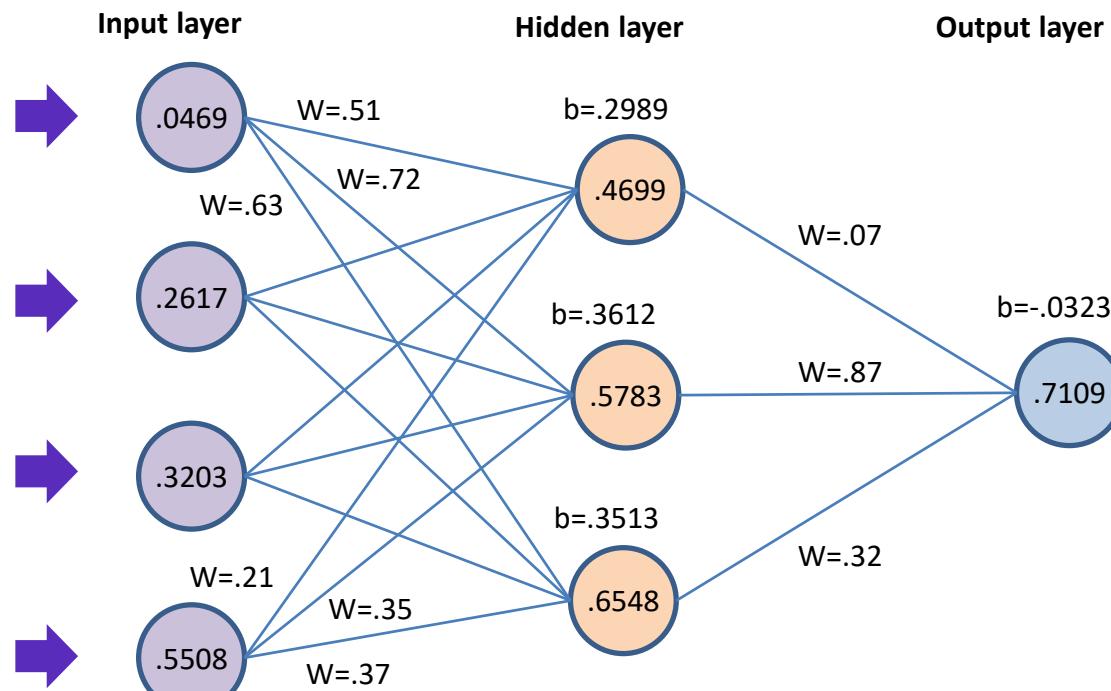
	1	2	3	4	...	64	
1	120	67	89	107	...	13	18
2	12	216	145	26	...	181	81
3	0	16	4	45	...	44	56
4	0	78	90	167	...	25	7
...	12
64	12	67	82	141	...	12	

Image array: [64 x 64 x 3]

120
12
0
0
...
67
216
...
89
...
107
78
90
167
...
25
...
26

Vector X

120
12
0
0
...
67
216
...
89
...
107
78
90
167
...
25
...
26



Werkelijke uitkomst:

0.7109 = kat

0.2891 = geen kat

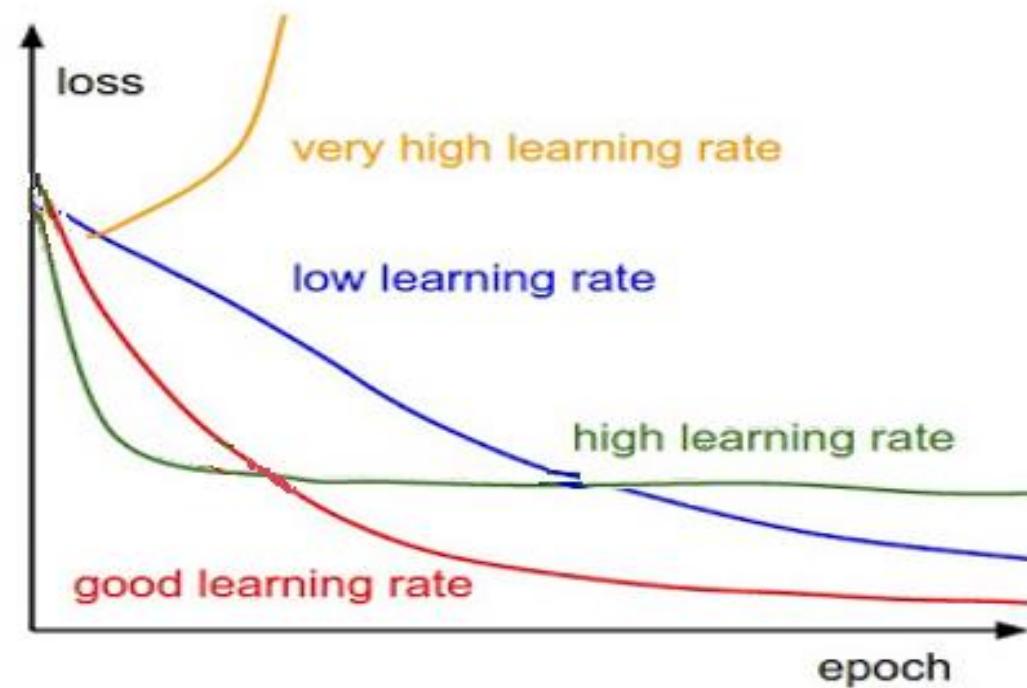
Gewenste uitkomst:

