

INTRODUCTION TO NEURAL NETWORKS

Presented by the Mac AI Team!

LEVELS OF UNDERSTANDING

LEVELS OF ABSTRACTION

**“WOW, A
PREDICTION
MACHINE!”**

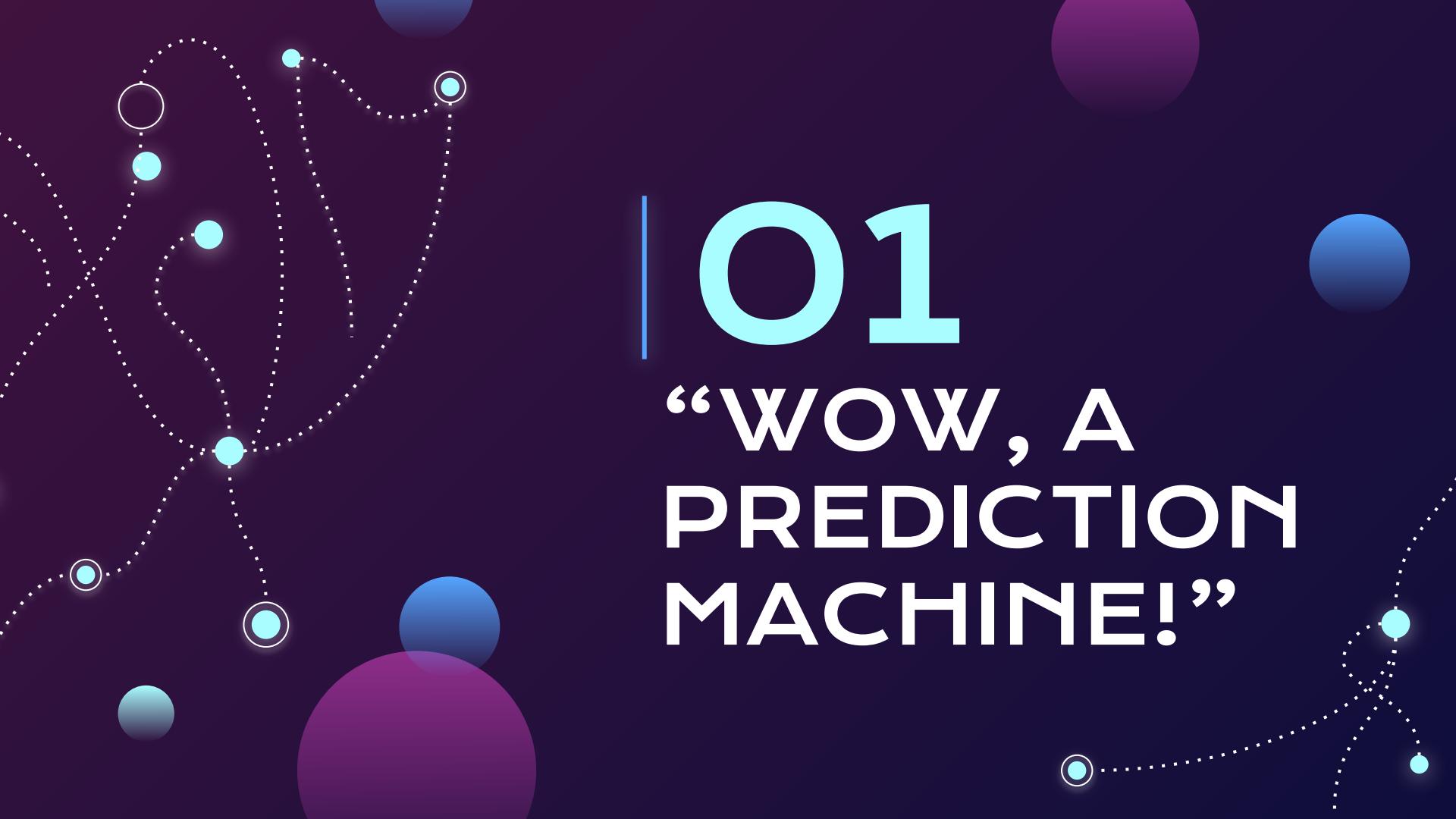
Input Health Data,
Receive Prediction!

**“WOAH,
IT’S A BRAIN?”**

From Raw Data to Refine
Insight, Layer by Layer.

**“OH...
IT’S MATH.”**

Breaking Down to
Weights and Biases.



01

“WOW, A PREDICTION MACHINE!”

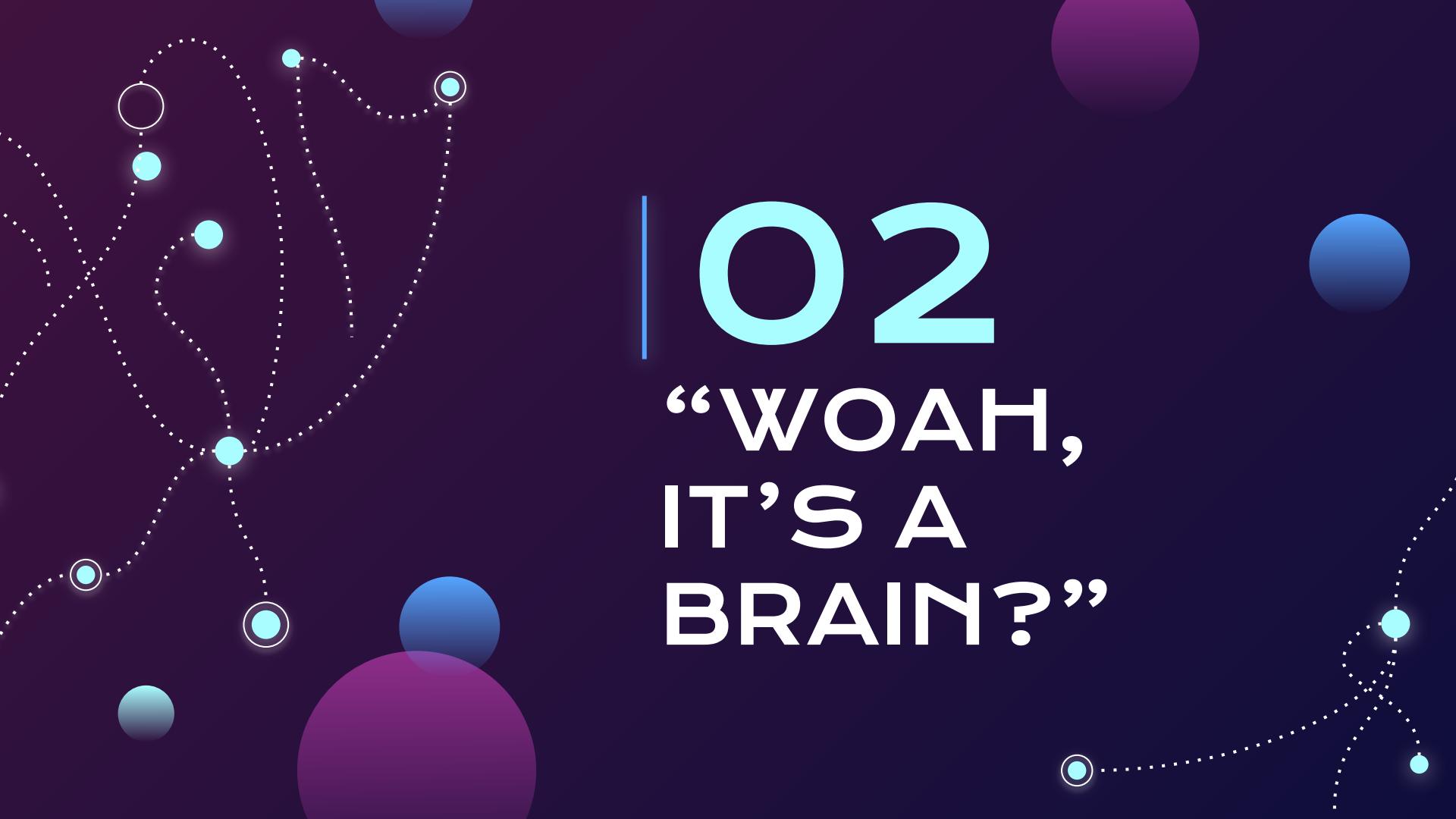
radius1	17.99
texture1	10.38
...	



