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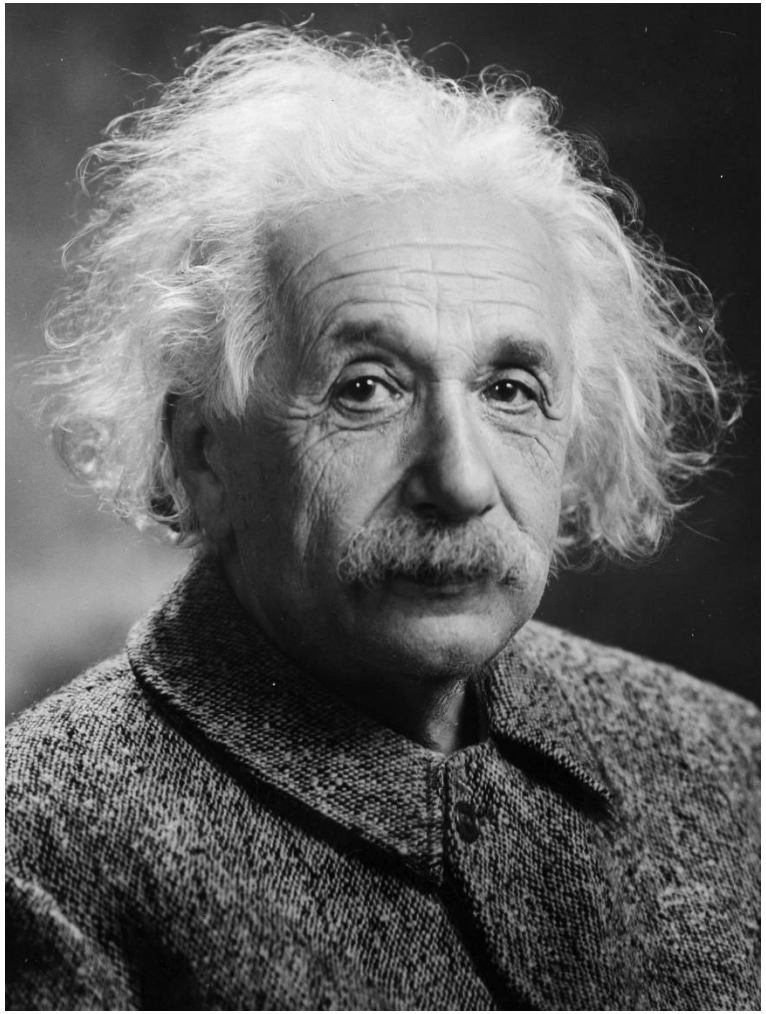
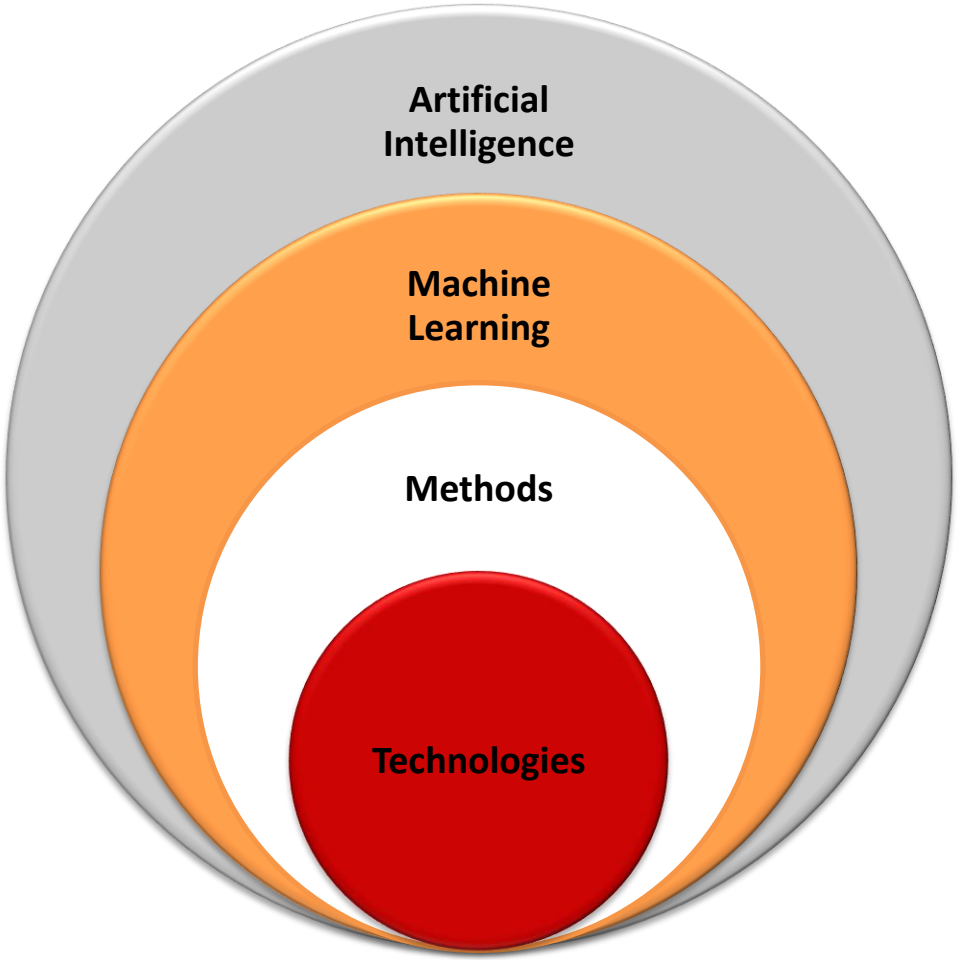
AI en Software Testing op de lange termijn

"Is het een appel?"

Traditioneel programmeren	AI
Kleur = rood, groen, geel Vorm = rond Textuur = glad	