1.0000 = kat

0.0000 = geen kat

} Verschil = verlies

Vector X



Totale data
set van
foto's

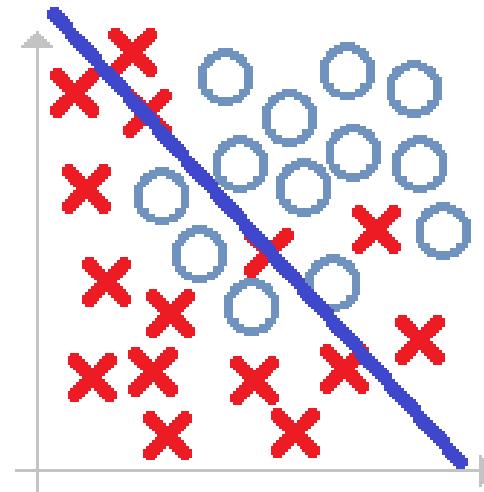


70 %

30 %

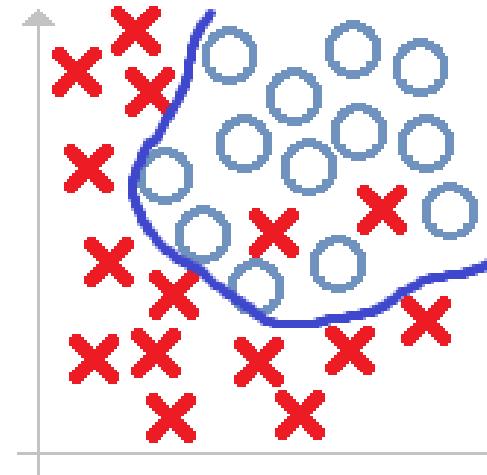
Training error is 0.001

Test error is 0.3



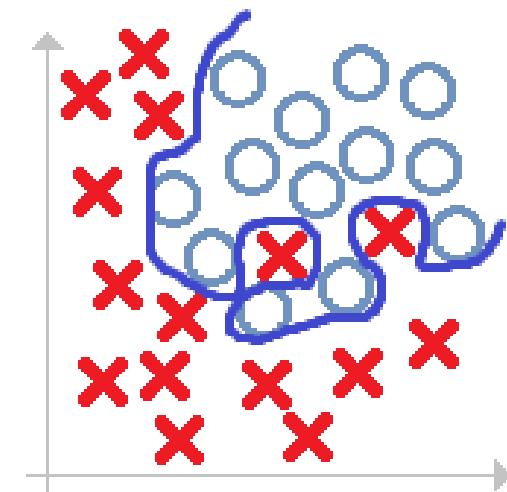
Under-fitting

High Bias – Underfitting
Training error high
Test error high



Appropriate-fitting

Just Right
Training error low
Test error low



Over-fitting

High variance – Overfitting
Training error low
Test error high

- Gebruik nooit de test set voor training!
- Gescheiden dev (cross validation) set noodzakelijk voor het scherpstellen van het netwerk