**Very Cool
Prediction
Machine**

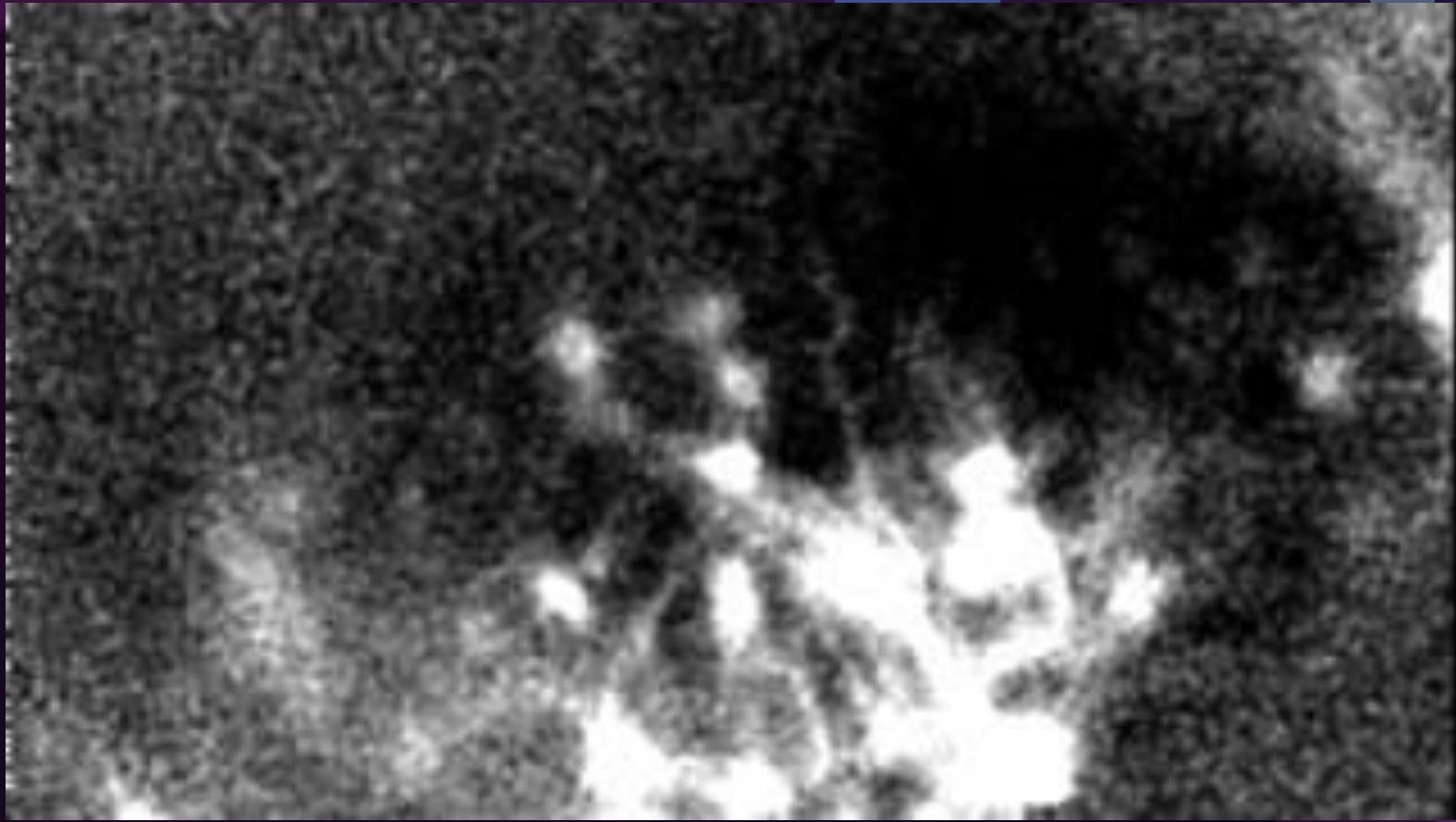
Likelihood Tumor is
Malignant

43%

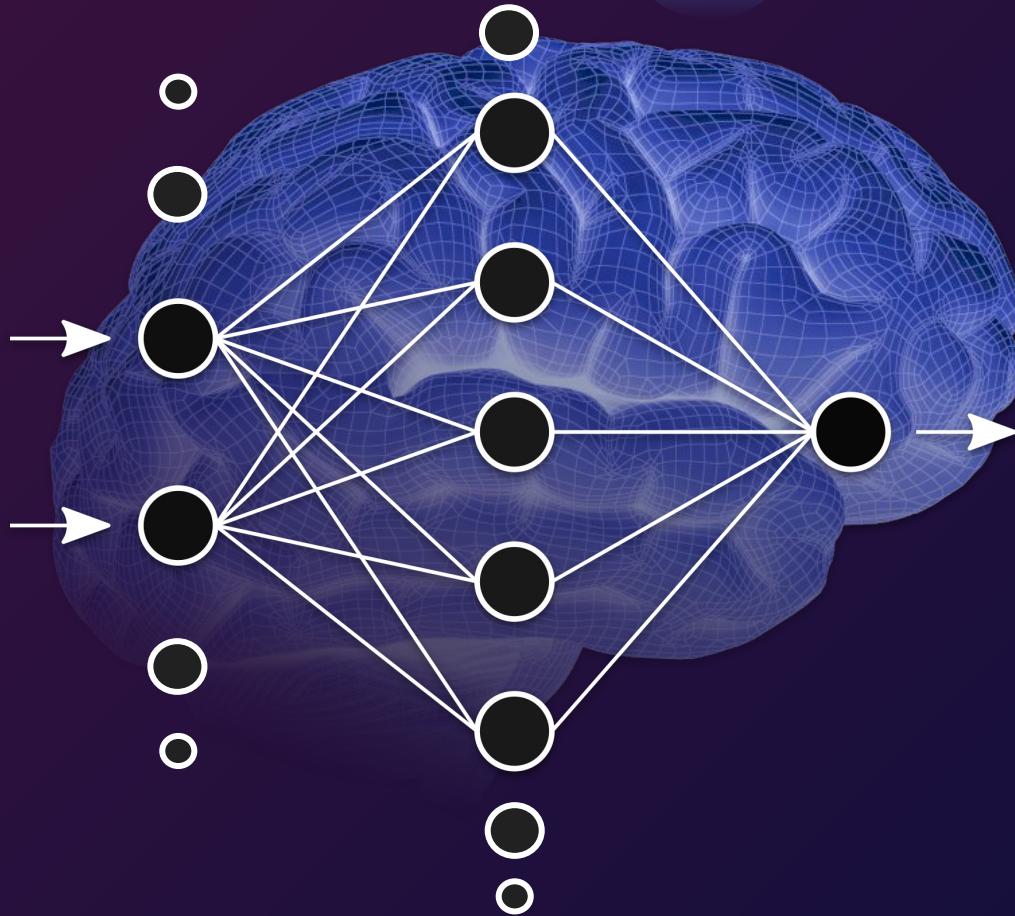
The background is a dark purple gradient. It features several glowing, semi-transparent spheres in shades of cyan, blue, and