Artificial Intelligence
Machine Learning
Methods
Technologies

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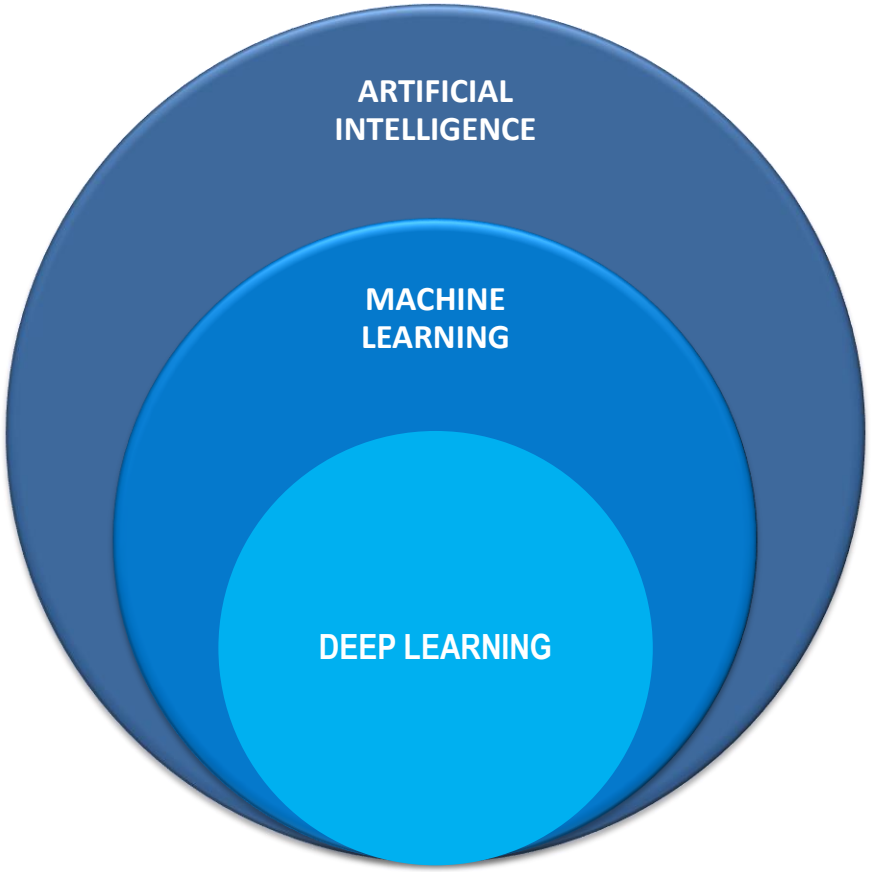
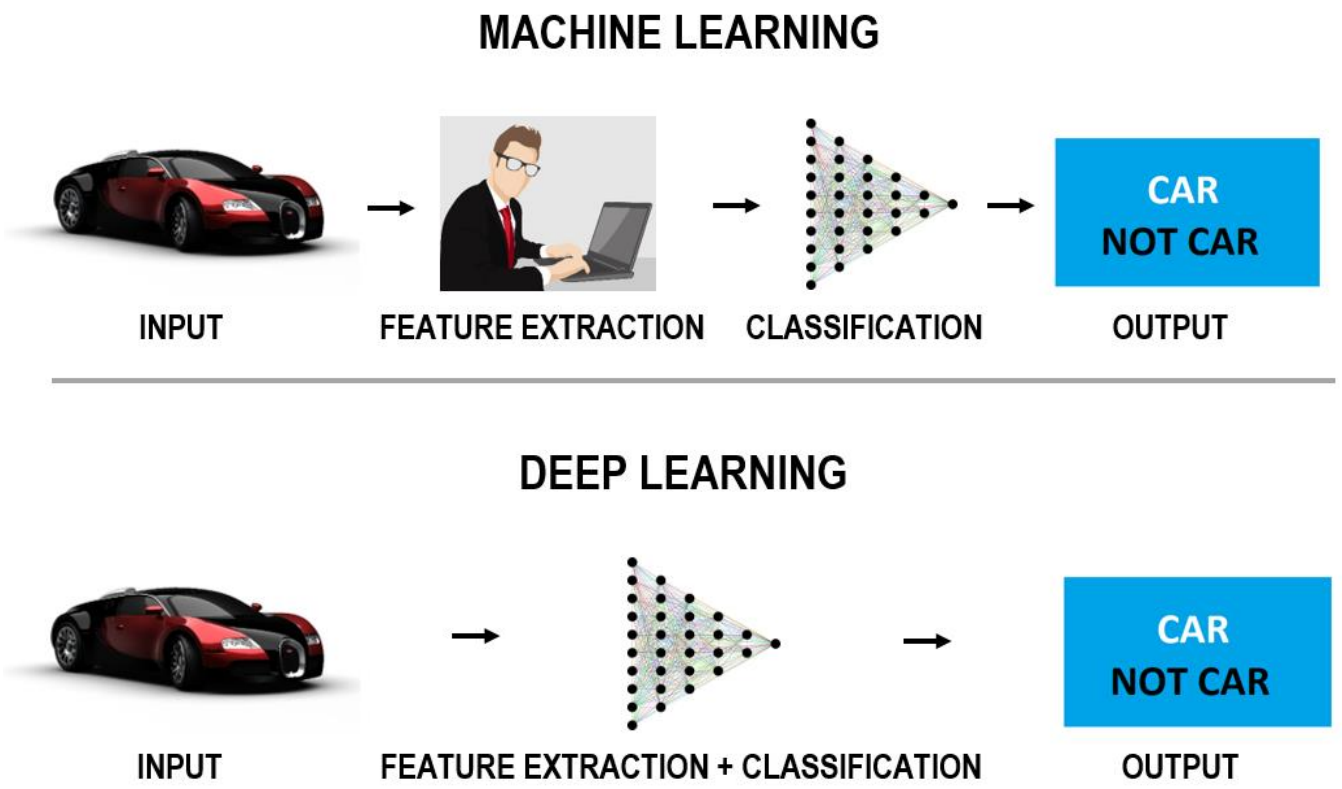
Machine Learning vs Deep learning



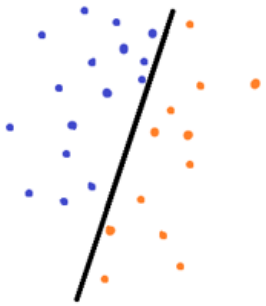


Machine learning

Configuratie van het systeem door middel van training

Verschillende soorten trainingen:

Supervised	Unsupervised	Reinforcement
Learning Known Patterns	Learning Unknown Patterns	Generating Data Learning Patterns



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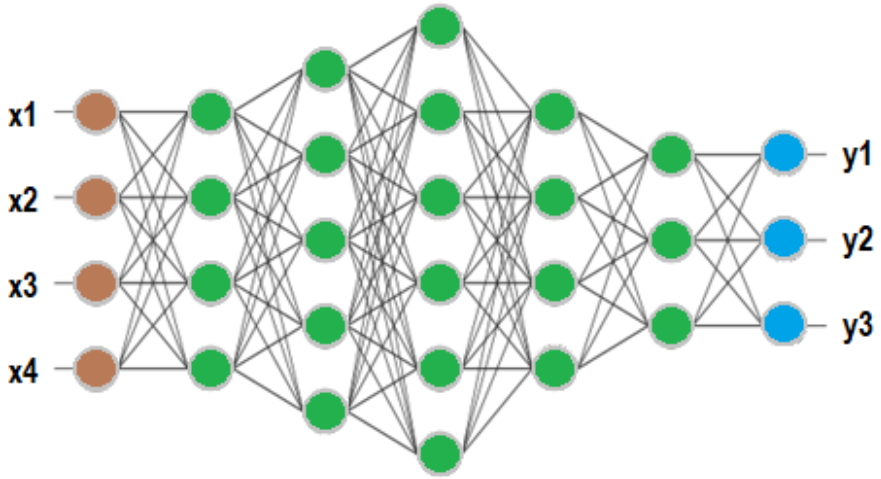
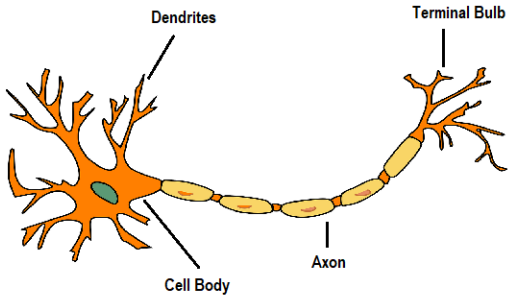
Deep Learning