Totale data
set van
foto's



Het algoritme

```
2016     selectedScope, element, attr, ngSwitchController) {
2017       if (!attr.ngSwitch || attr.on,
2018           previousElements = [],
2019           selectedElements = [],
2020           previousScopes = [],
2021           selectedScopes = []);
2022
2023       if (ngSwitchWatchExpr, function ngSwitchWatchAction(value) {
2024         var i, ii;
2025         for (ii = 0, ii = previousElements.length; i < ii; ++i) {
2026           previousElements[i].remove();
2027         }
2028         previousElements.length = 0;
2029
2030         for (ii = 0, ii = selectedScopes.length; i < ii; ++i) {
2031           var selected = selectedElements[i];
2032           selectedScopes[i].destroy();
2033           previousElements[i] = selected;
2034           $animate.leave(selected, function() {
2035             previousElements.splice(i, 1);
2036           });
2037         }
2038
2039         selectedElements.length = 0;
2040         selectedScopes.length = 0;
2041
2042         if ((selectedTranscludes = ngSwitchController.cases['!'] + value) || ngSwitchC
2043             scope.$eval(attr.change);
2044             forEach(selectedTranscludes, function(selectedTransclude) {
2045               var selectedScope = scope.$new();
2046               selectedScopes.push(selectedScope);
2047             selectedScope.$on('$destroy', function() {
2048               selectedScopes.pop();
2049             });
2050           });
2051         });
2052       });
2053     });
2054   });
2055 }
```

De data



```
def make_convnet(input_image):

    net = slim.conv2d(input_image, 32, [11, 11], scope="conv1_11x11")

    net = slim.conv2d(net, 64, [5, 5], scope="conv2_5x5")

    net = slim.max_pool2d(net, [4, 4], stride=4, scope='pool1')

    net = slim.conv2d(net, 64, [5, 5], scope="conv3_5x5")

    net = slim.conv2d(net, 128, [3, 3], scope="conv4_3x3")

    net = slim.max_pool2d(net, [2, 2], scope='pool2')

    net = slim.conv2d(input_image, 128, [3, 3], scope="conv5_3x3")

    net = slim.max_pool2d(net, [2, 2], scope='pool3')

    net = slim.conv2d(net, 32, [1, 1], scope="conv6_1x1")

    return net
```

- Controleer of de juiste uitkomst wel mogelijk is.