magenta. Dotted lines connect these spheres in a network-like pattern, creating a sense of motion and connectivity.

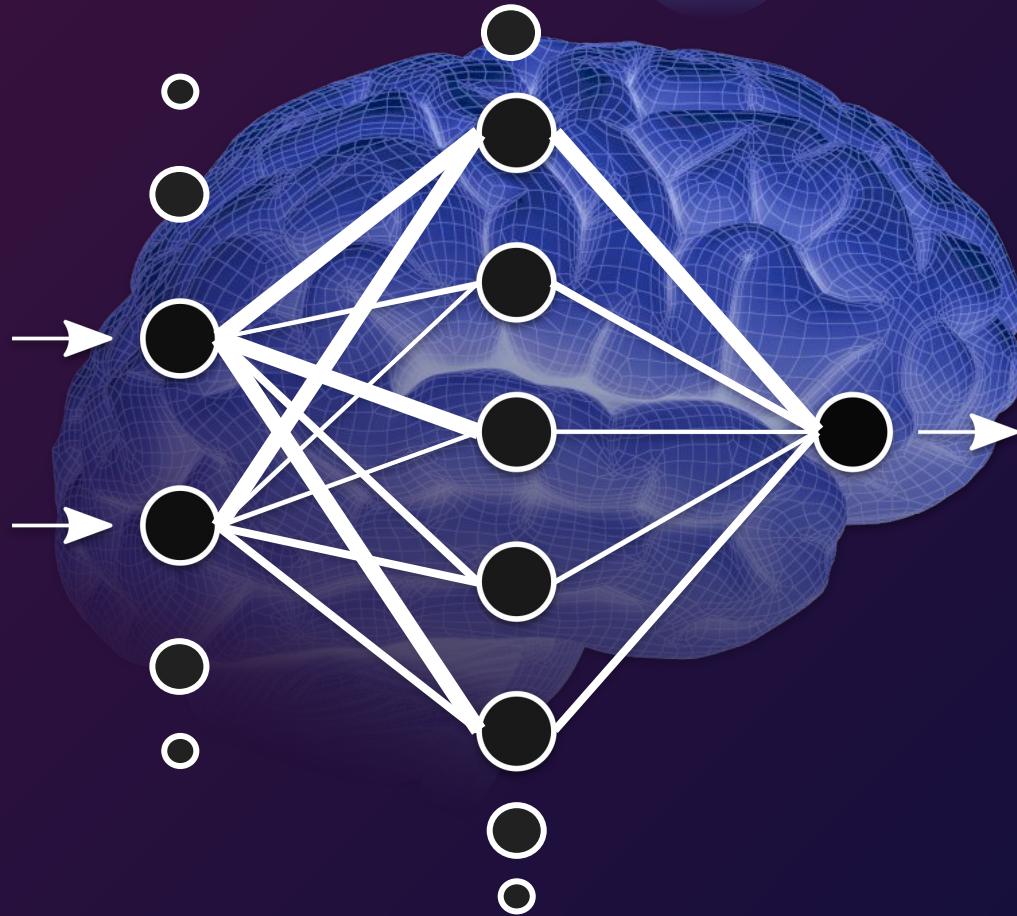
02

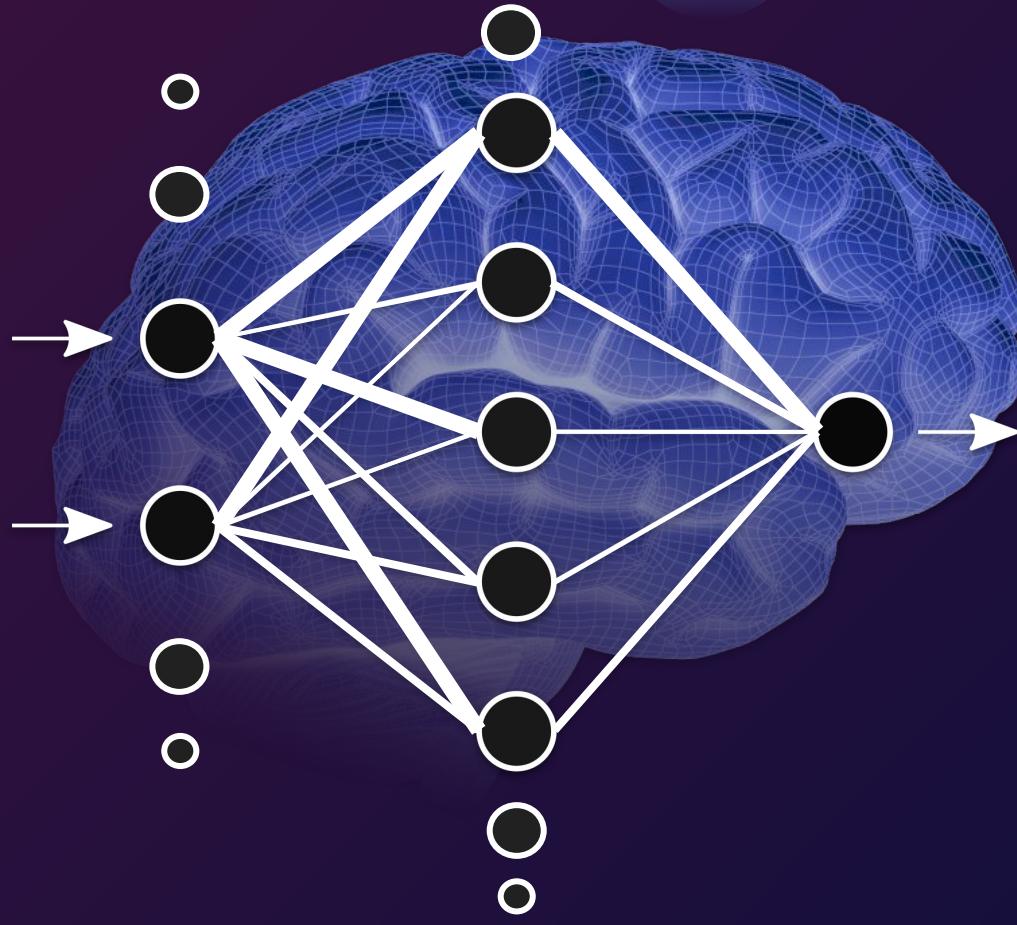
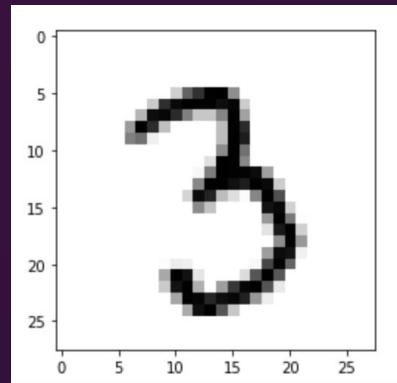
“WOAH, IT’S A BRAIN?”