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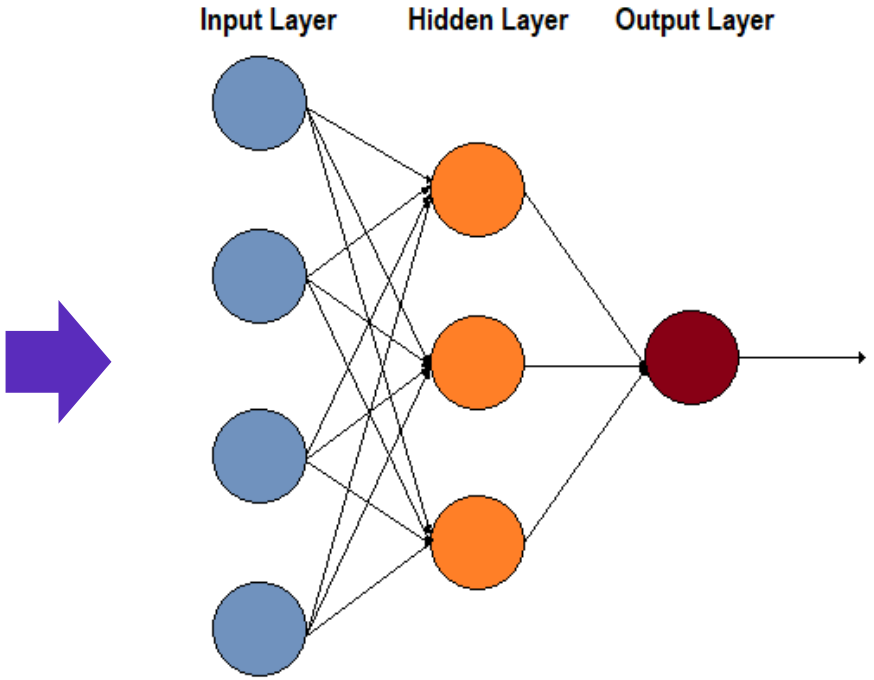
Voorbeeld van een neuraal netwerk



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

Input vector X

64 x 64 pixels

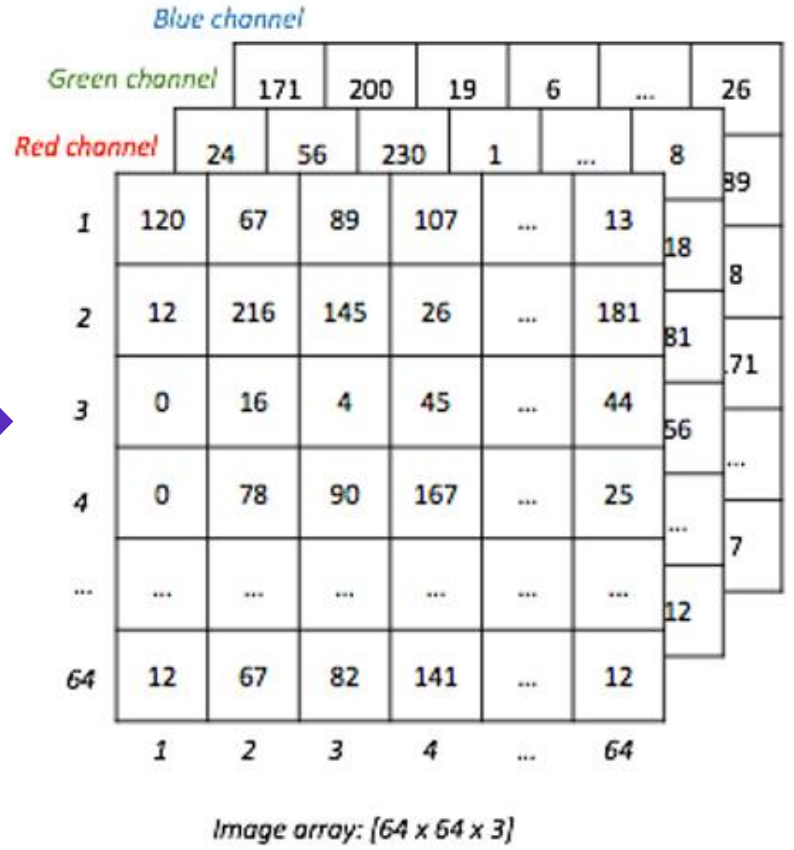
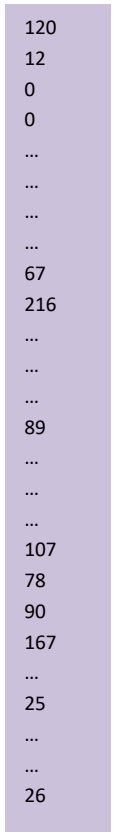


Image array: [64 x 64 x 3]



