



Van data naar diagnose: De impact van AI op kankeronderzoek

Toon Callens



Intro

Toon Callens



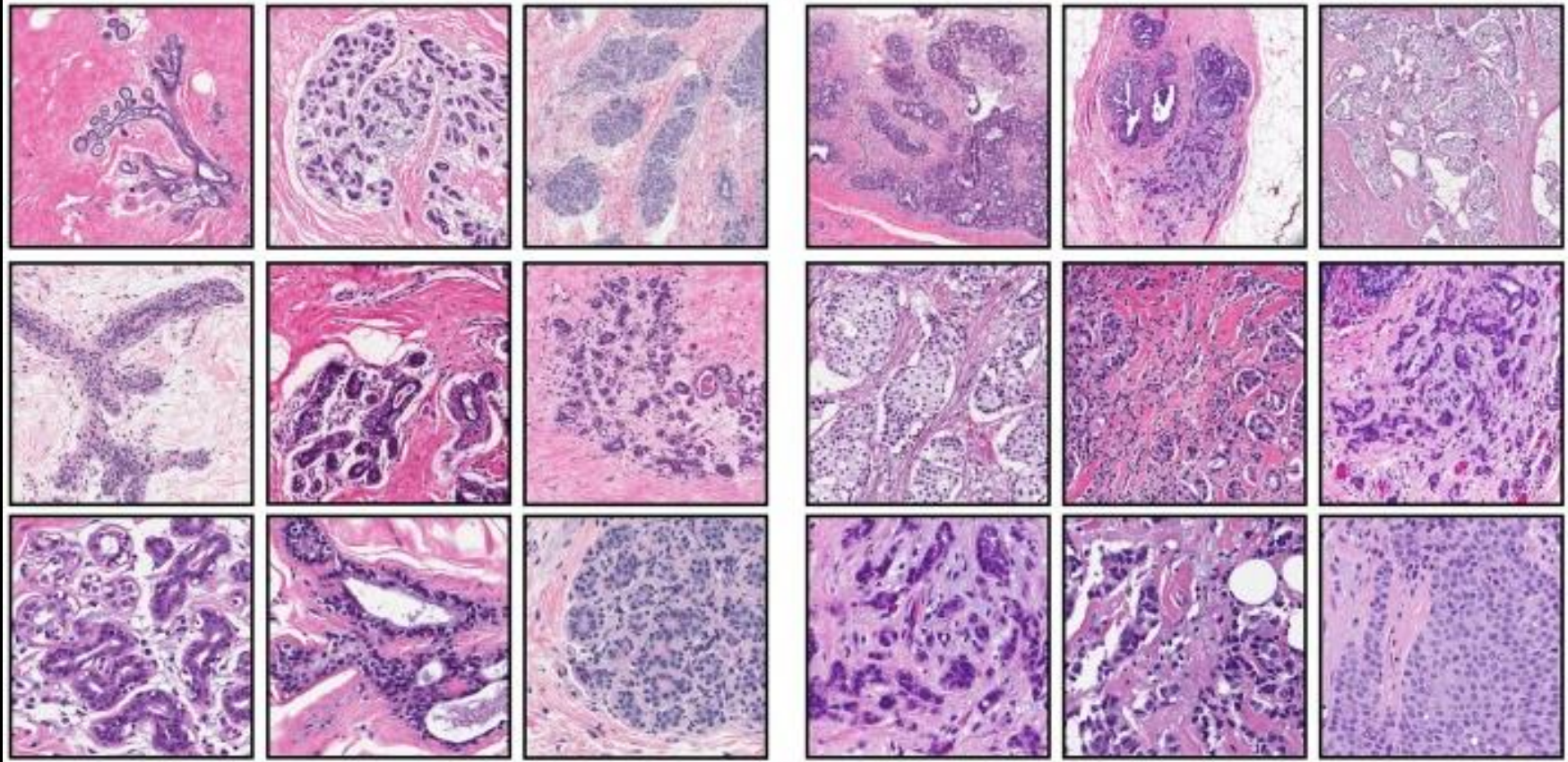
**GHENT
UNIVERSITY**

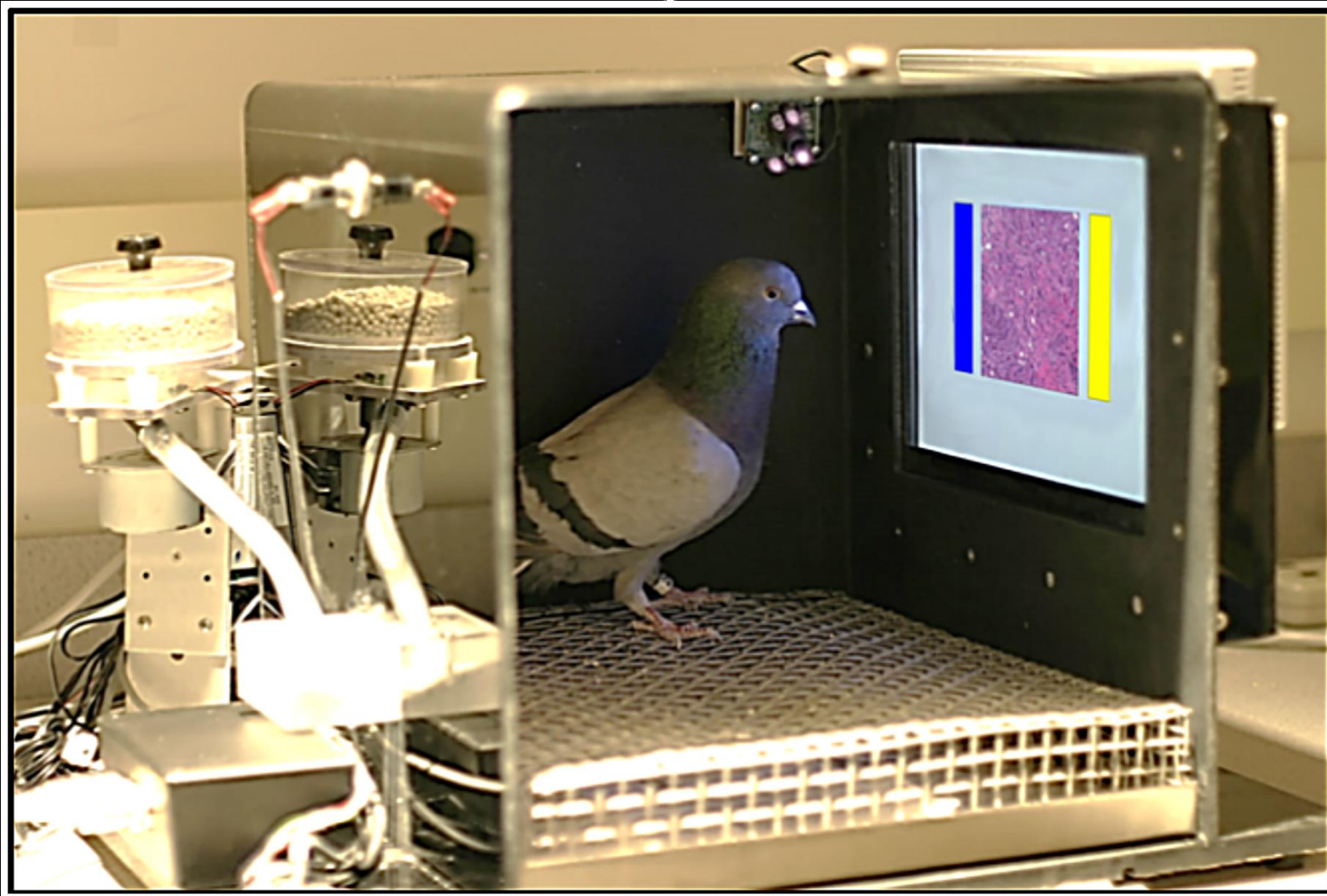


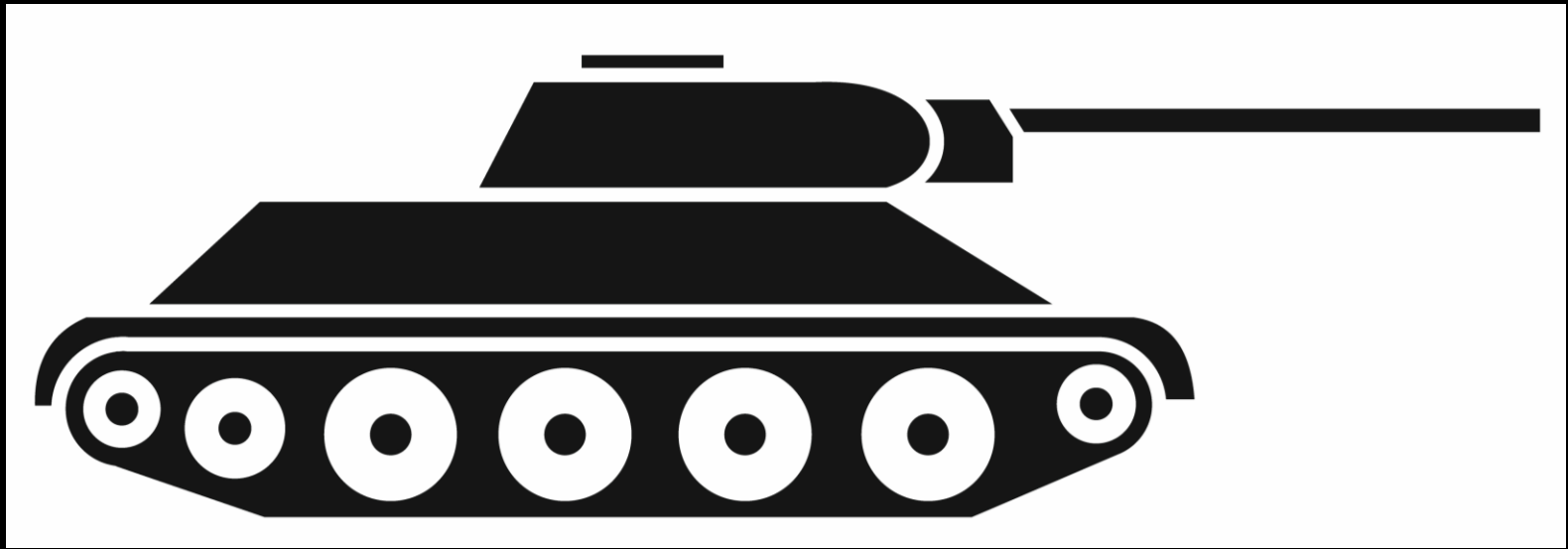
**VIB-UGENT CENTER
FOR MEDICAL
BIOTECHNOLOGY**

**Comp
omics**

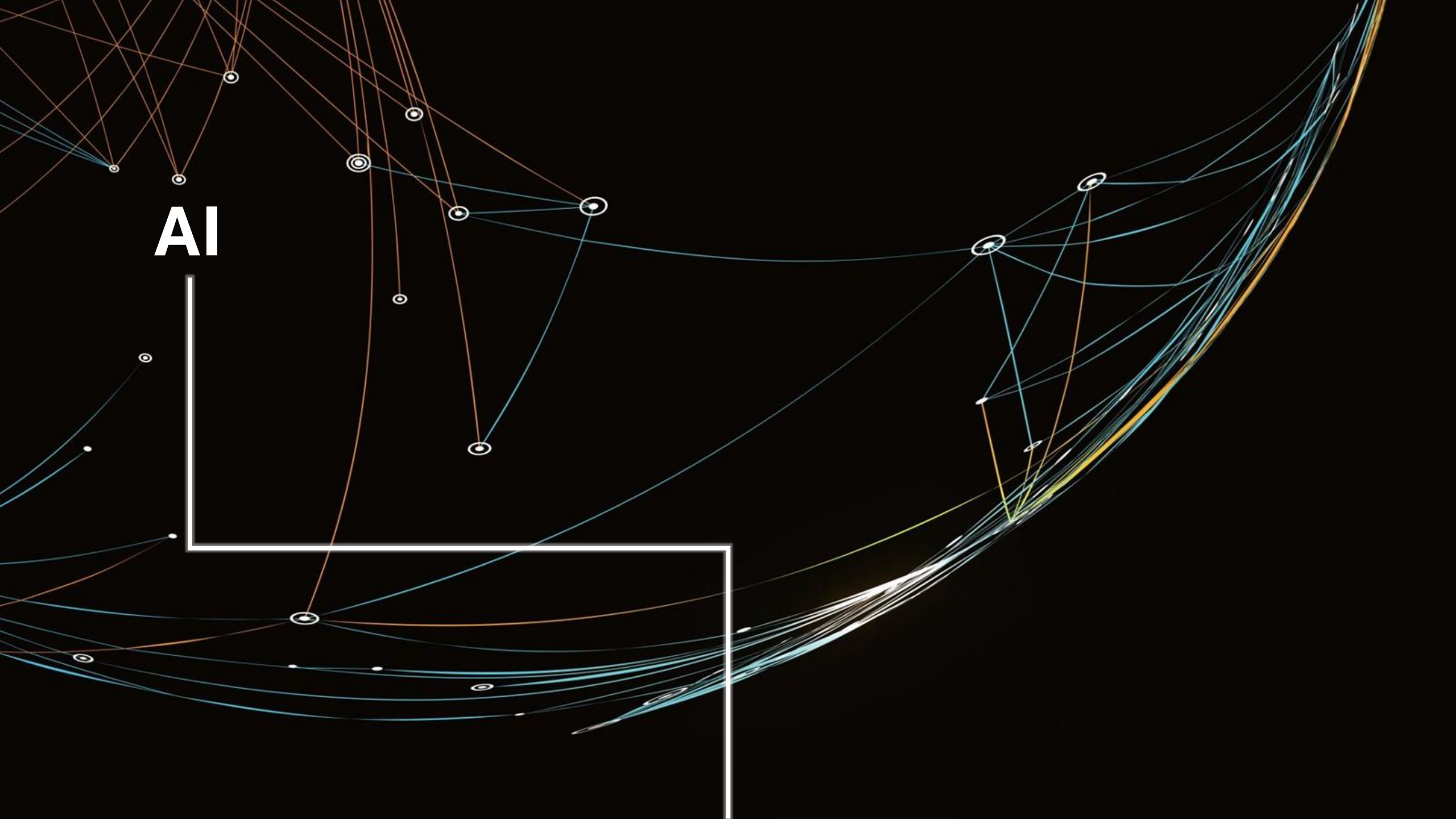








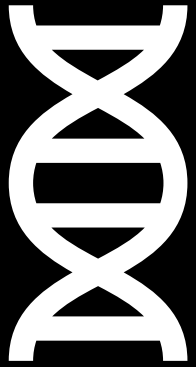
AI



```
graph TD; A[ ] --- B[ ]; B --- C[Machine learning]; B --- D[Deep learning]; C --- E[ ]
```