Deel van de training set



Test



Mok



Glas

Deel van de training set



Colour matters

Test



Mok



Glas

Deel van de training set



Size matters

Test



Mok



Glas

Deel van de training set



Angle matters

Test



Mok



Glas

Deel van de training set



Labelling matters

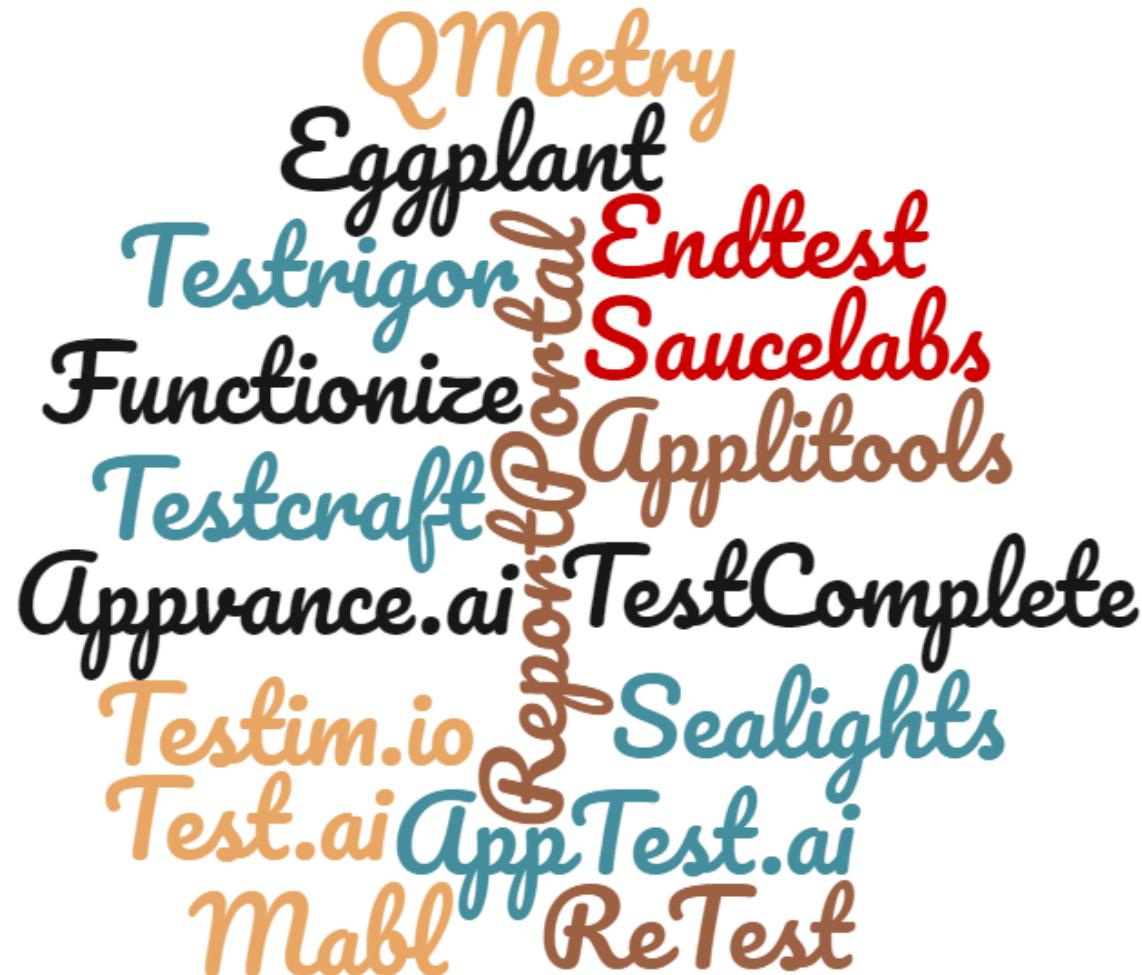
Test



Mok

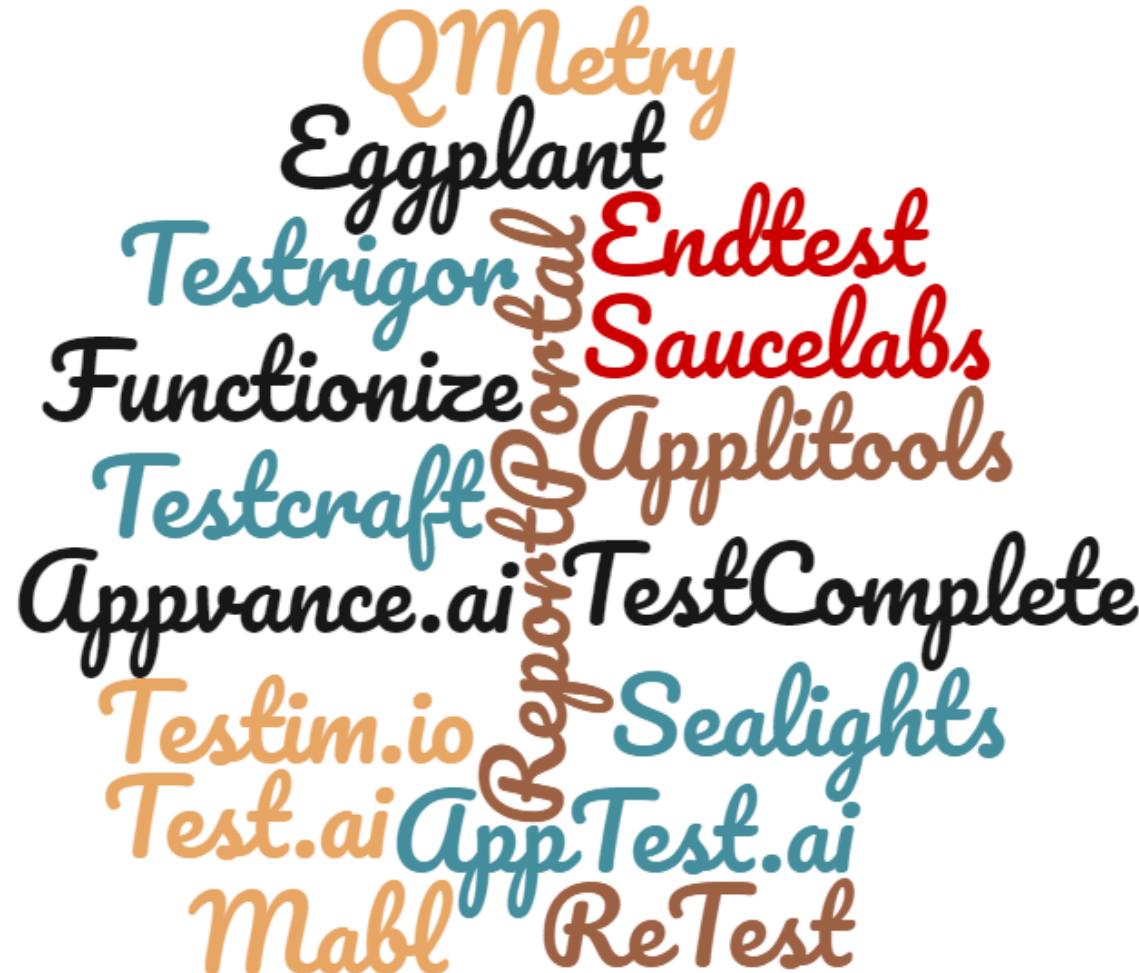


Glas



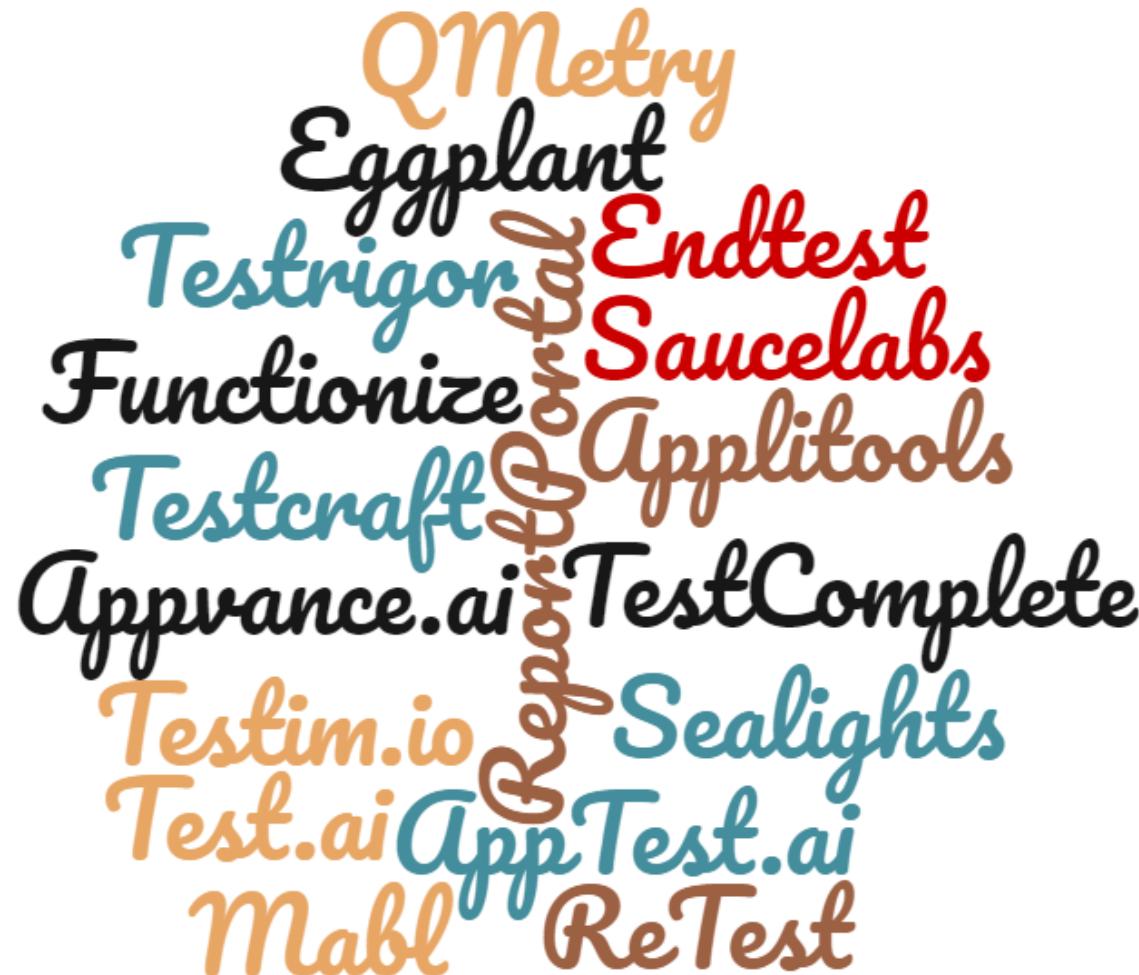
Oplossingen voor:

- Onderhoud van testen
- Analyse van code



Oplossingen voor:

- ✓ Onderhoud van testen
- Analyse van code



Oplossingen voor:

- ✓ Onderhoud van testen
- ✓ Analyse van code

Steps

Step Name:	Action:	Full URL:	
1. Go to homepage	Go to URL	https://example.com	
Step Name:	Action:	Locate Element By:	Id:
2. Click on Login button	Click	Id	login
Step Name:	Action:		
3. Enter email	✓ Choose action		

Add Step

- ✓ Choose action
- Click**
- Write Text
- Go to URL
- Select Option
- Add Assertion
- Upload File
- Press Key

Test Suite	Configuration	Start time	End time	Status
Wikipedia - Demo Test Suite	Windows 10 Chrome 1280 x 1024 San Francisco, US	2018-11-03 11:25:23		Running

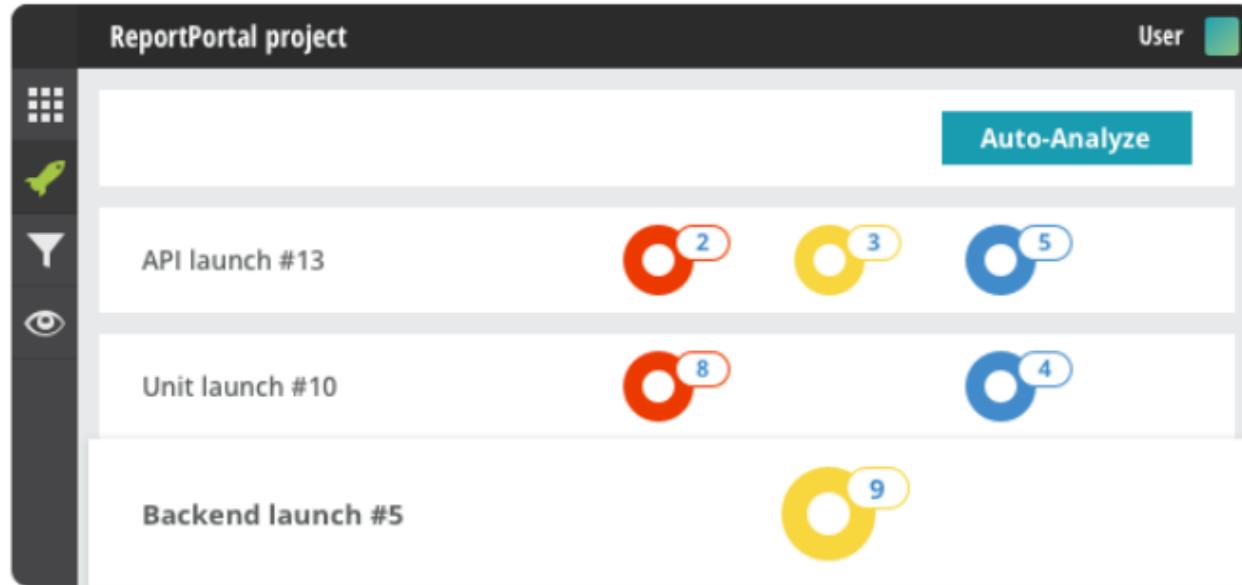
[PASSED] Go to Wikipedia - Verify title
Updated locator from Id: searchTextBox to Id: searchInput
Updated locator from Id: searchIcon to Id: searchButton
[PASSED] Search for Test Automation - Verify title from article

[1_Go_to_Wikipedia.png](#)

The screenshot shows the ReportPortal interface with a sidebar on the left containing icons for Dashboard, Launches, Filters, and Debug. The main area displays three test launches under the heading "ALL LAUNCHES". Each launch includes details like name, start time, total tests, passed, failed, and skipped counts, along with icons for Product Bug, Auto Bug, System Issue, and To Investigate.

Launch	Start Time	Total	Passed	Failed	Skipped	Product Bug	Auto Bug	System Issue	To Investigate
Demo Api Tests_a #10	an hour ago	138	68	9	21	9	10	11	30
Demo Api Tests_a #9	an hour ago	137	79	37	21	17	10	8	29
Demo Api Tests_a #8	an hour ago	135	94	25	16	15	11	7	18

A large red arrow points from the top right towards the first launch's Product Bug icon, which has a value of 9. The interface also features a "Add filter" button and various navigation and action buttons at the top and bottom.



Delegate a part of analytics work to Artificial Intelligence

Reduce time cost and analyze the failure reasons by Auto-Analyzer based on Machine Learning.

- Toename van AI technologie in IT Solutions, met name Neural Networks
- Groeiende behoefte naar testers van AI
- Meer test tools die AI gebruiken





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