Vector X

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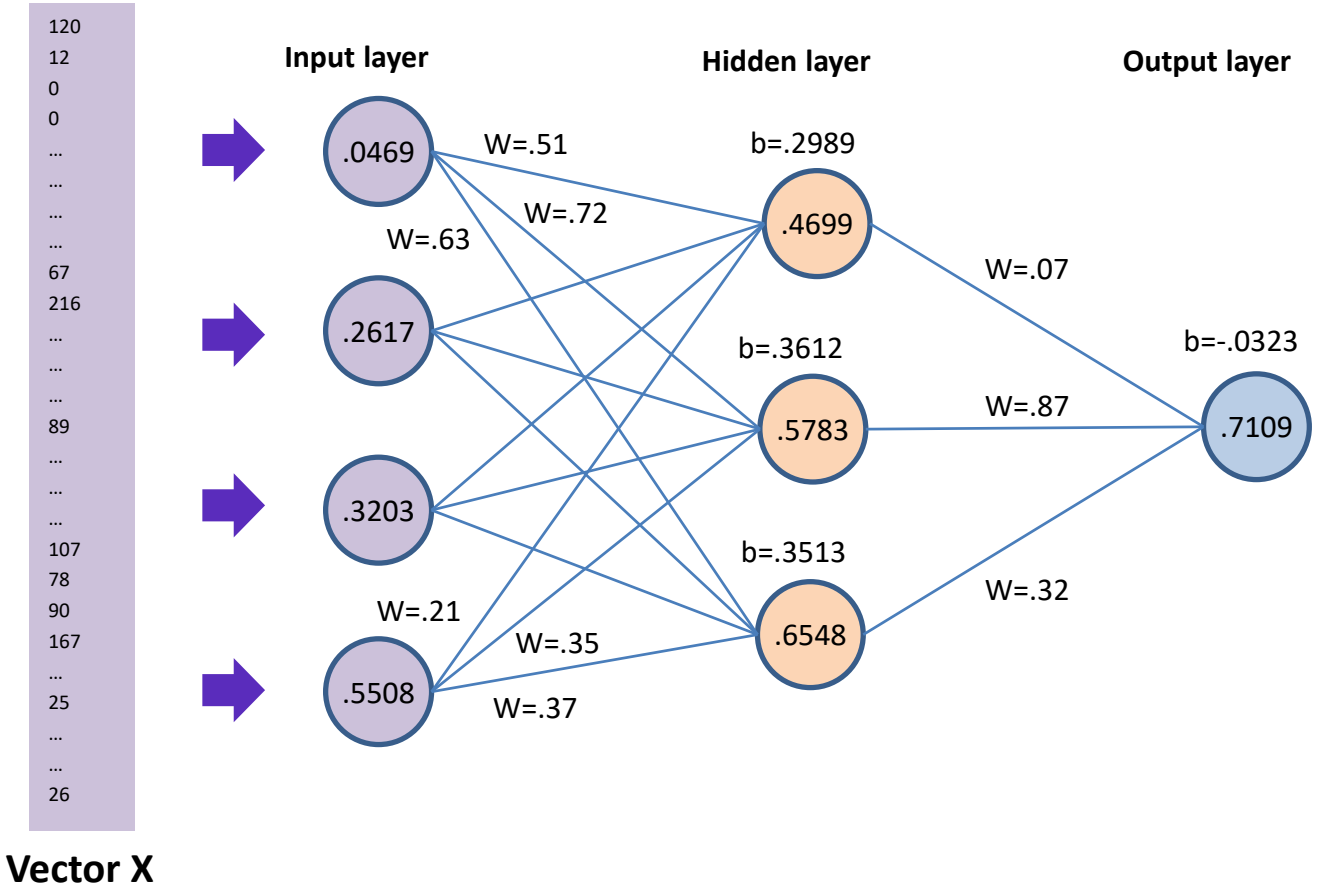
Parameters van het neurale netwerk



Werkelijke uitkomst:
0.7109 = kat
0.2891 = geen kat

Gewenste uitkomst:
1.0000 = kat
0.0000 = geen kat

} Verschil = verlies

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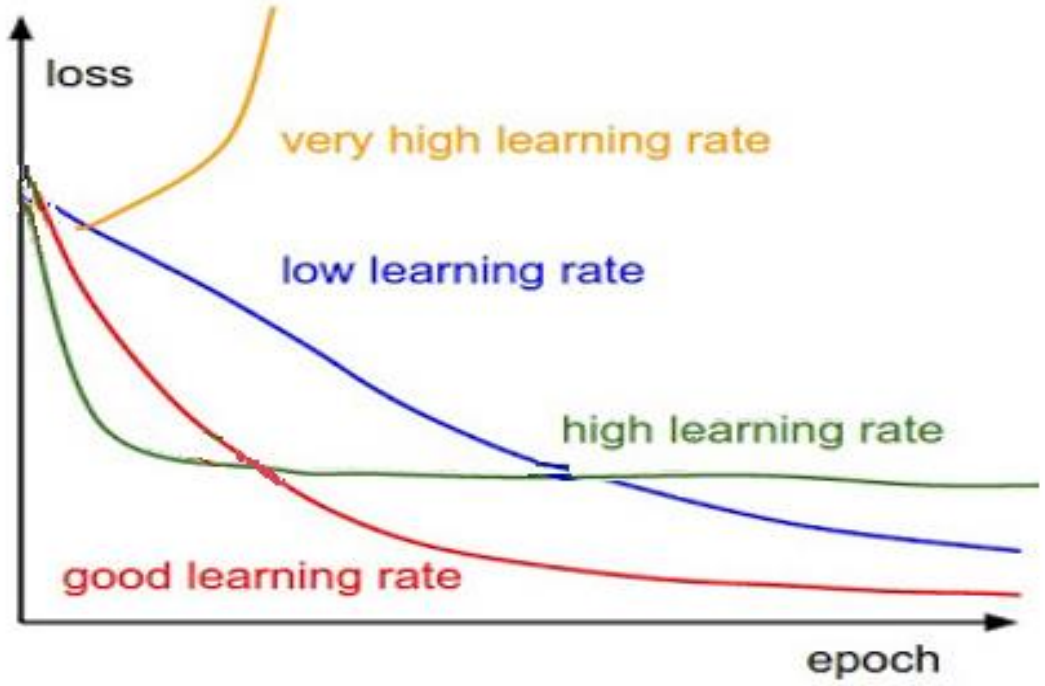
Verlies en training



Standaard manier van testen

Totale data set van foto's

70 %

30 %

Training error is 0.001

Test error is 0.3

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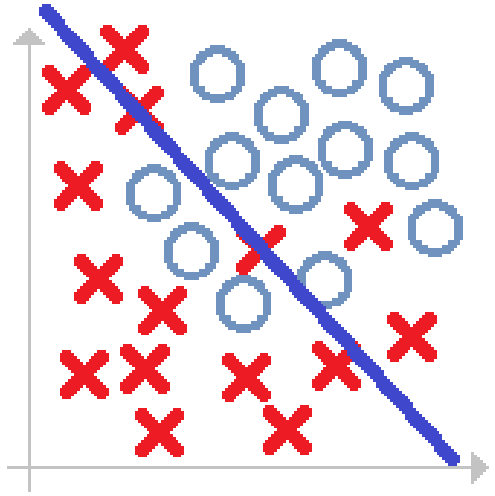
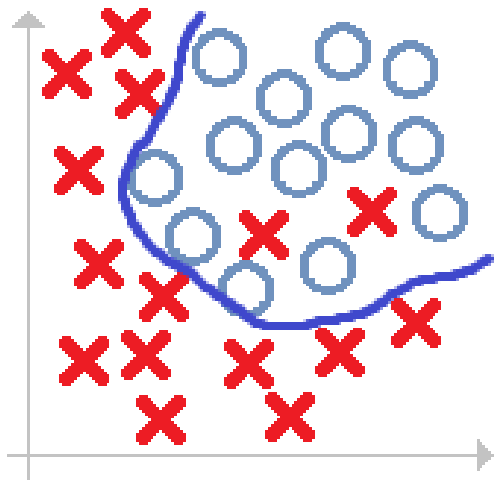
Test resultaten