**Machine
learning**

**Deep
learning**



Model



kanker
of
geen kanker



Model



appel
of
banaan



Model



appel
of
banaan



groen:	17%
rood:	80%
blauw:	3%
gewicht:	60g
hardheid:	6
rondheid:	9
suikergehalte:	5%
zuurtegraad:	5.5pH

[17,80,3,60,6,9,5,5.5]



appel1: [17,80,3,60,6,9,5,5.5]

appel2: [13,80,7,80,7,6,6,5.4]

appel3: [70,27,3,88,5,9,4,5.5]

appel4: [77,22,1,74,6,8,3,5.1]

...



banaan1: [55,44,1,10,1,1,4,3.1]

banaan2: [43,54,3,25,5,2,4,2.2]

banaan3: [20,79,1,15,2,2,6,1.6]

banaan4: [51,48,1,31,3,4,2,2.4]

...

[17,80,3,60,6,9,5,5.5]
[13,80,7,80,7,6,6,5.4]
[70,27,3,88,5,9,4,5.5]
[77,22,1,74,6,8,3,5.1]
...

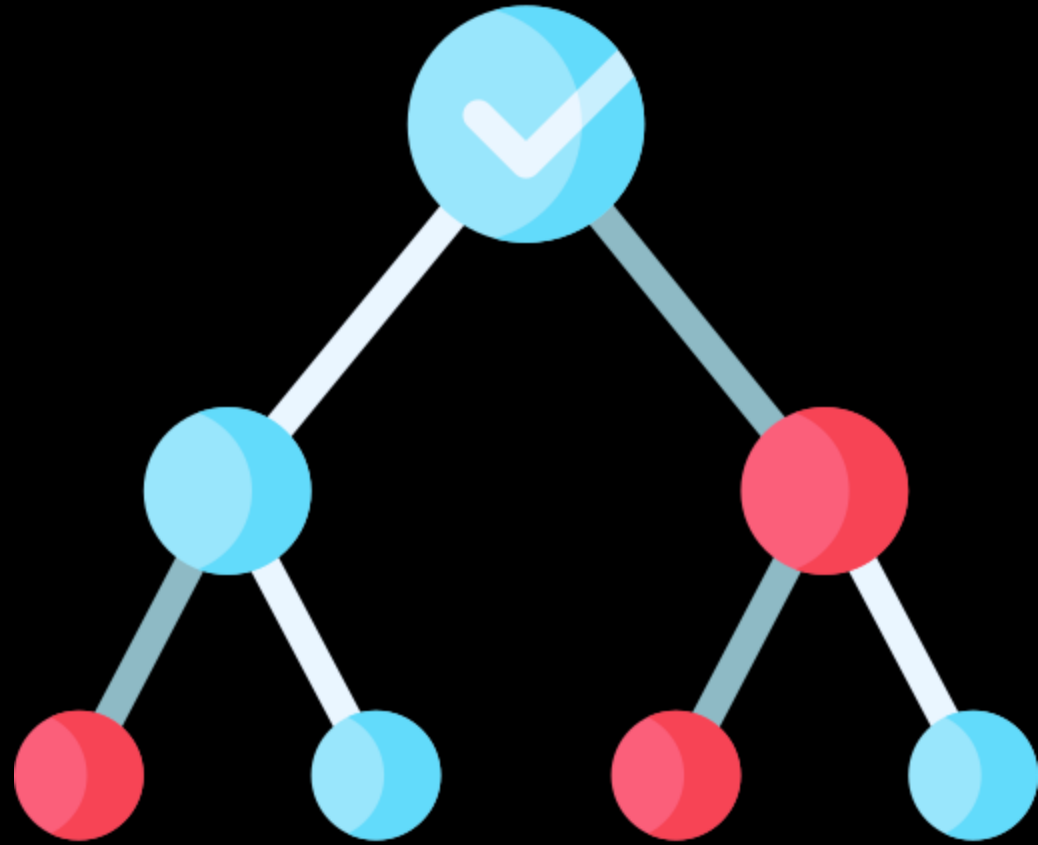
[55,44,1,10,1,1,4,3.1]
[43,54,3,25,5,2,4,2.2]
[20,79,1,15,2,2,6,1.6]
[51,48,1,31,3,4,2,2.4]
...

[17,80,3,60,6,9,5,5.5]



Model





MB
SPELLEN



Vanaf 6 jaar
2 spelers

WIE IS? HET.

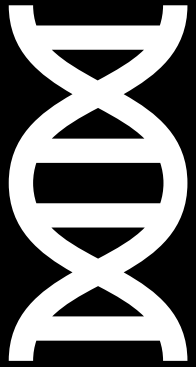
HET SPEL VAN DE
GROTE ONBEKENDE




```
graph TD; A[ ] --- B[Machine learning]; A --- C[Deep learning]; C --- D[ ]
```