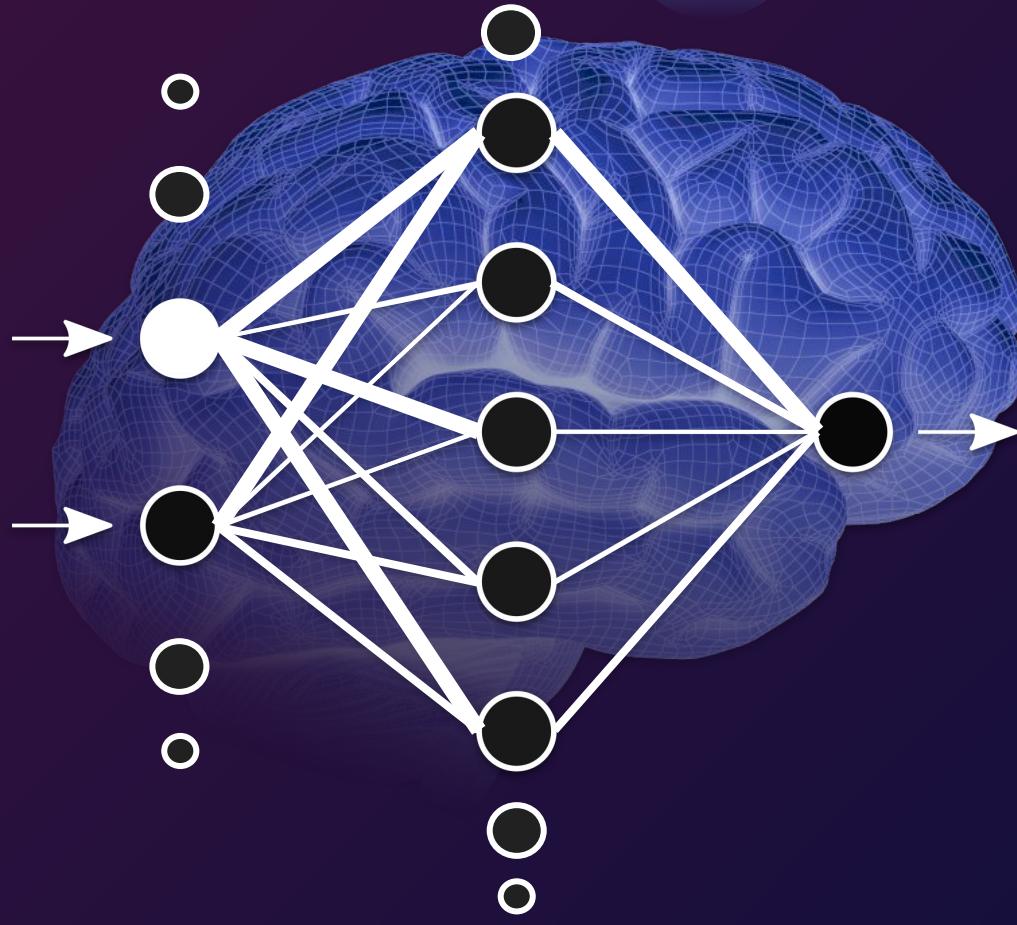
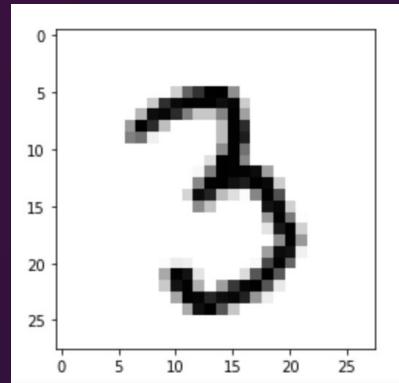