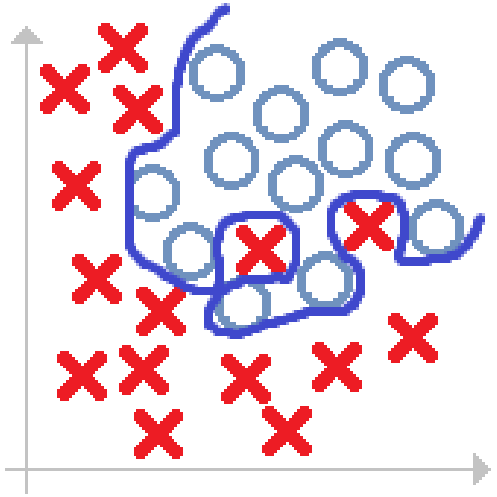
Under-fitting

High Bias – Underfitting
Training error high
Test error high



Appropriate-fitting

Just Right
Training error low
Test error low

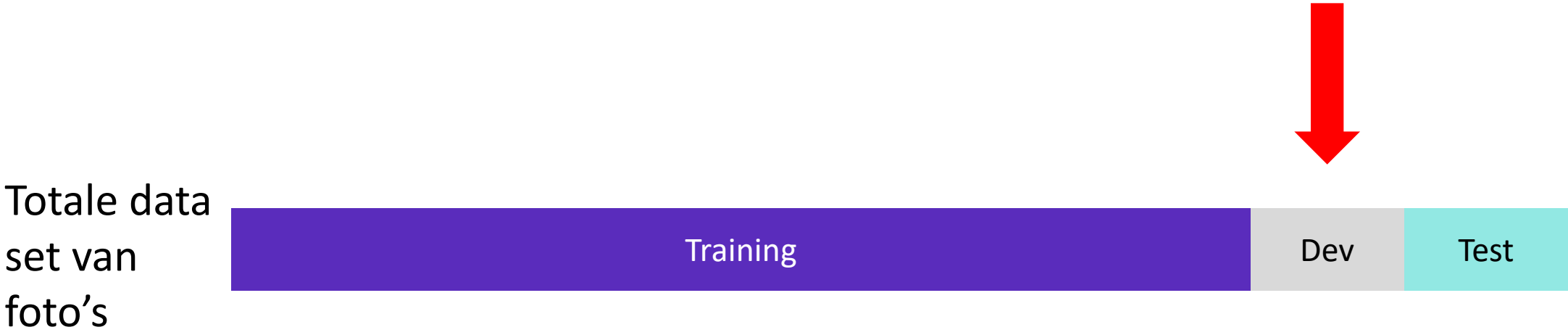


Over-fitting

High variance – Overfitting
Training error low
Test error high

Neurale netwerken testen

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



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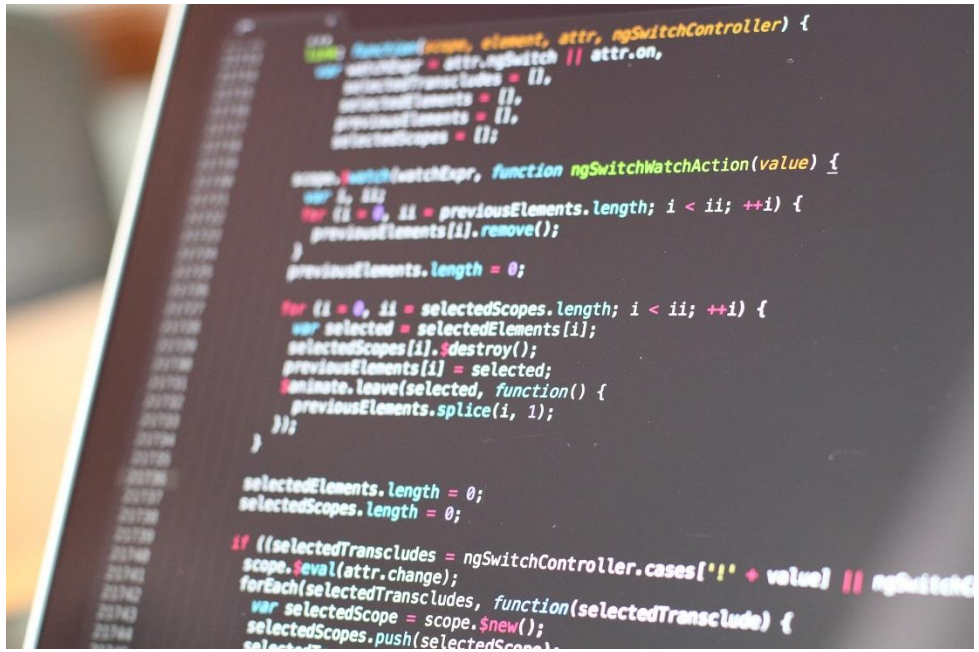
Wat zou ook getest moeten worden?