**Machine
learning**

**Deep
learning**



Model



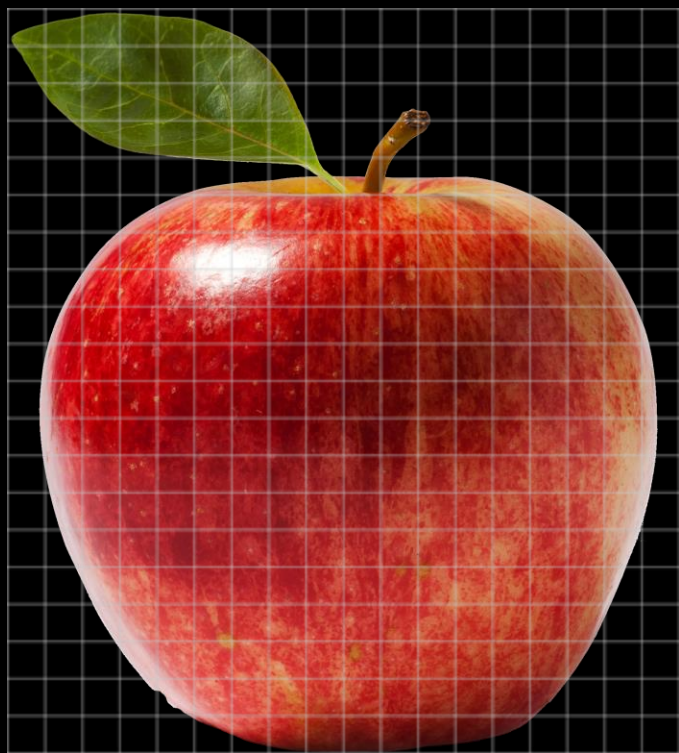
kanker
of
geen kanker

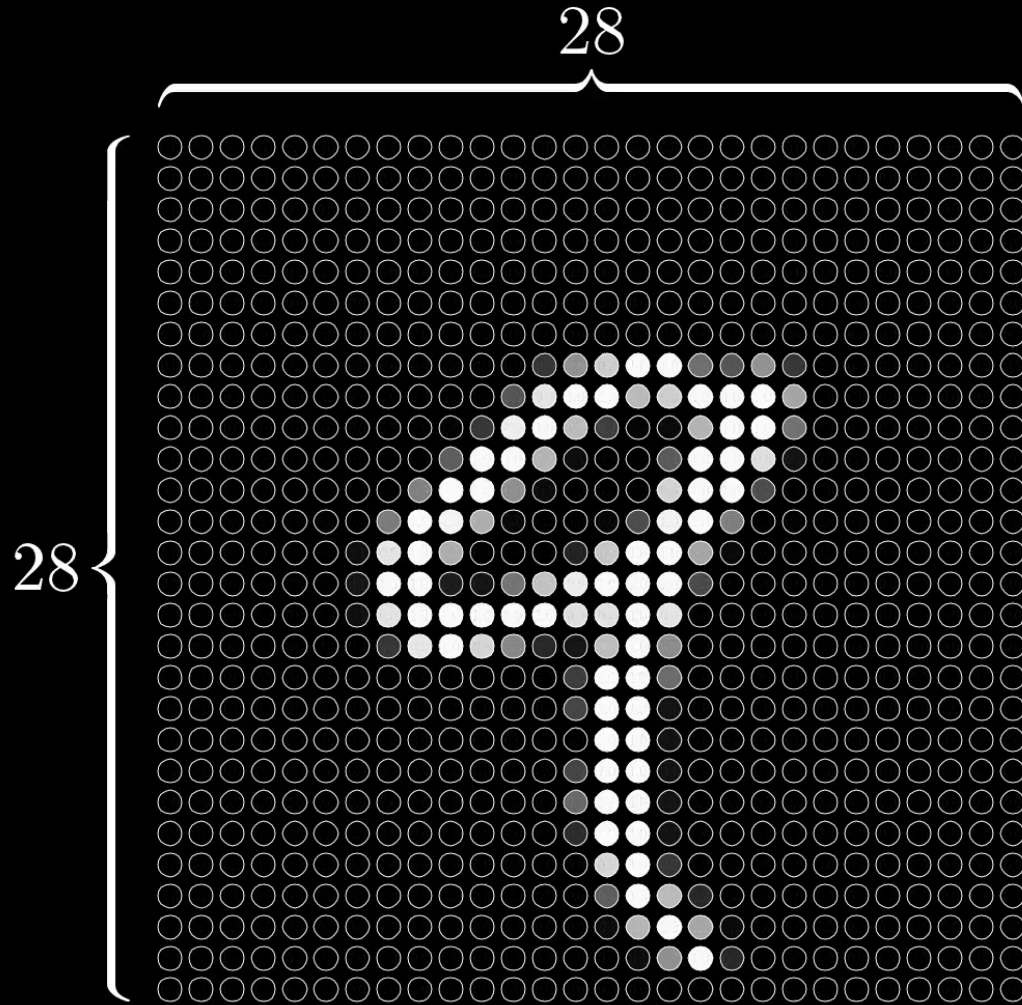


Model

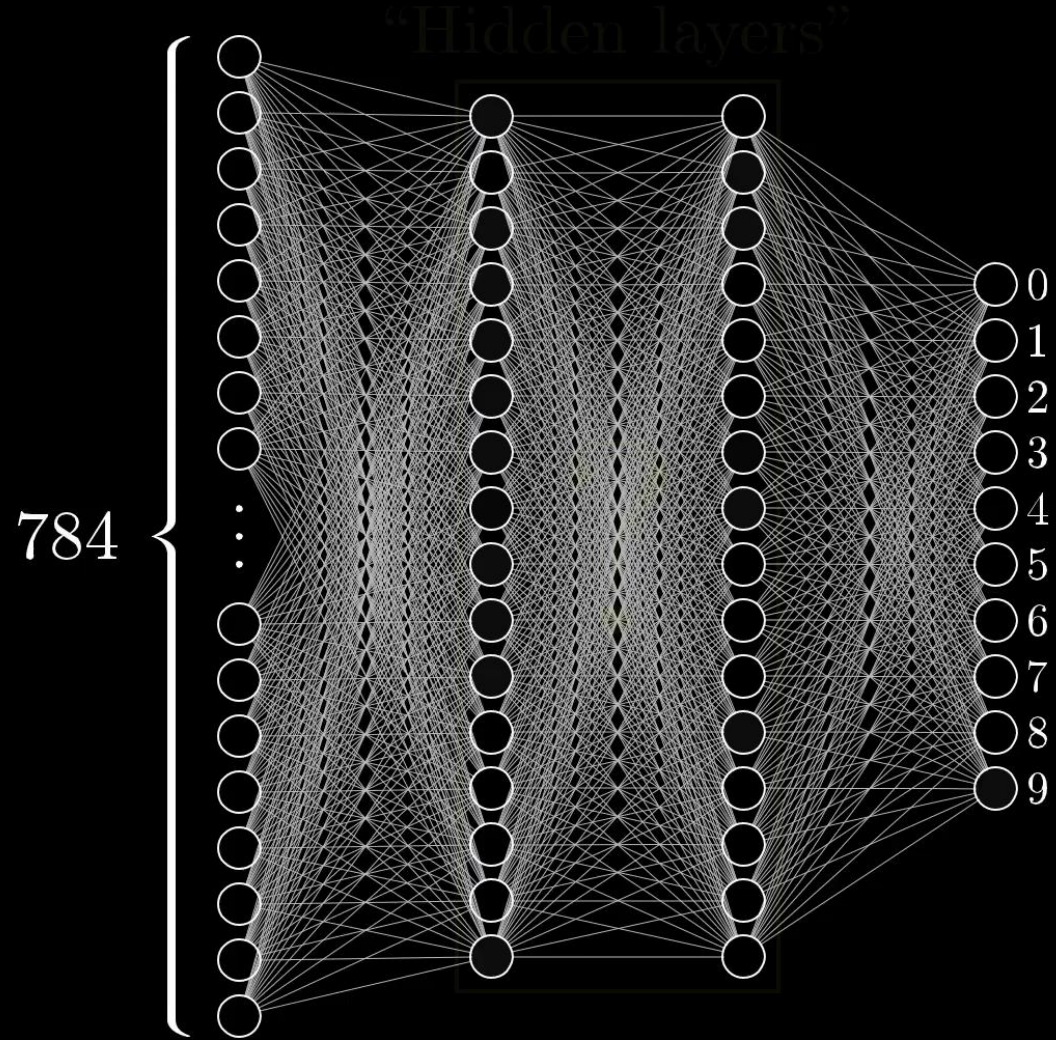


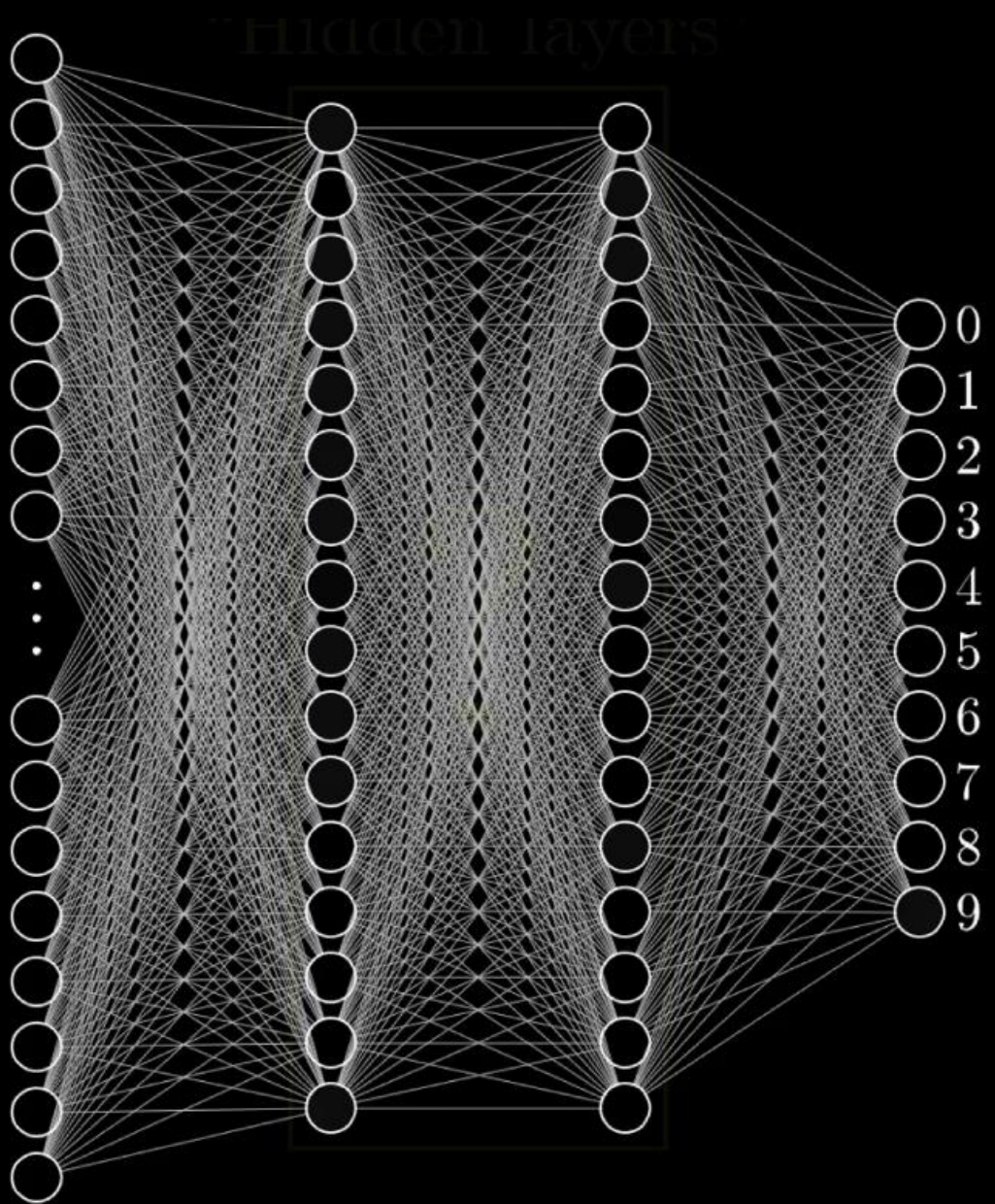
appel
of
banaan





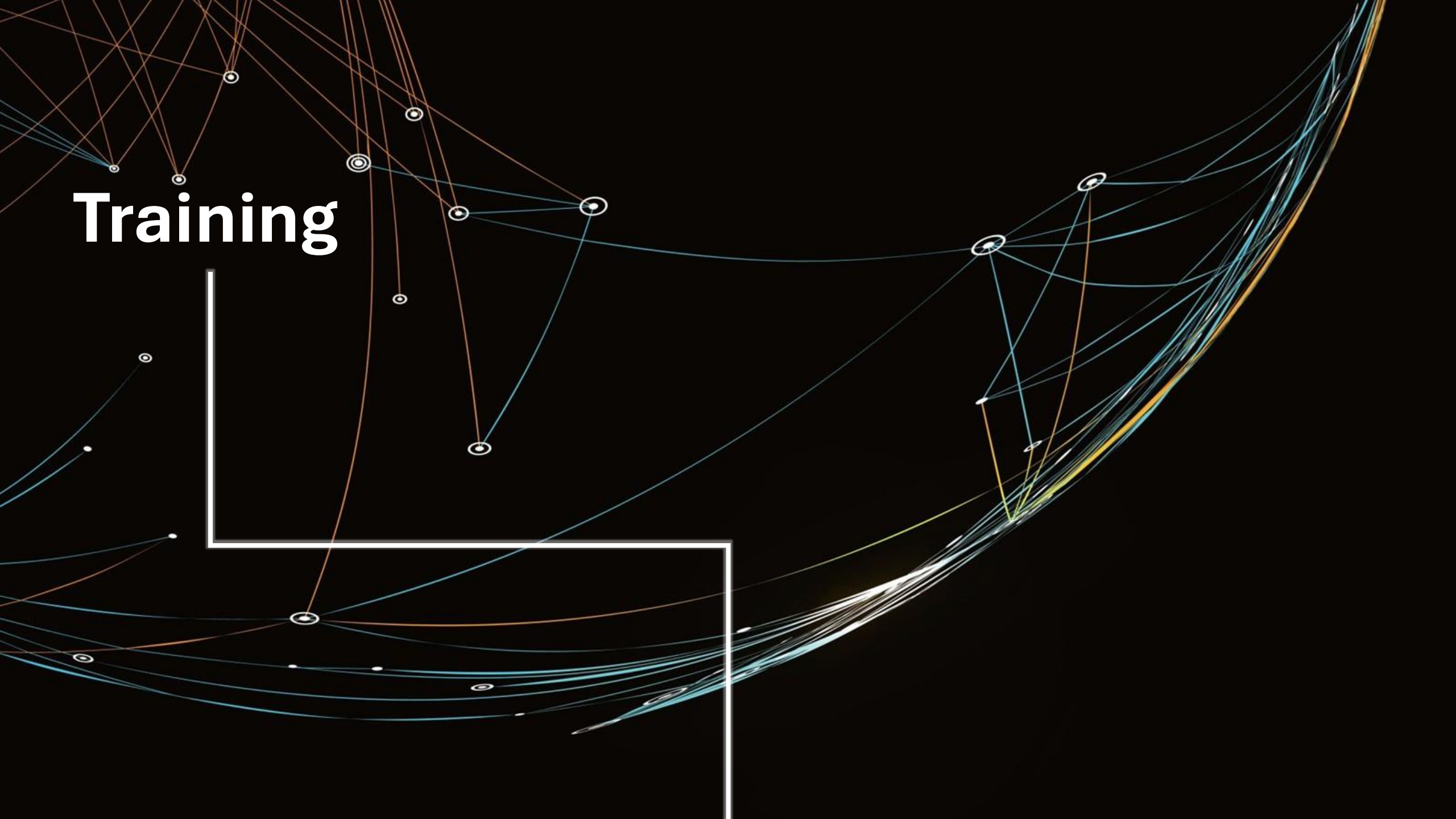
$$28 \times 28 = 784$$







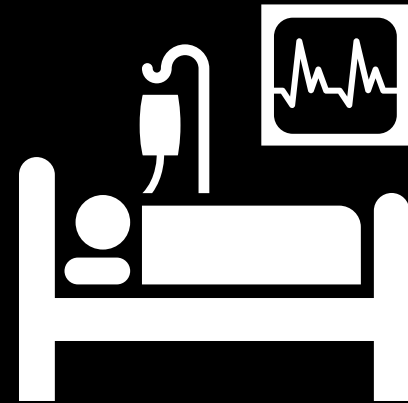
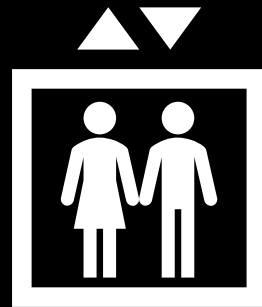
Training