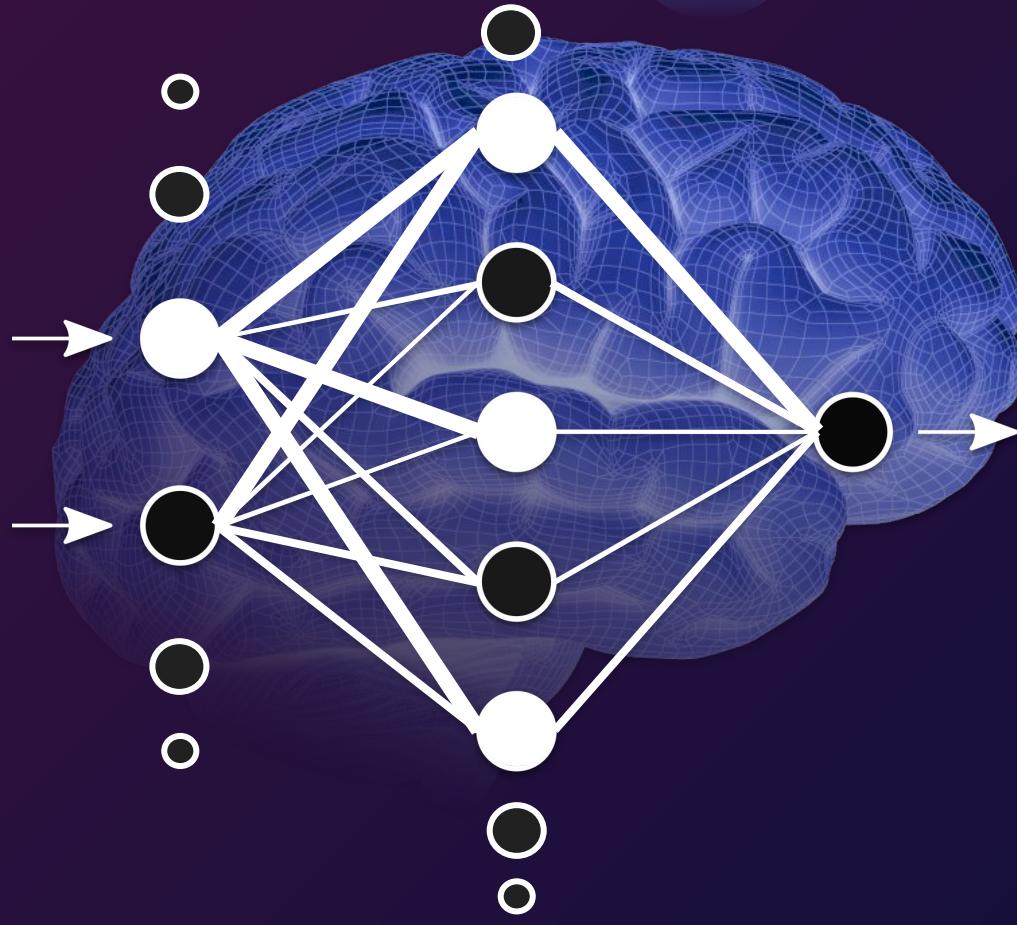
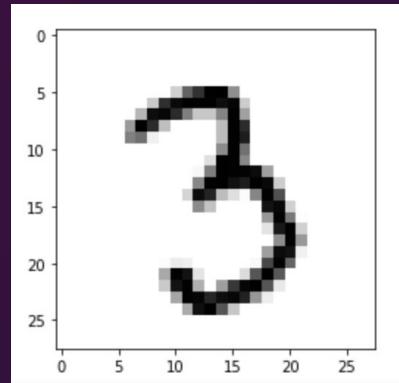


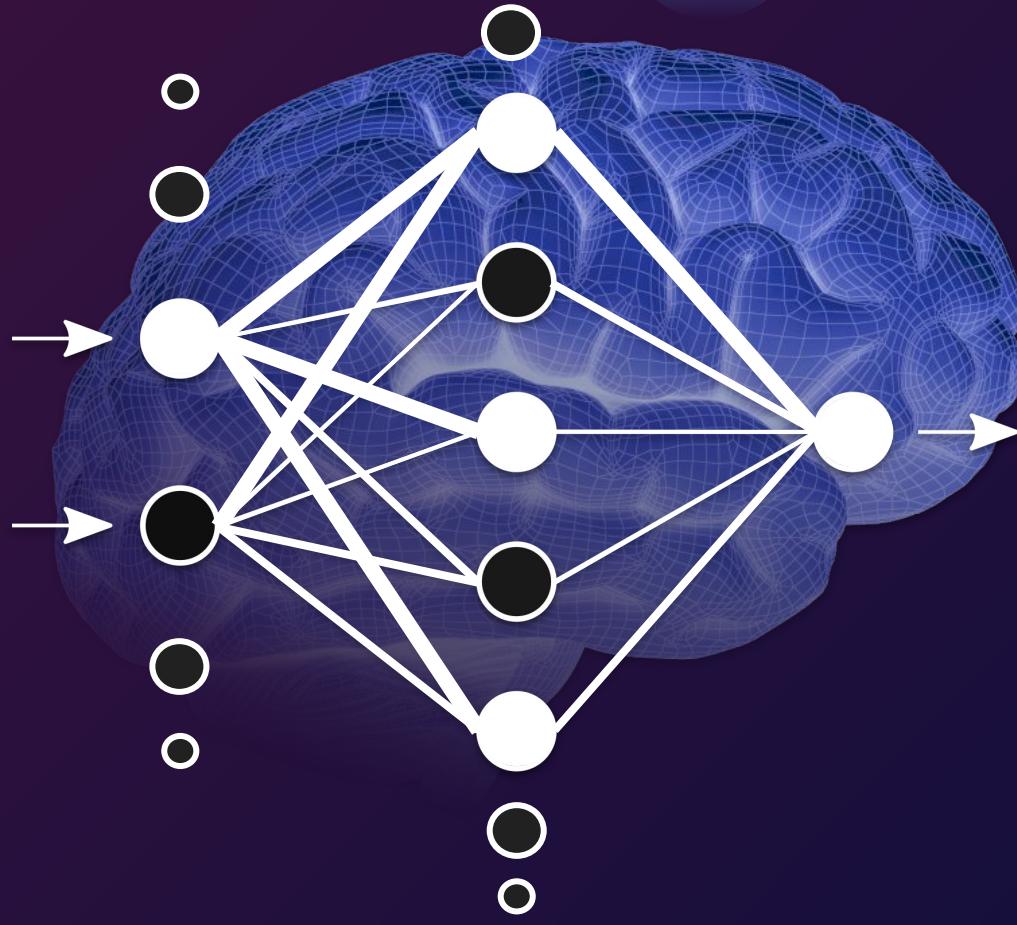
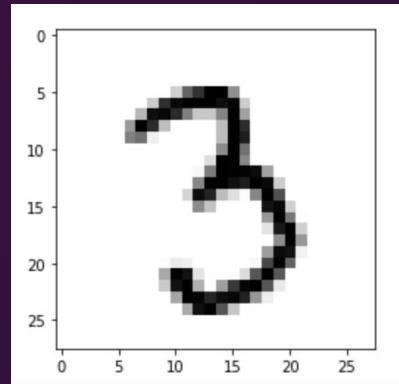