Het algoritme



De data

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Test het algoritme

```
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.

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Test de data

Deel van de training set




Test

☐ Mok

☐ Glas

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Test data

Deel van de training set




Colour matters

Test

☐ Mok

☐ Glas

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Test data

Deel van de training set



Size matters

Test

☐ Mok

☐ Glas

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Test data

Deel van de training set



Angle matters

Test

☐ Mok

☐ Glas

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Test data

Deel van de training set




Labelling matters

Test

☐ Mok

☐ Glas

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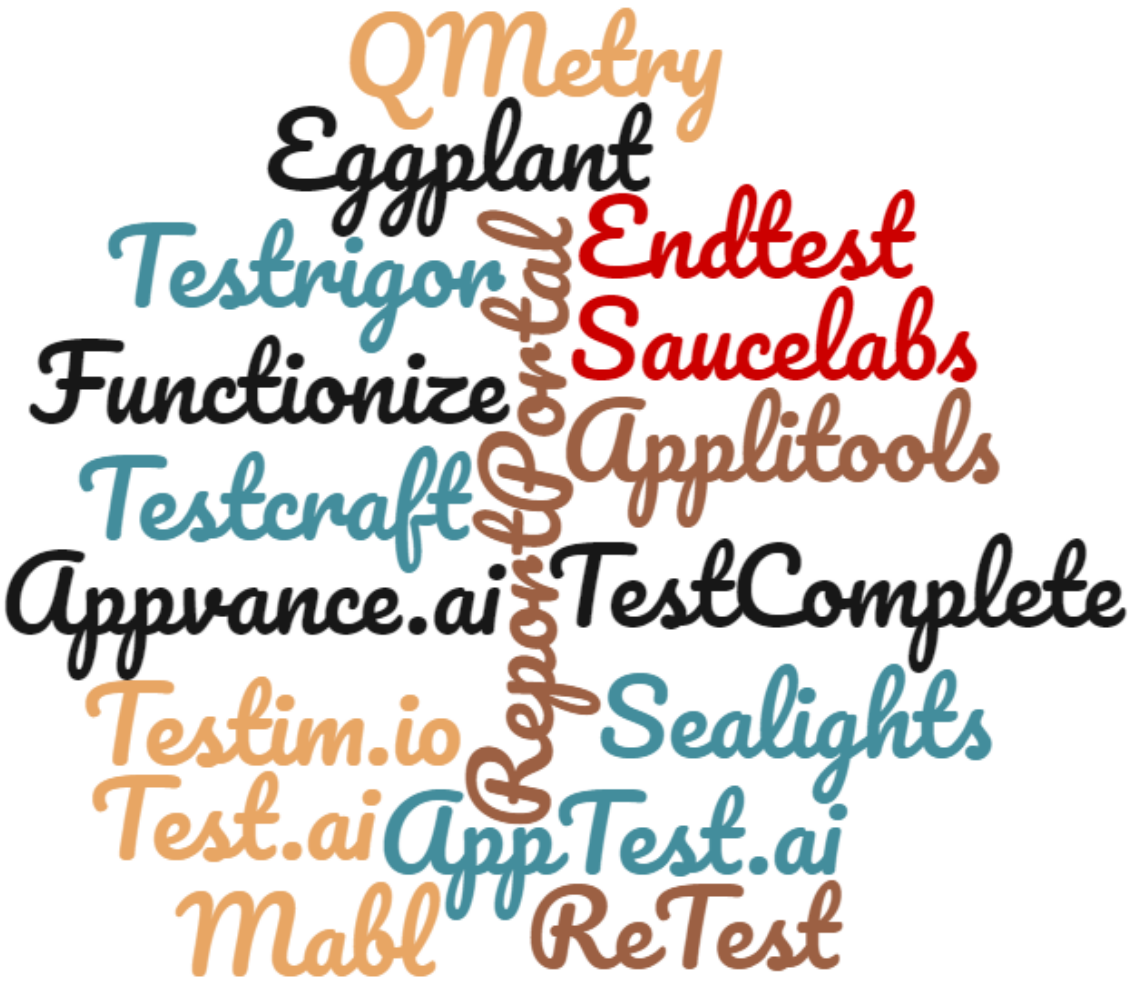
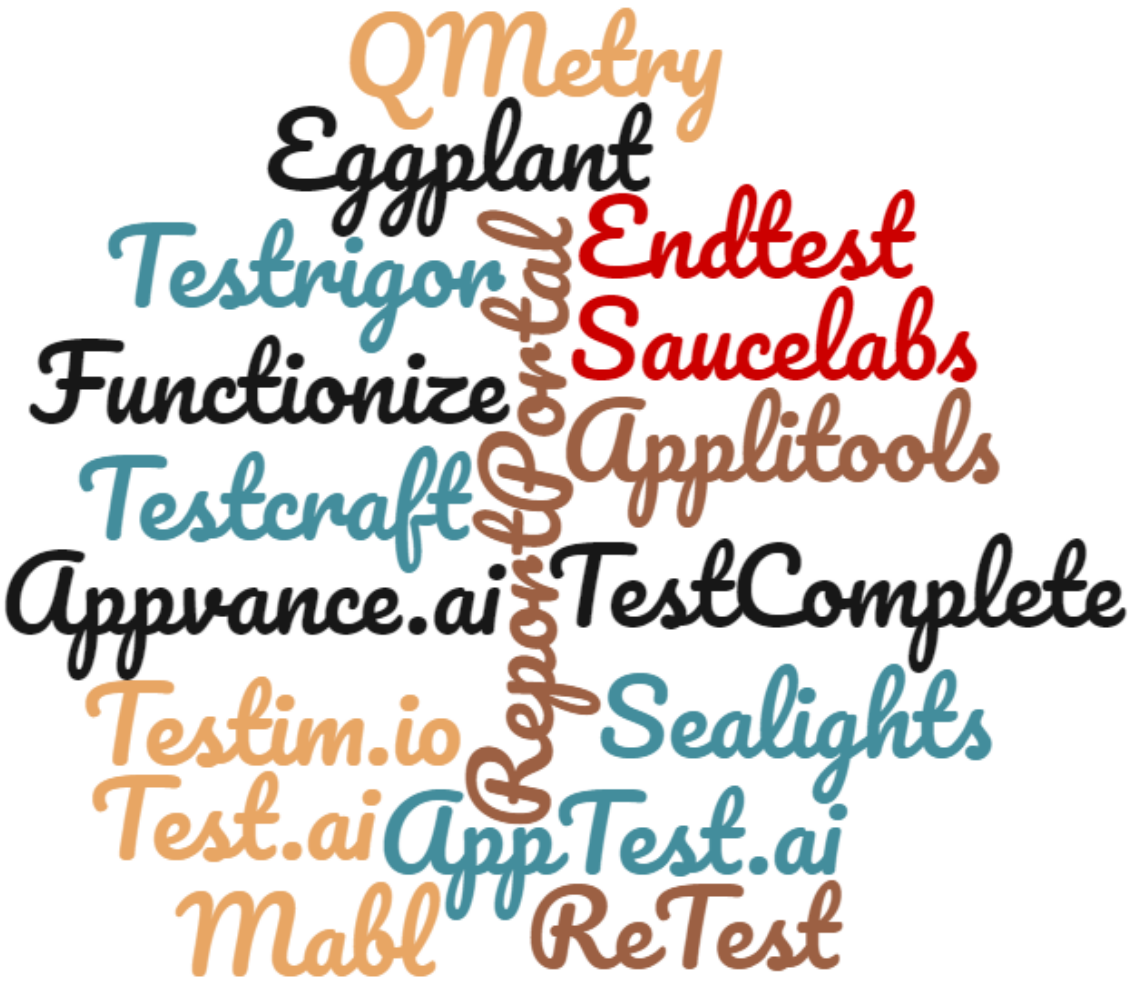
AI als hulpmiddel voor testers



Oplossingen voor:

- Onderhoud van testen
- Analyse van code

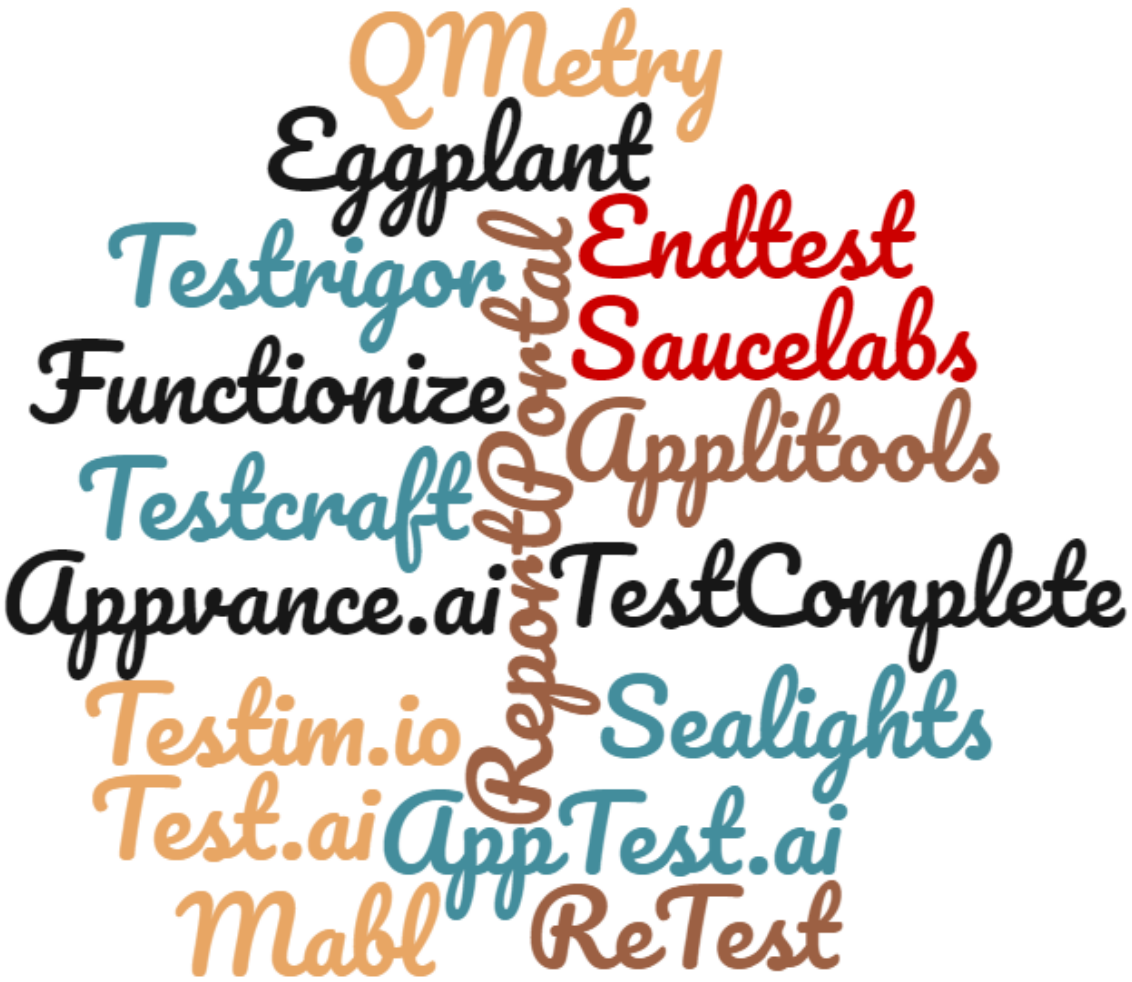
AI als hulpmiddel voor testers



Oplossingen voor:

- ✓ Onderhoud van testen
- Analyse van code

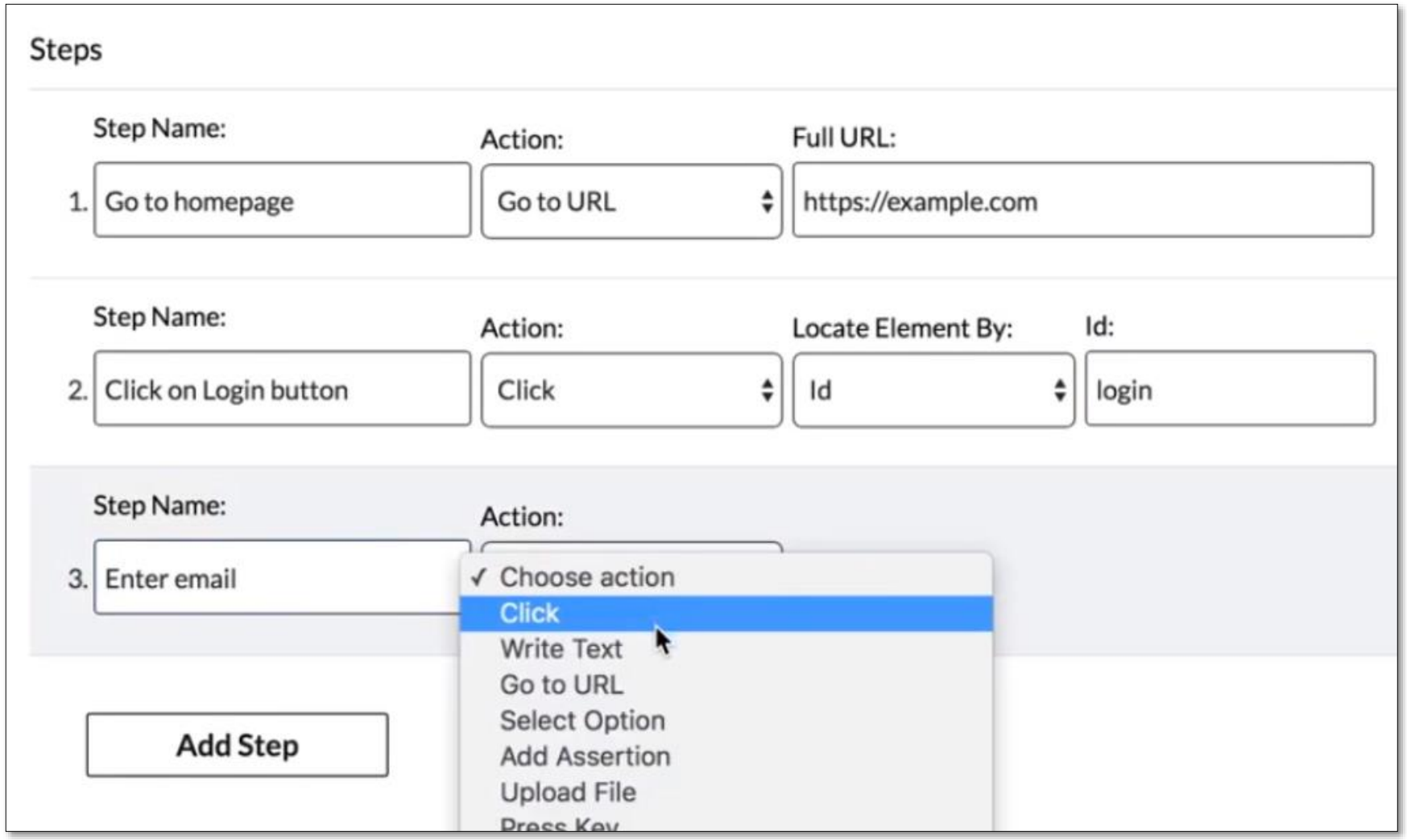
AI als hulpmiddel voor testers



Oplossingen voor:

- ✓ Onderhoud van testen
- ✓ Analyse van code

AI-powered test tool: EndTest



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AI-powered test tool: EndTest

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