DATA

GIGO



Notebook

26382V

AAXUE

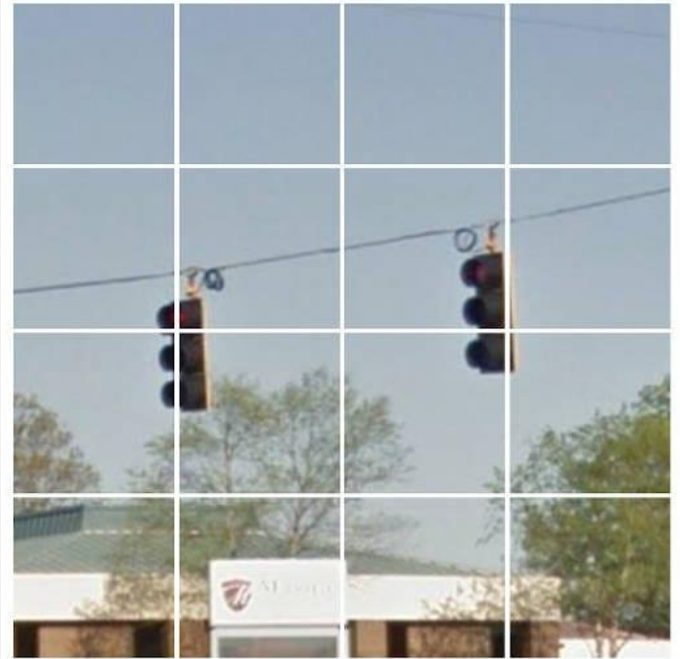
RUNAJIX

STICER

~~mwx2~~

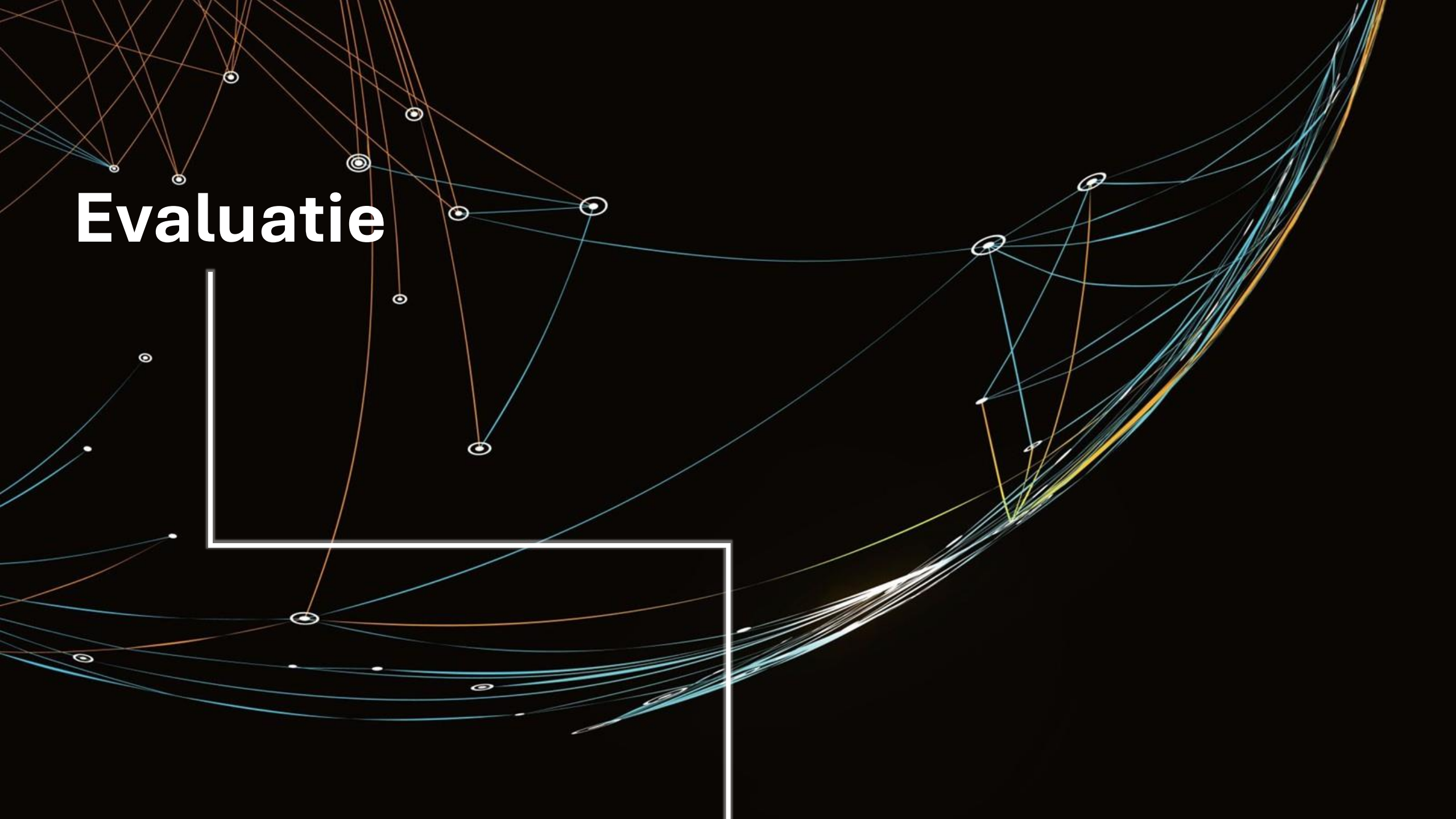
Eps10 vector

Select all squares with
traffic lights
If there are none, click skip



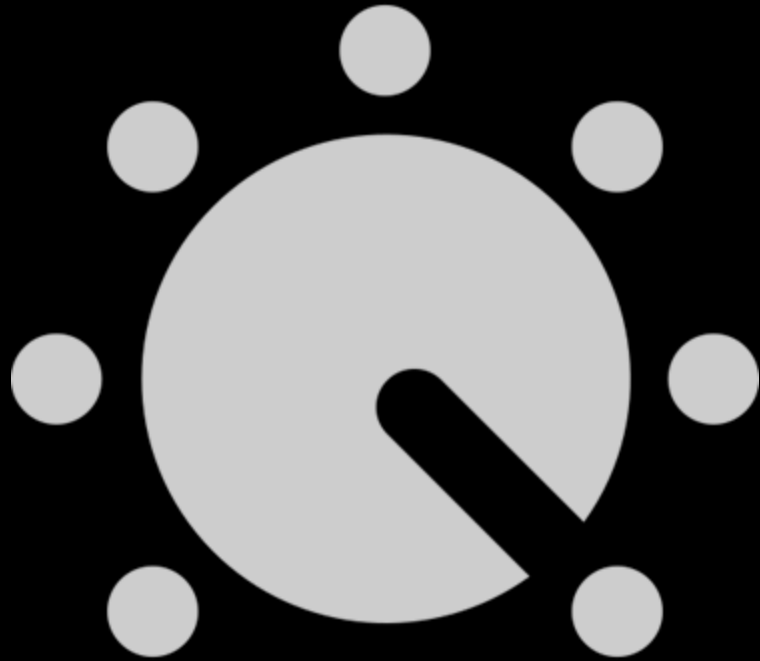
SKIP

Evaluatie



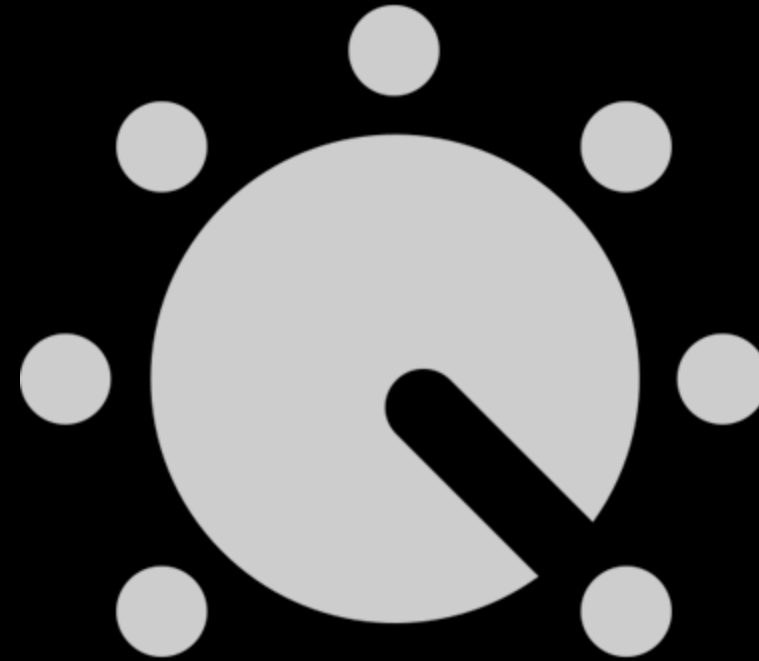
Resultaat

**Belangrijke
kenmerken**



Sensitiviteit

tumor herkennen



Specificiteit

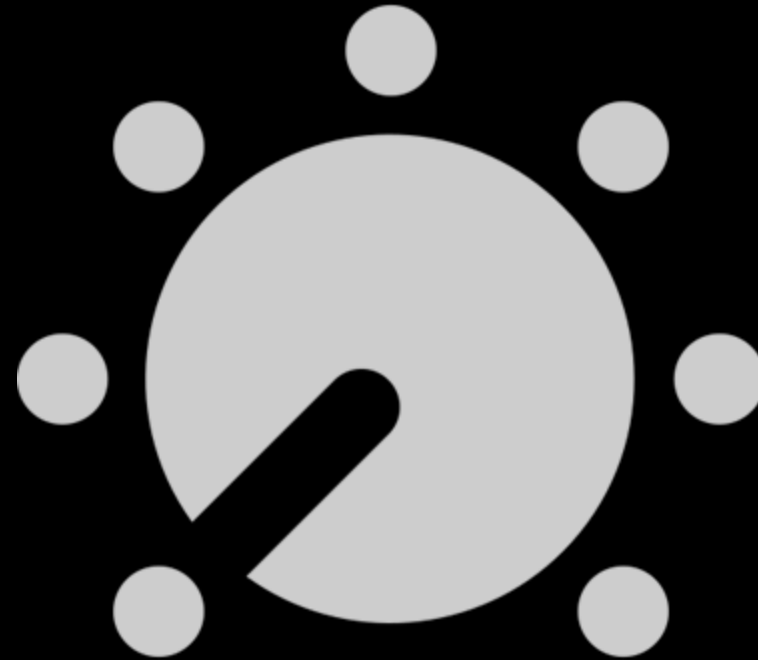
normaal weefsel herkennen

Iedereen heeft kanker



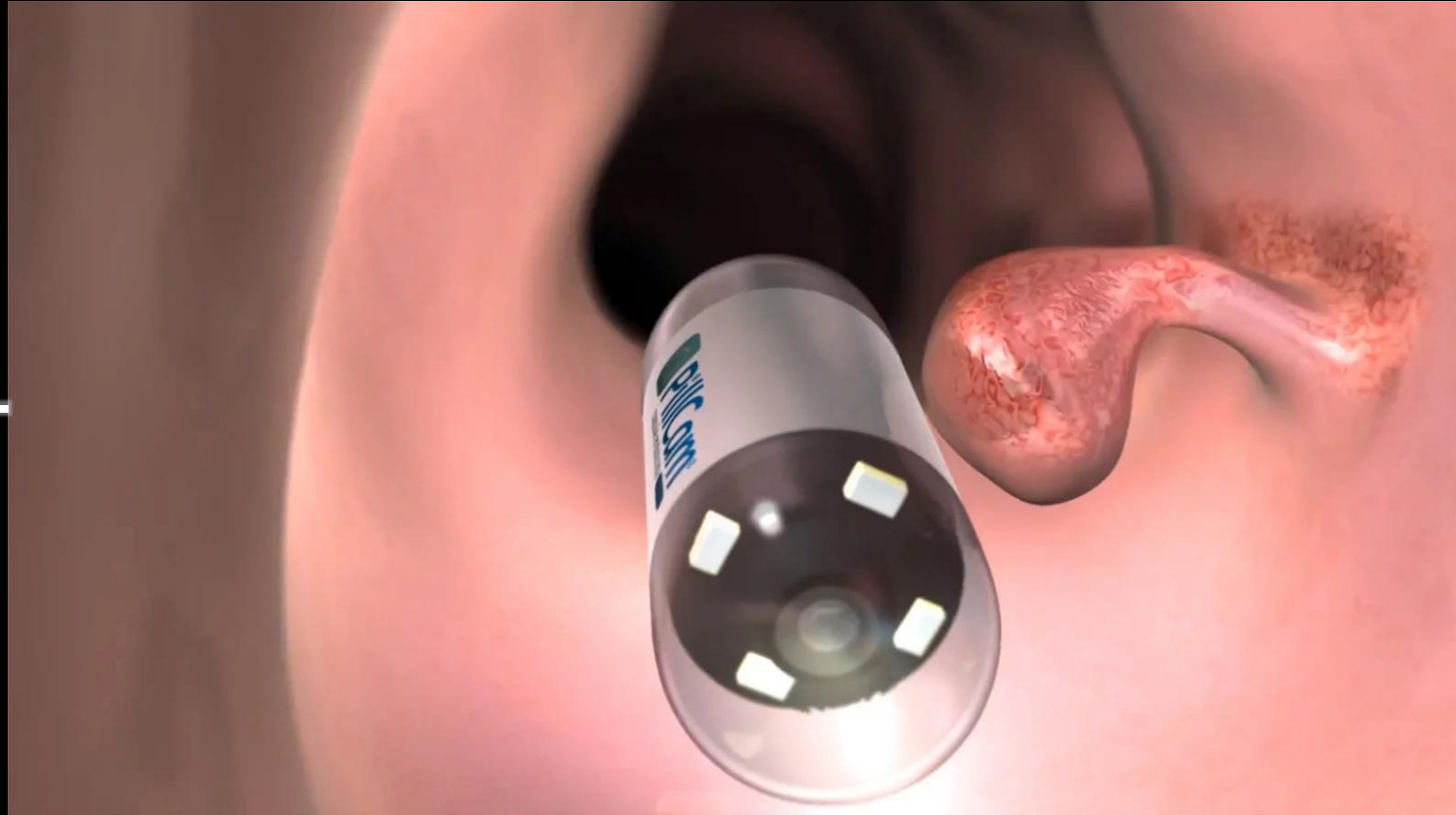
Sensitiviteit

tumor herkennen