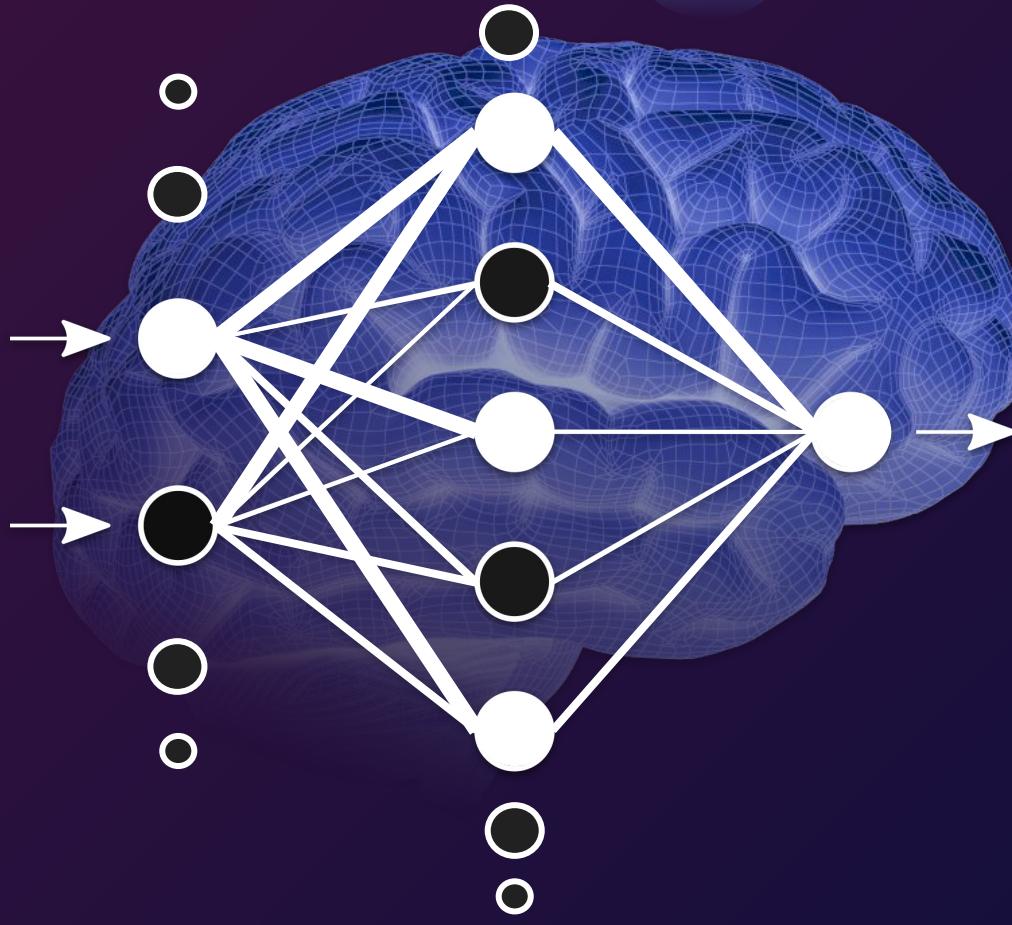
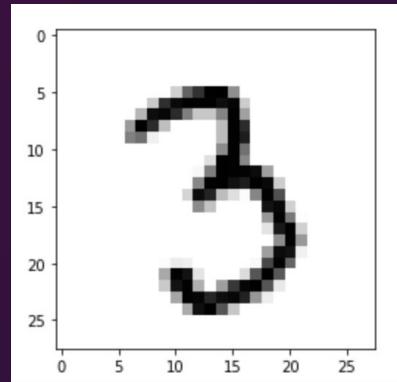




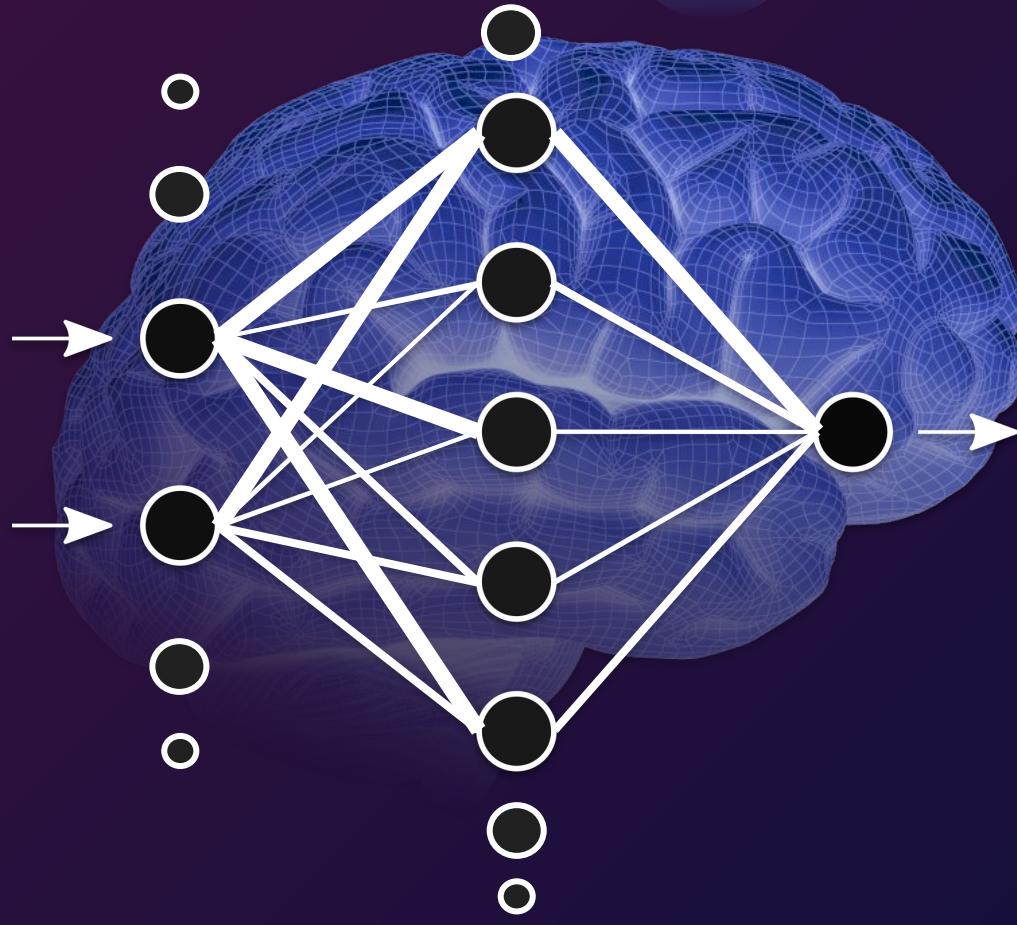
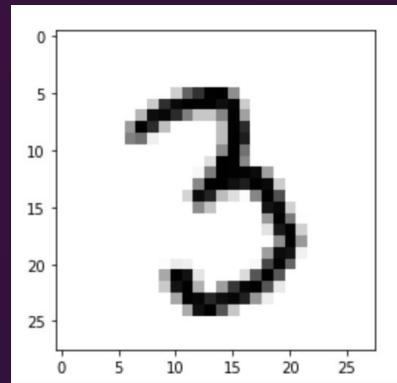