[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

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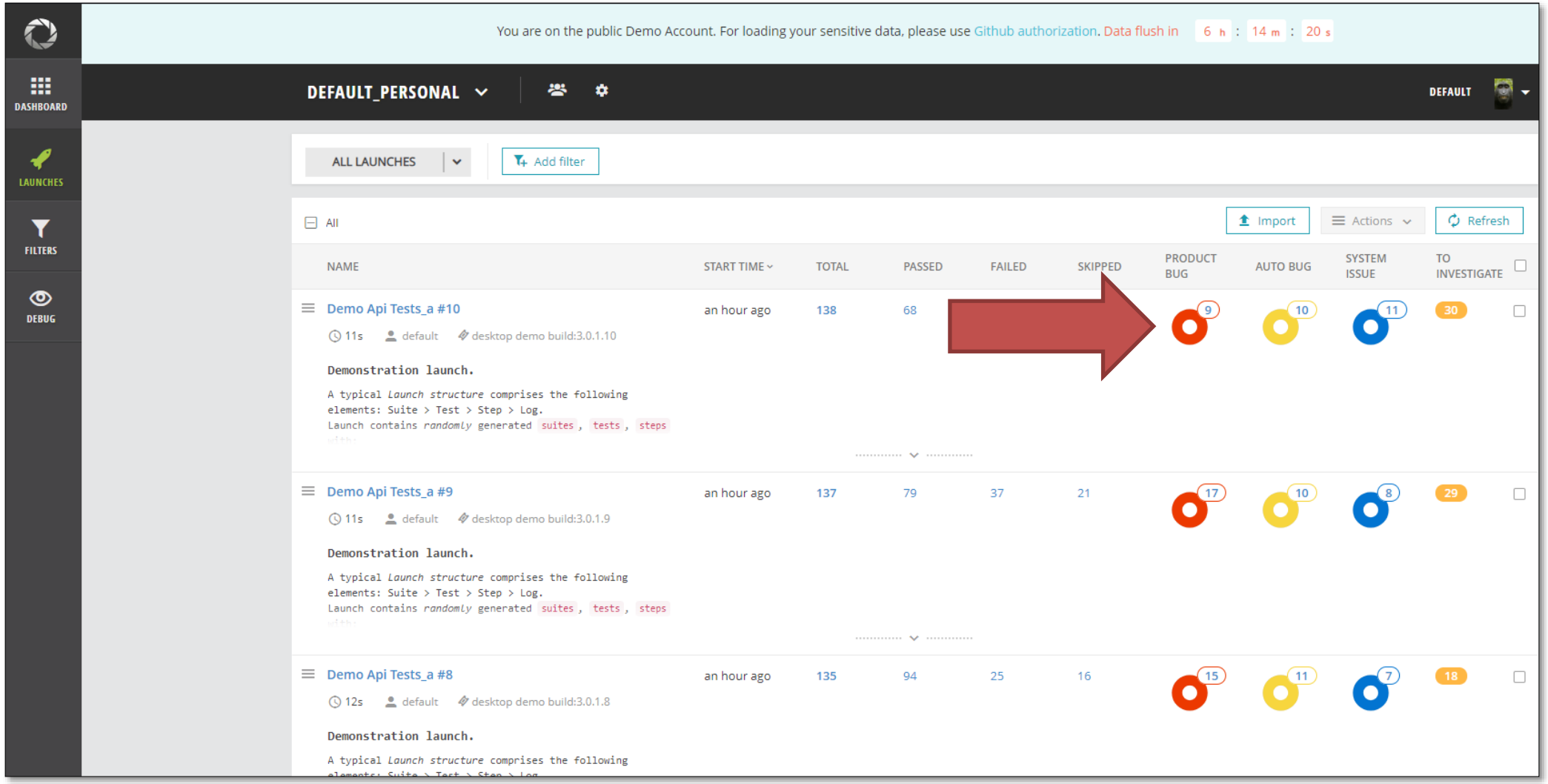
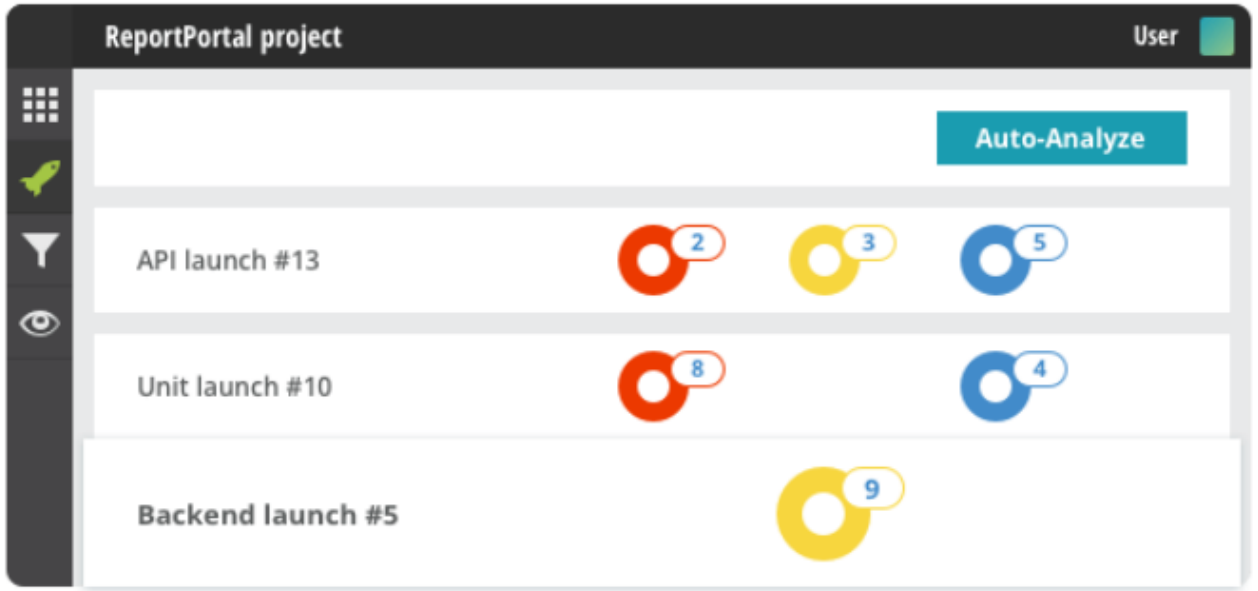
AI-powered test tool: ReportPortal



AI-powered test tool: ReportPortal



Delegate a part of analytics work to Artificial Intelligence

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

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Verwachtingen

- 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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Takeaways

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Vilas Pultoo

vilas.pultoo@bartosz.nl

https://www.linkedin.com/in/vilas-pultoo-a1412117a/