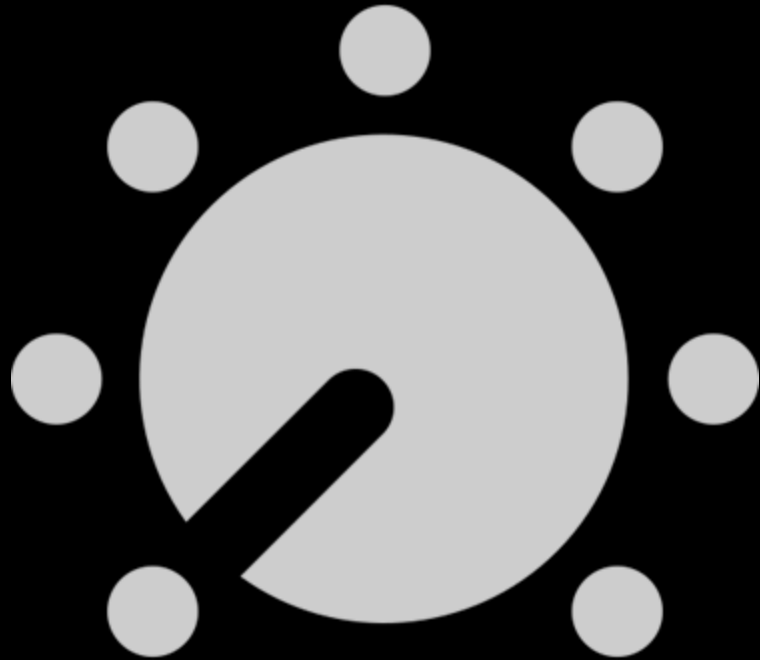


Specificiteit

normaal weefsel herkennen



Niemand heeft kanker



Sensitiviteit

tumor herkennen



Specificiteit

normaal weefsel herkennen

Resultaat

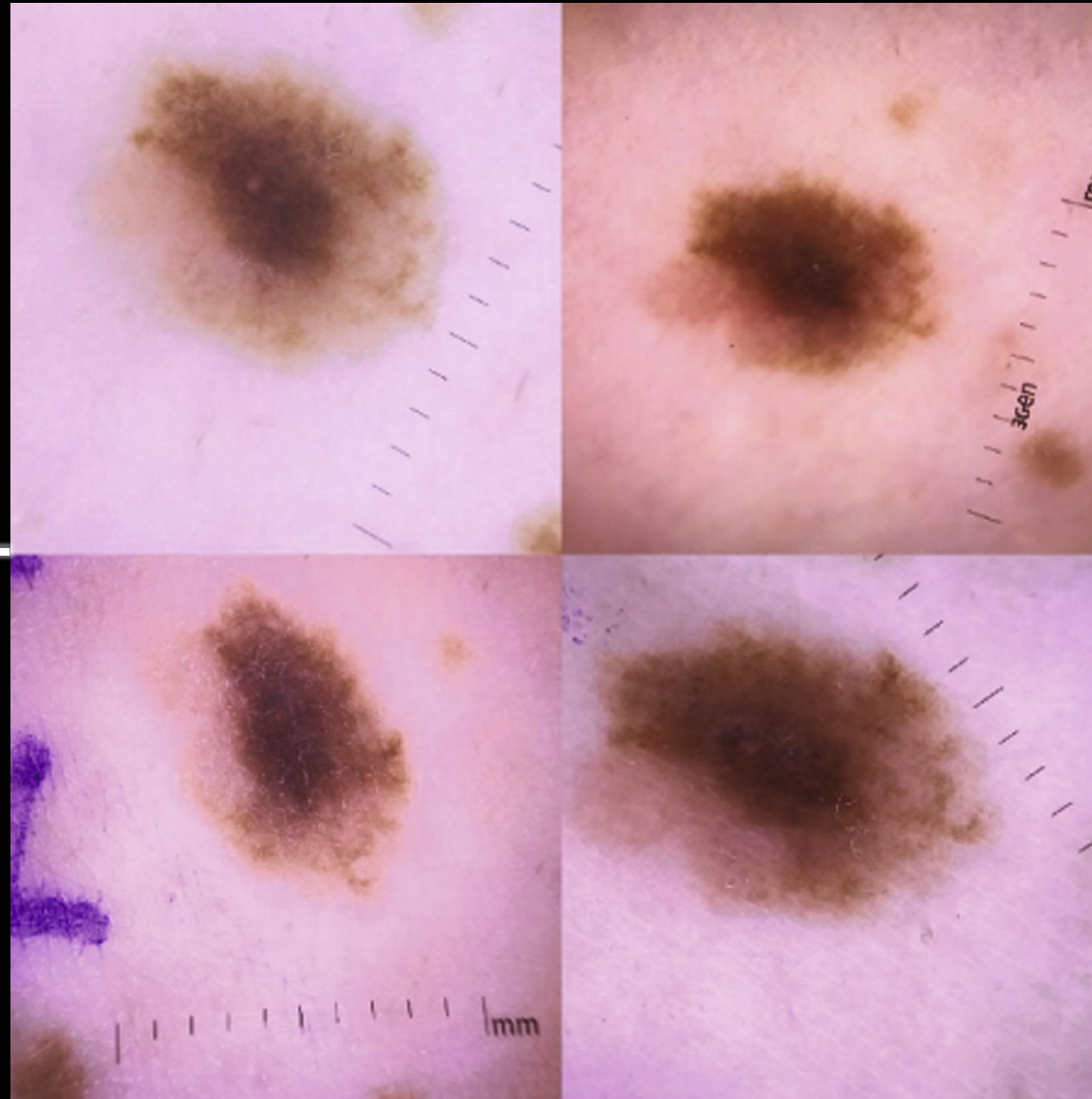
**Belangrijke
kenmerken**

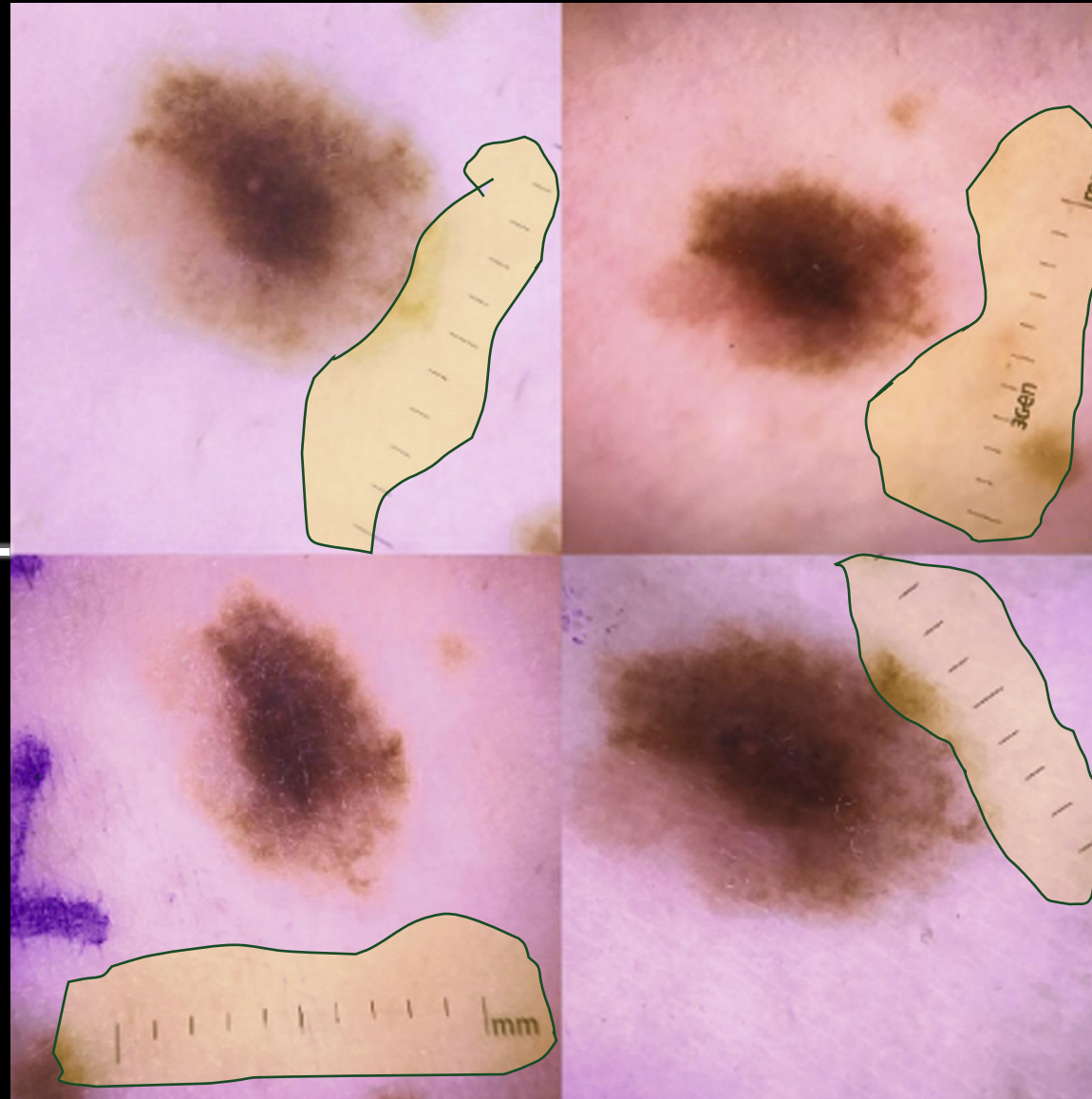


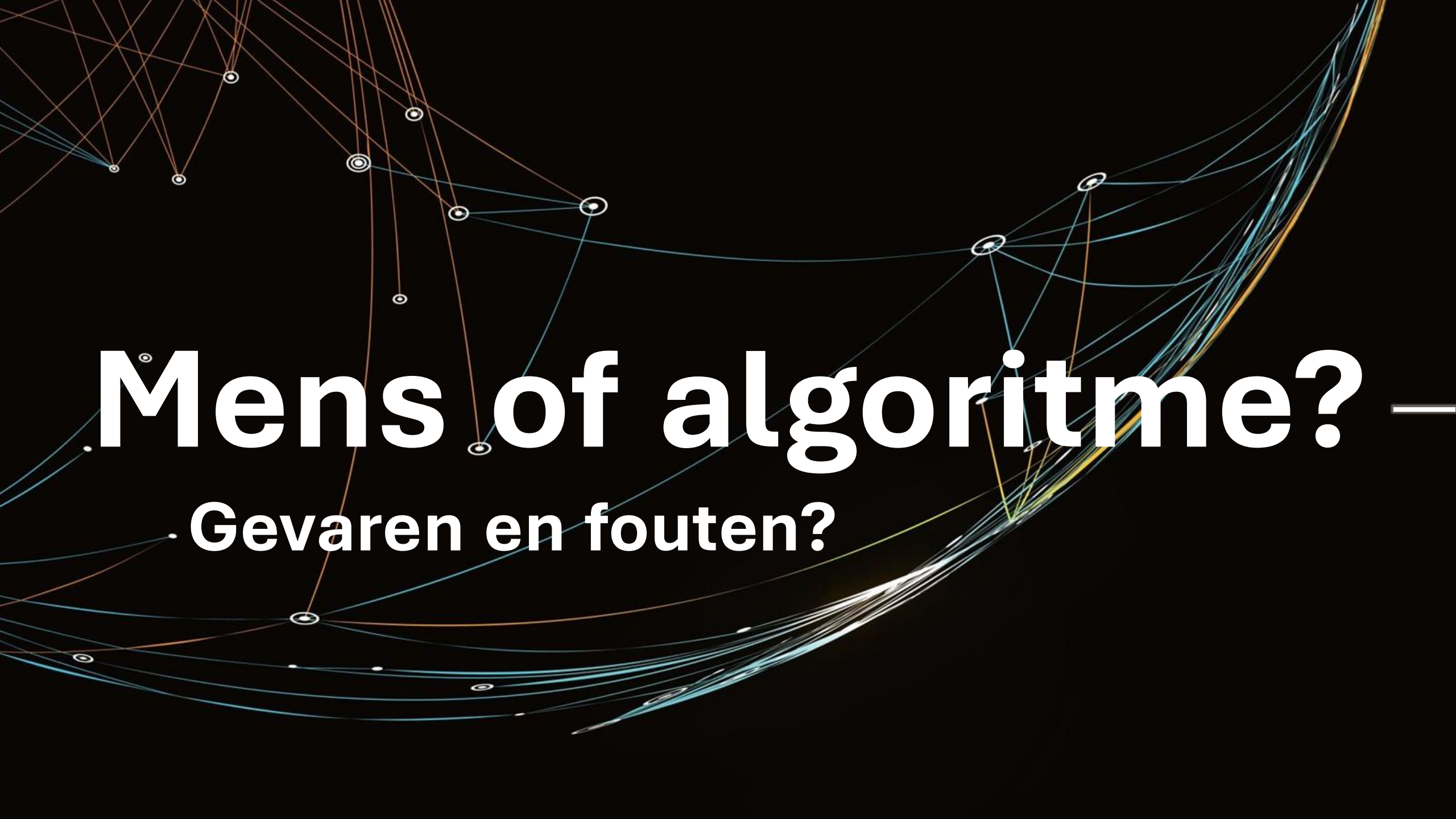
groen:	17%
rood:	80%
blauw:	3%
gewicht:	60g
hardheid:	6
rondheid:	9
suikergehalte:	5%
zuurtegraad:	5.5pH

1

Notebook





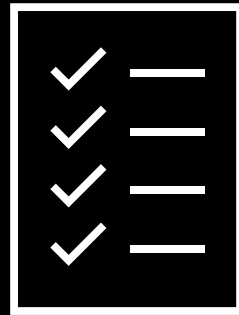


Mens of algoritme? —

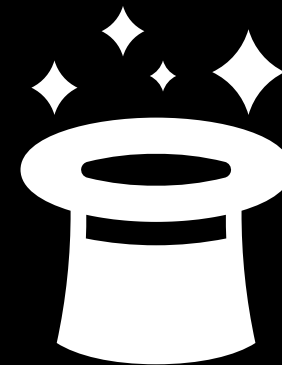
• Gevaren en fouten?