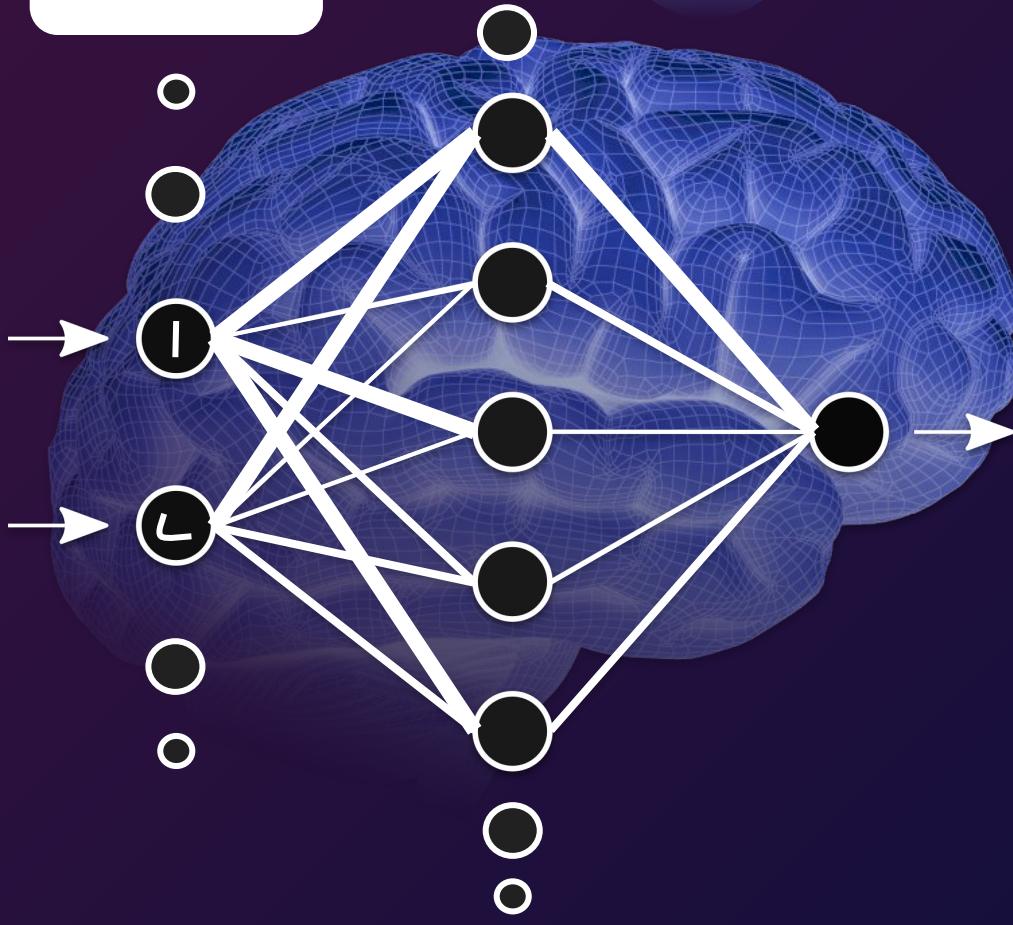
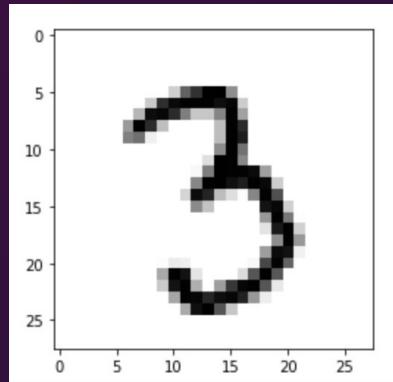




The Number is
3

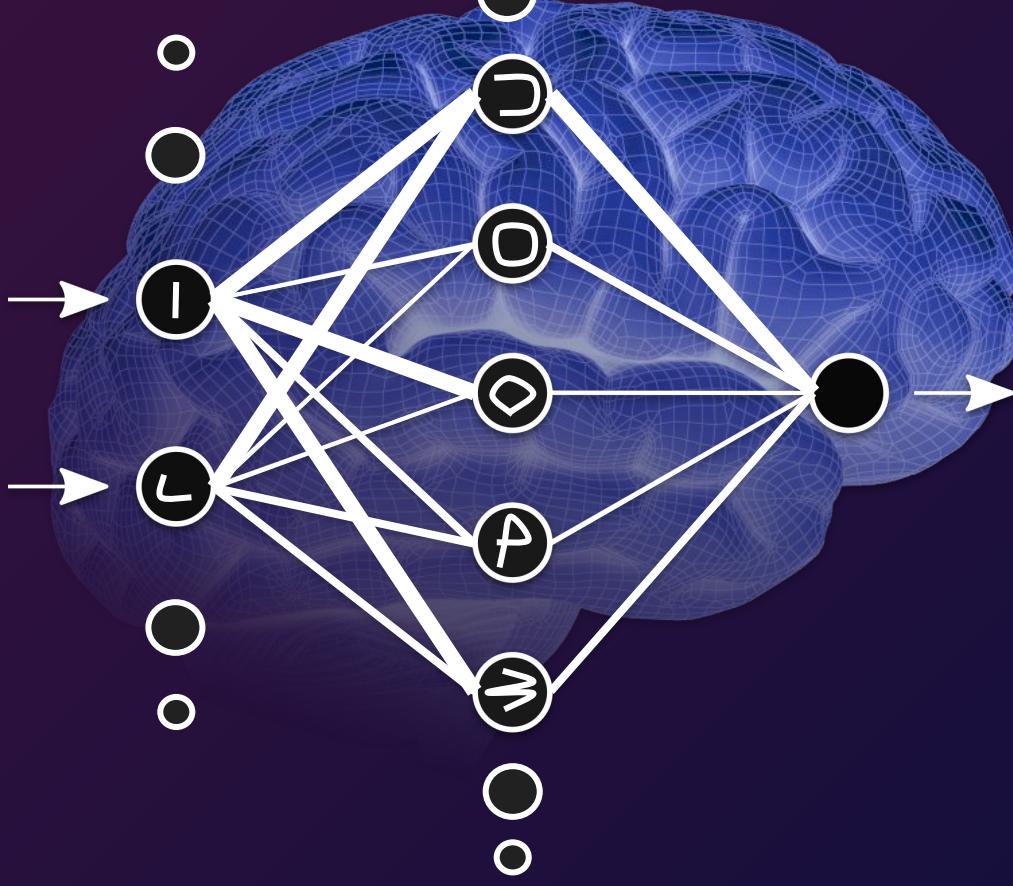
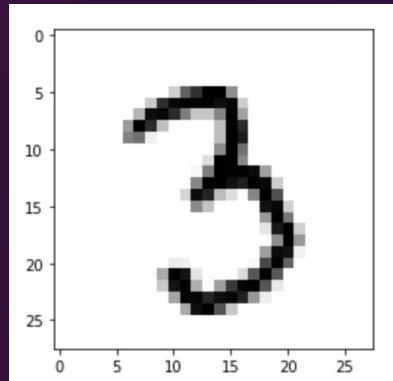