Gevaren

Overfitten



Black box



Explain the Prediction



Predicted: **Wolf**
True: **Wolf**



Predicted: **Husky**
True: **Husky**



Predicted: **Husky**
True: **Husky**



Predicted: **Wolf**
True: **Wolf**



Predicted: **Wolf**
True: **Wolf**



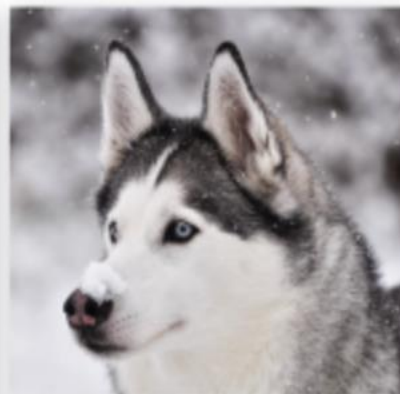
Predicted: **Wolf**
True: **Wolf**



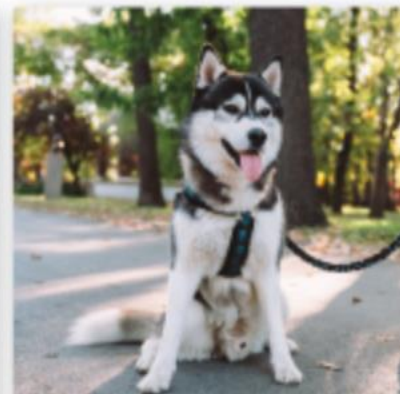
Predicted: **Husky**
True: **Wolf**



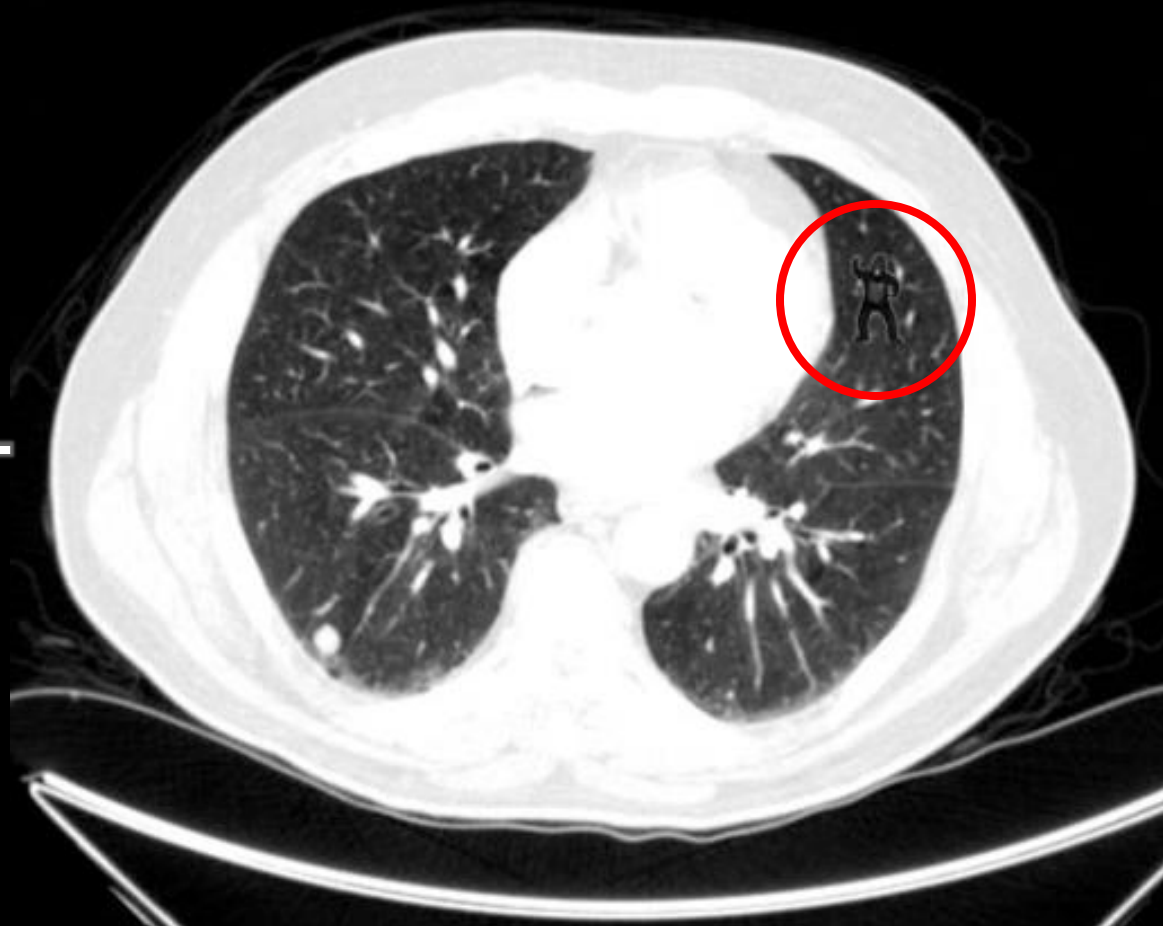
Predicted: **Wolf**
True: **Wolf**

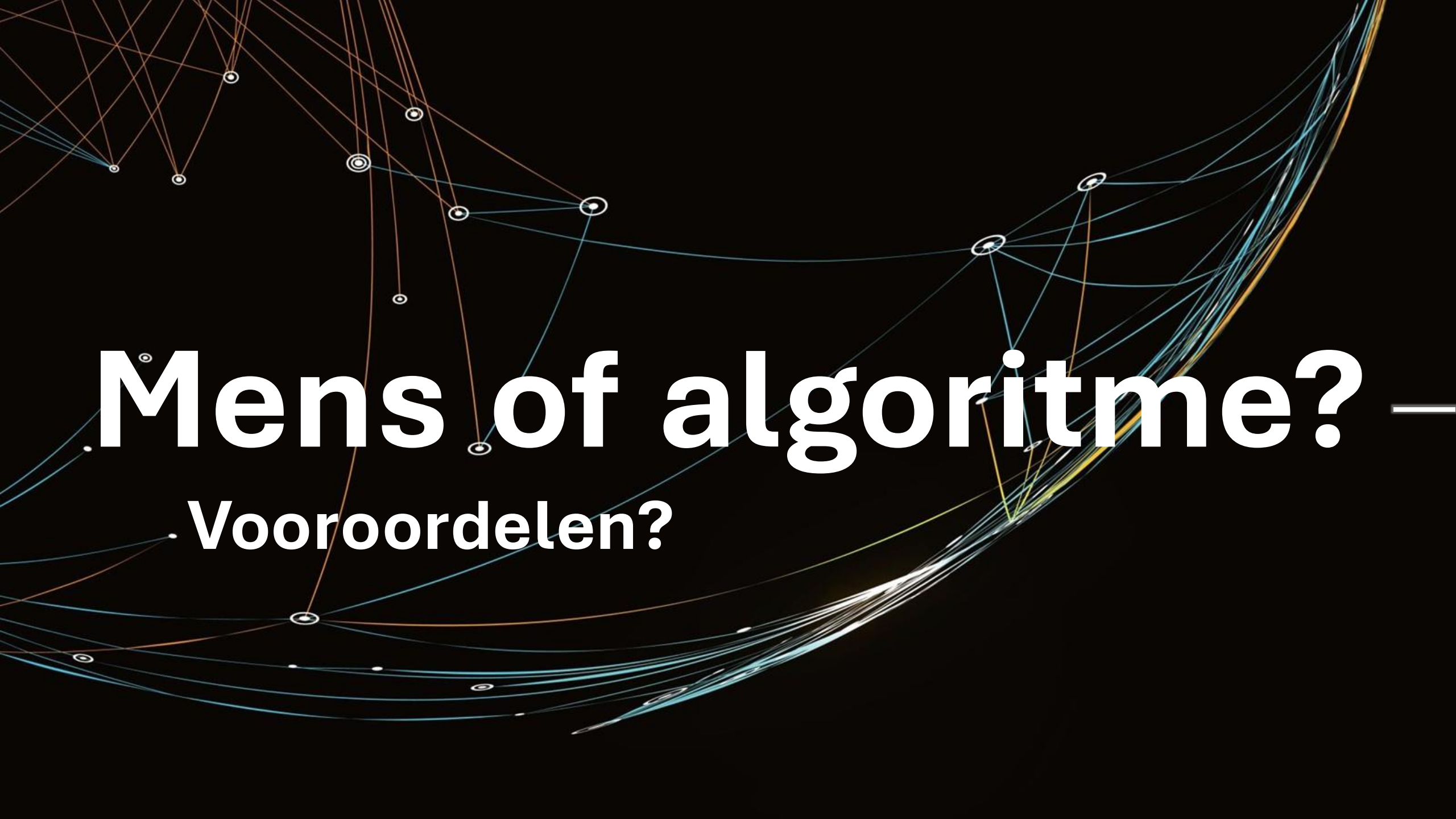


Predicted: **Wolf**
True: **Husky**



Predicted: **Husky**
True: **Husky**





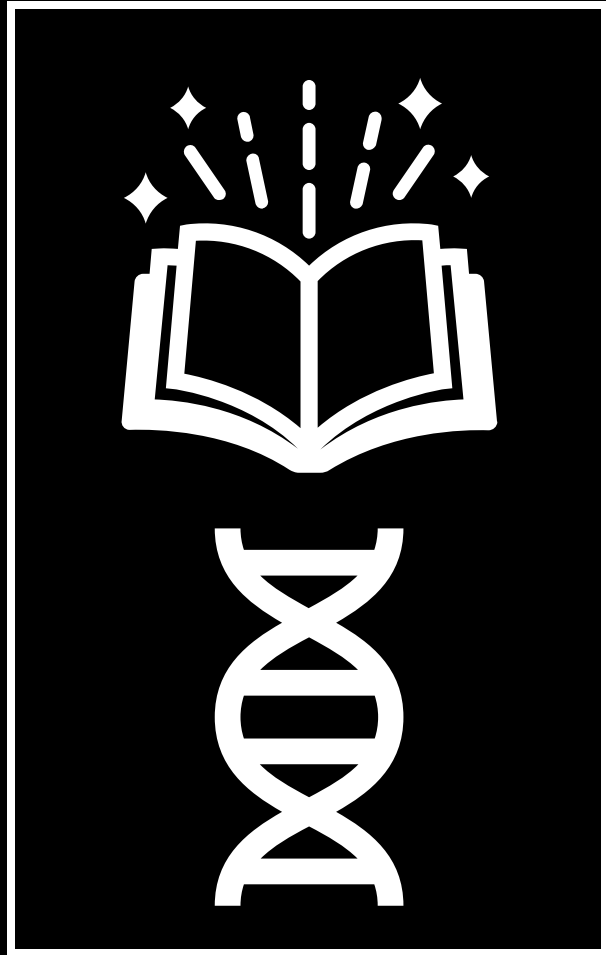
Mens of algoritme? —

Vooroordelen?

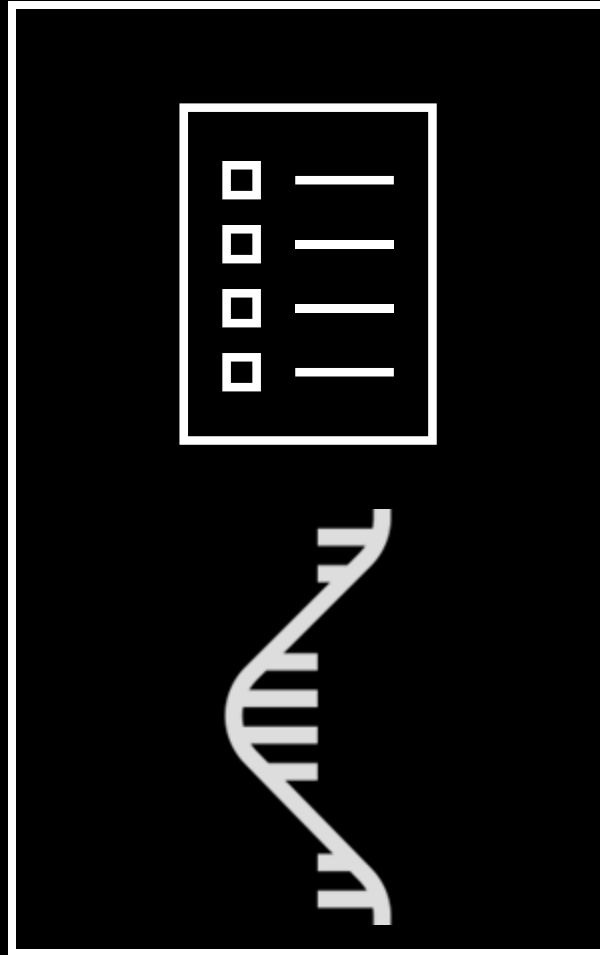


Eigen werk

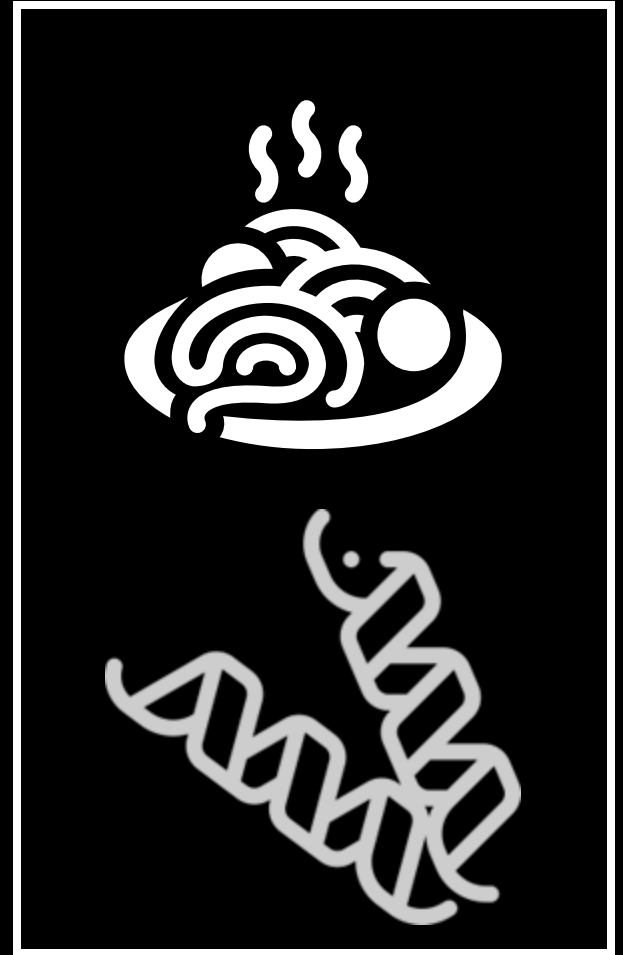
An abstract network diagram on a black background. It features numerous nodes, represented by small white circles with black centers, connected by thin lines. The lines are colored in shades of blue, orange, and yellow. The network is dense and complex, with many overlapping connections. A white L-shaped frame is overlaid on the left side of the image, consisting of a vertical line and a horizontal line that meet at a right angle. The text "Eigen werk" is written in a bold, white, sans-serif font in the upper left quadrant of the image.



DNA

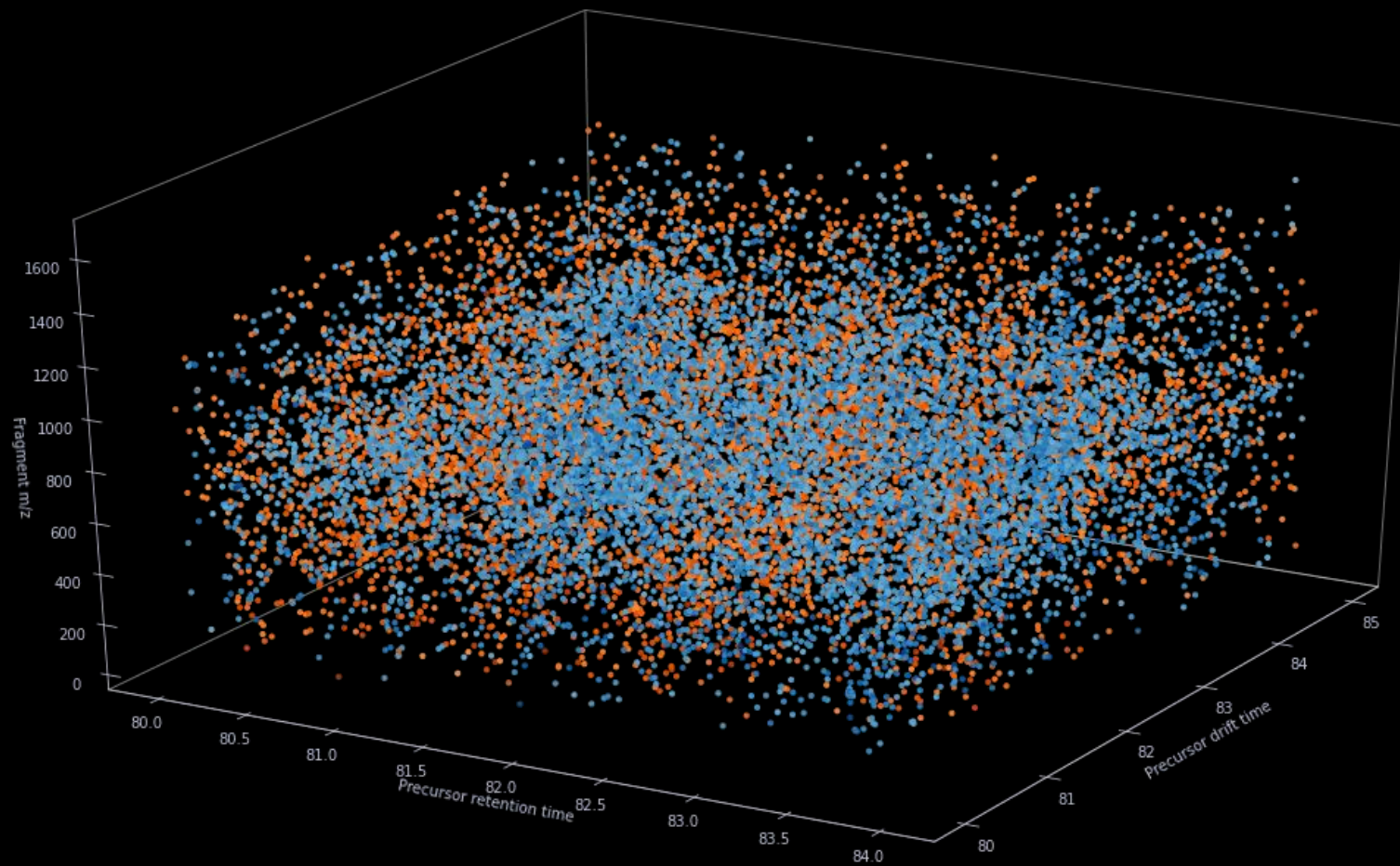


RNA



Eiwitten





EVE ECHOES PROJECT DISCOVERY

In collaboration with Ghent University, VIB and MMOS

By joining EVE Echoes mini-game, you could help advance real science in Project Discovery along with other pilots and win in-game rewards at the mean time.





Sleeper

Daily Events

0



Project Discovery



Project Discovery



Project Discovery
Leaderboard

NEW



Navigator
Program

NEW



Cumulative
Top-up



Supplies

PROJECT DISCOVERY

! 2022-08-15 07:00 - 2022-12-19 07:00 [UTC +0]

CONTRIBUTE TO SCIENCE

The Yan Jung and New Eden have launched a collaborative effort to research their genetic lineage and shine light on their mysterious origins. CONCORD calls on all capsuleers to contribute their problem solving skills and train an advanced AI capable of

EXCLUSIVE REWARDS

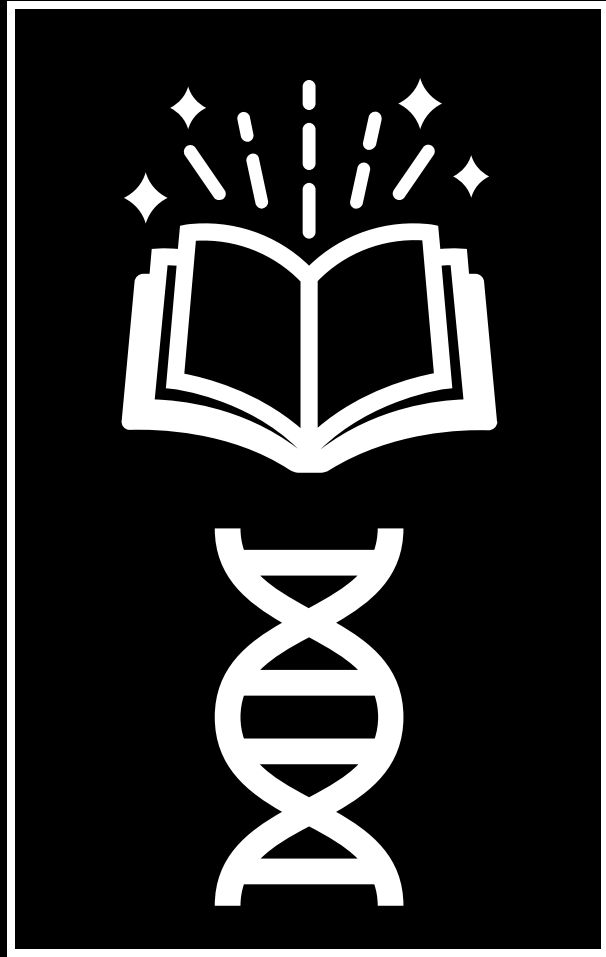
Participate to earn powerful rewards, from resources and components to Yan Jung-designed SKINs and even cutting edge CONCORD ships!



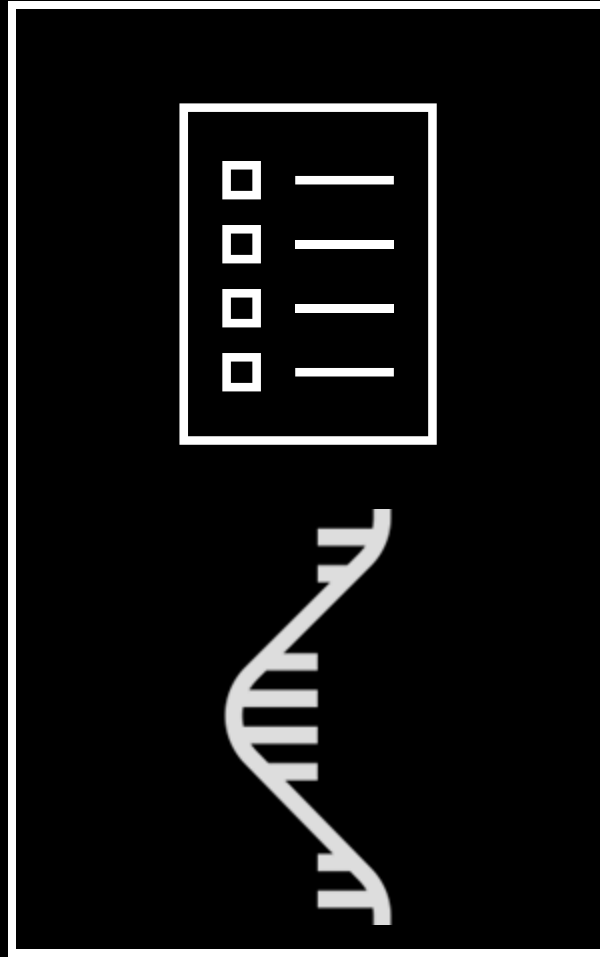
Use Research Points  in exchange for
ENTER STORE >>

START

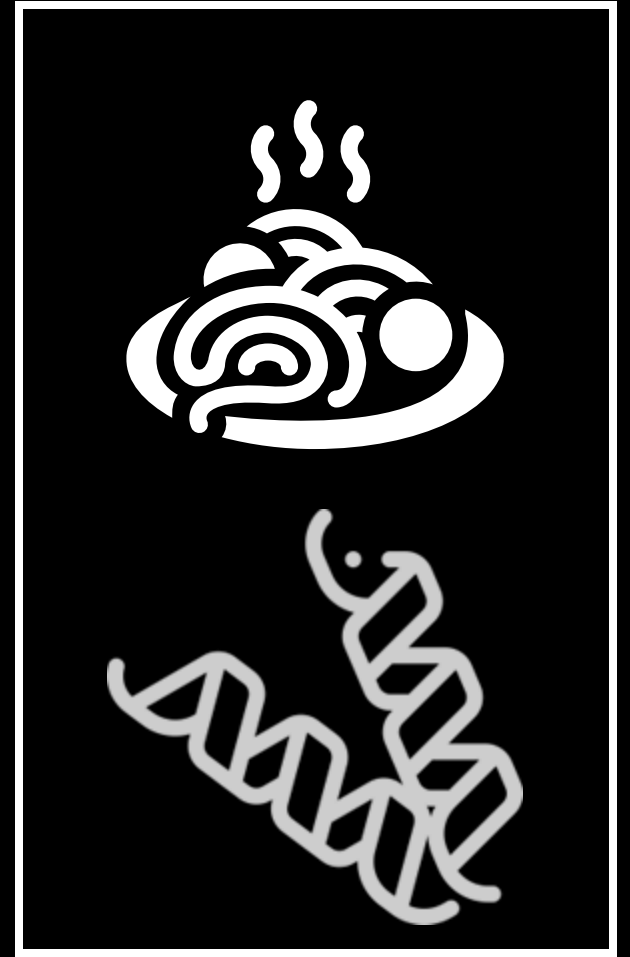




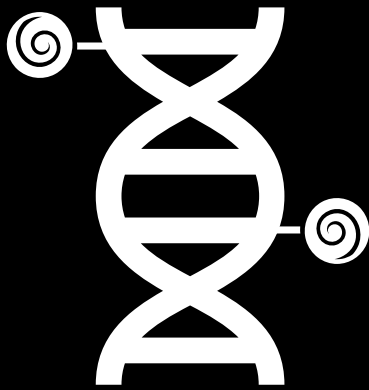
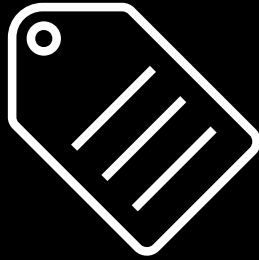
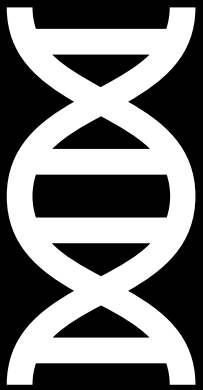
DNA



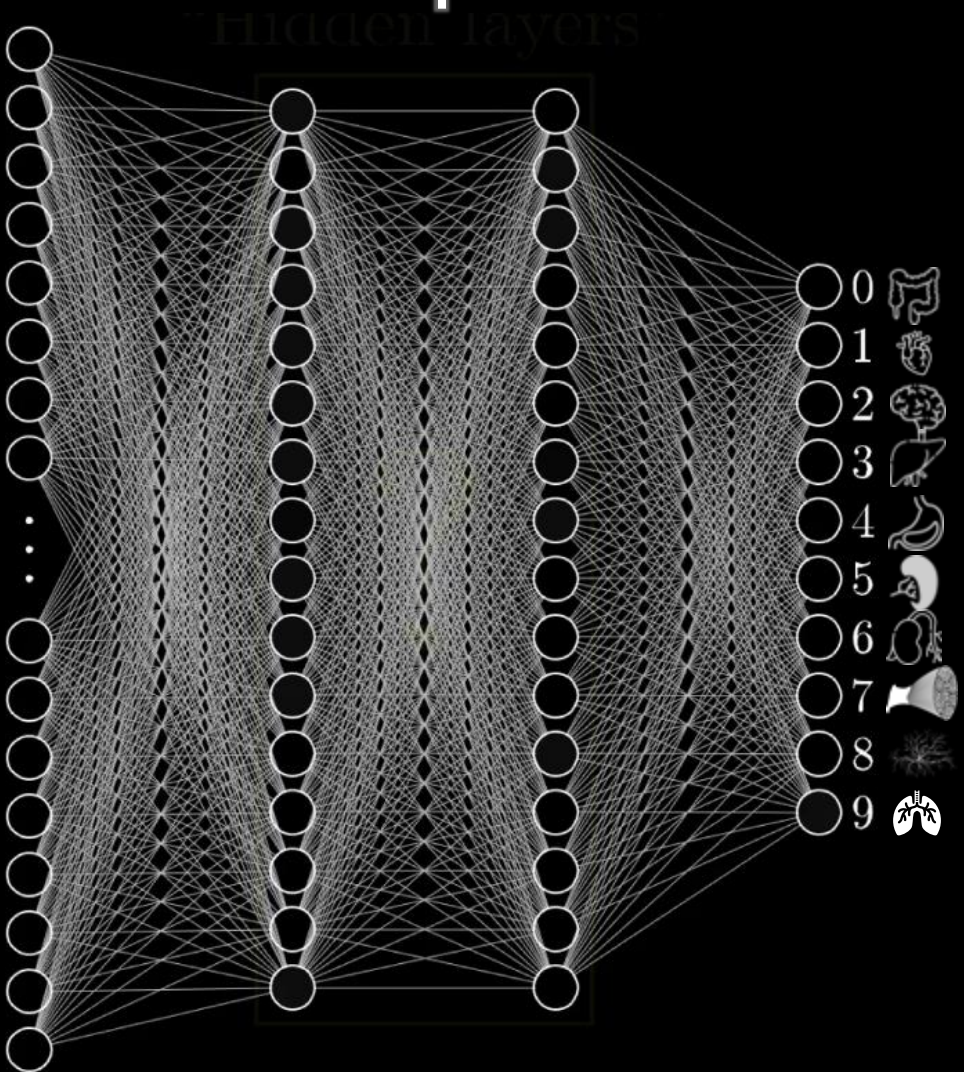
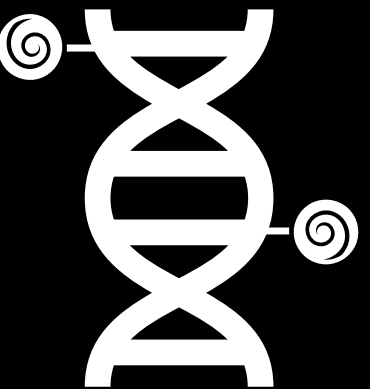
RNA



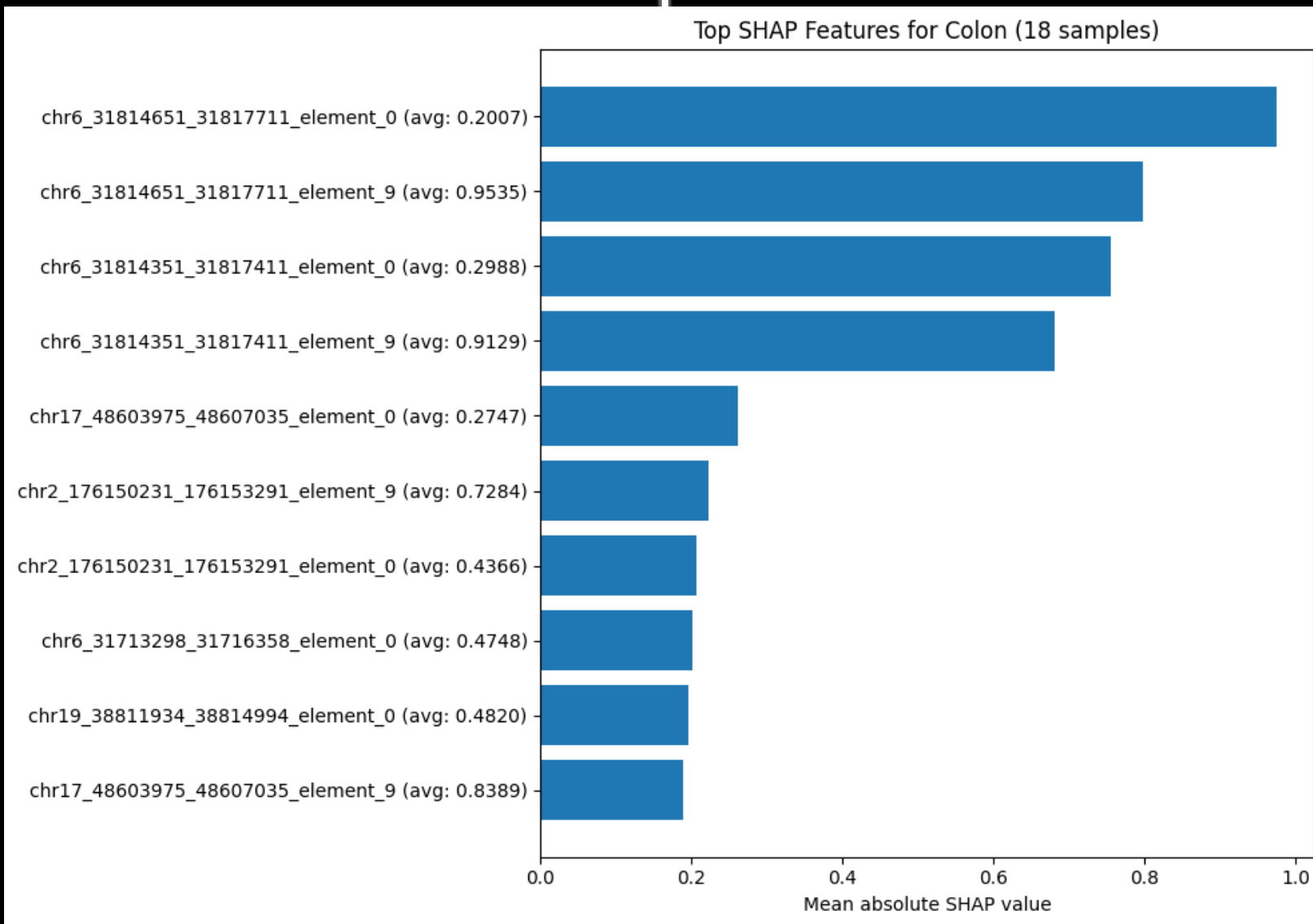
Eiwitten

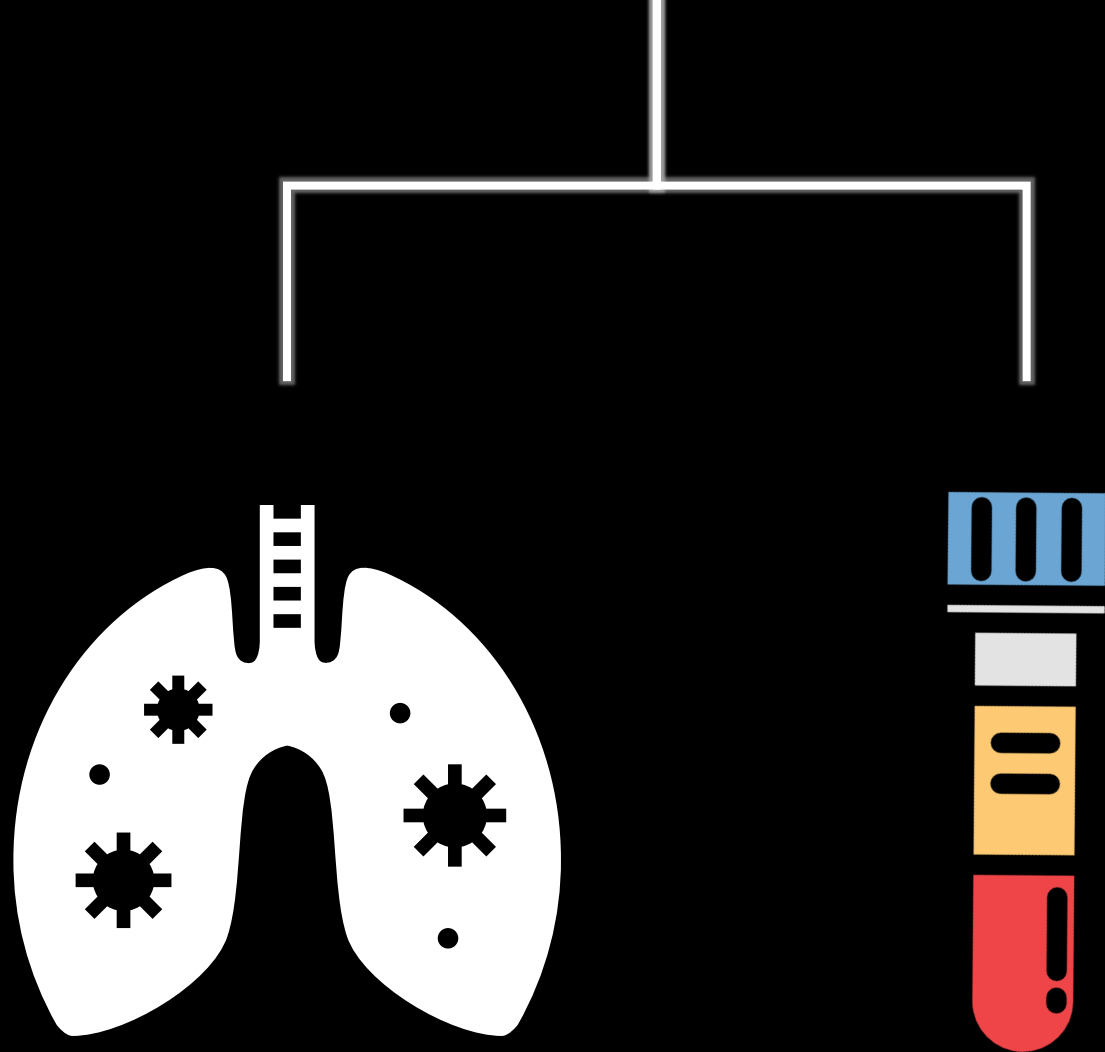


DNA modificaties



Genen



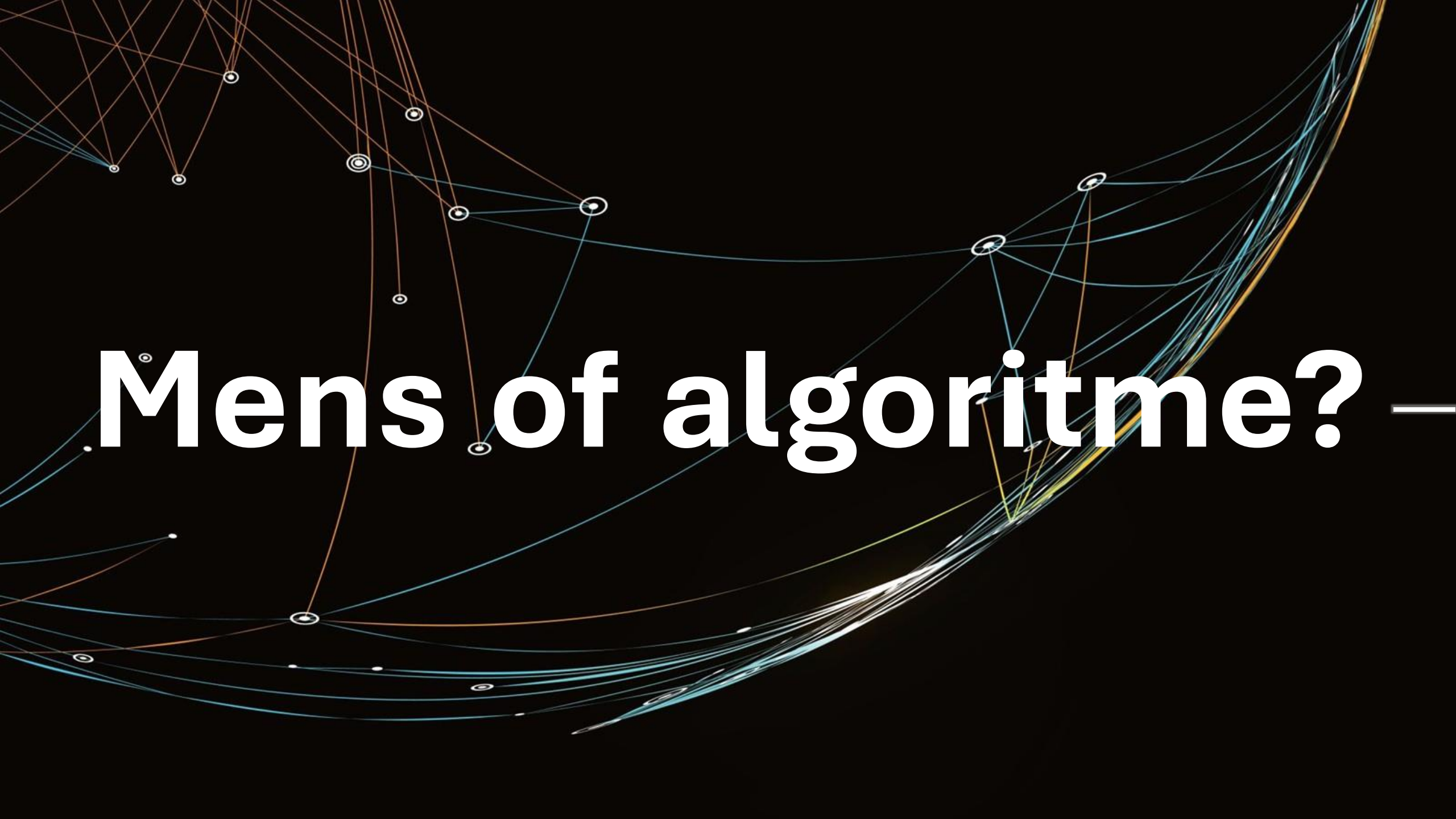


CUP

Preventie
screening

Diagnose
vroeg detectie

Behandeling
gepersonaliseerd



Mens of algoritme? —



— Mens en algoritme!