Corners &
Lines



Corners &
Lines

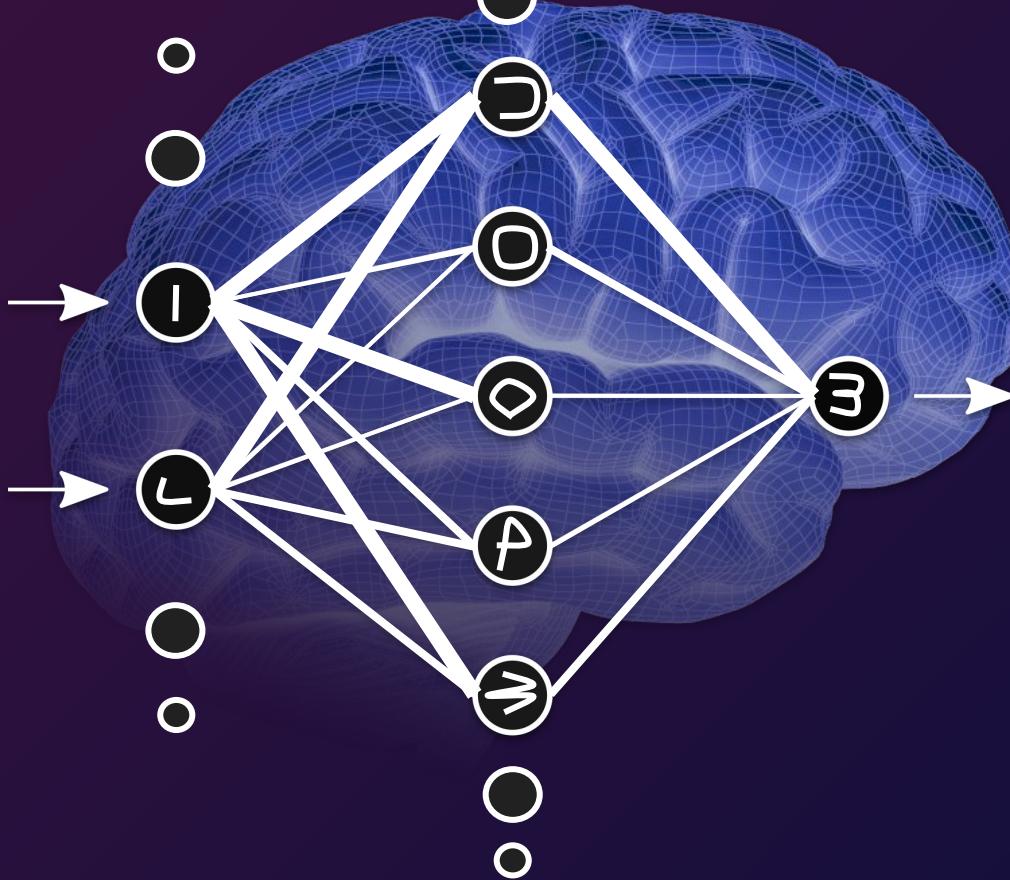
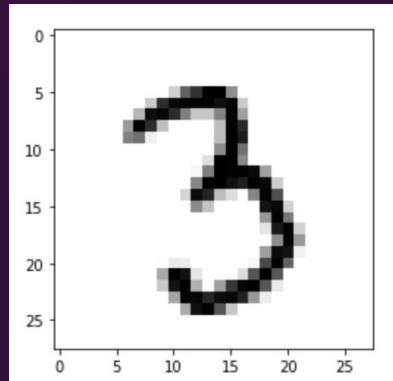
Shapes



Corners &
Lines

Shapes

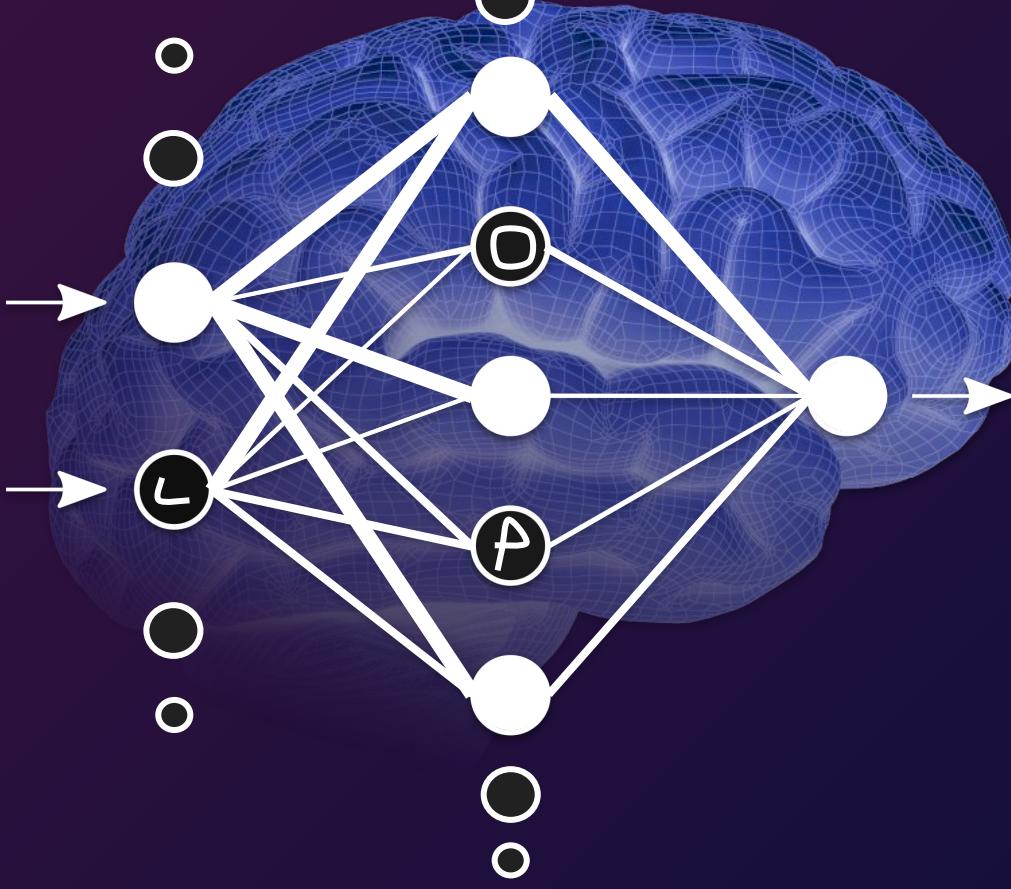
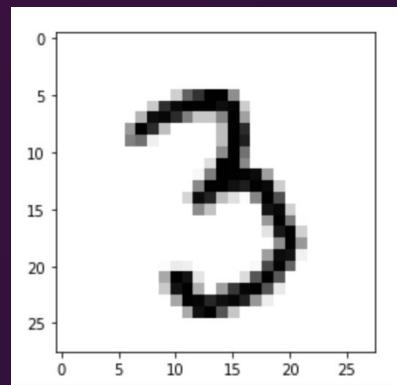
Number!



Corners &
Lines

Shapes

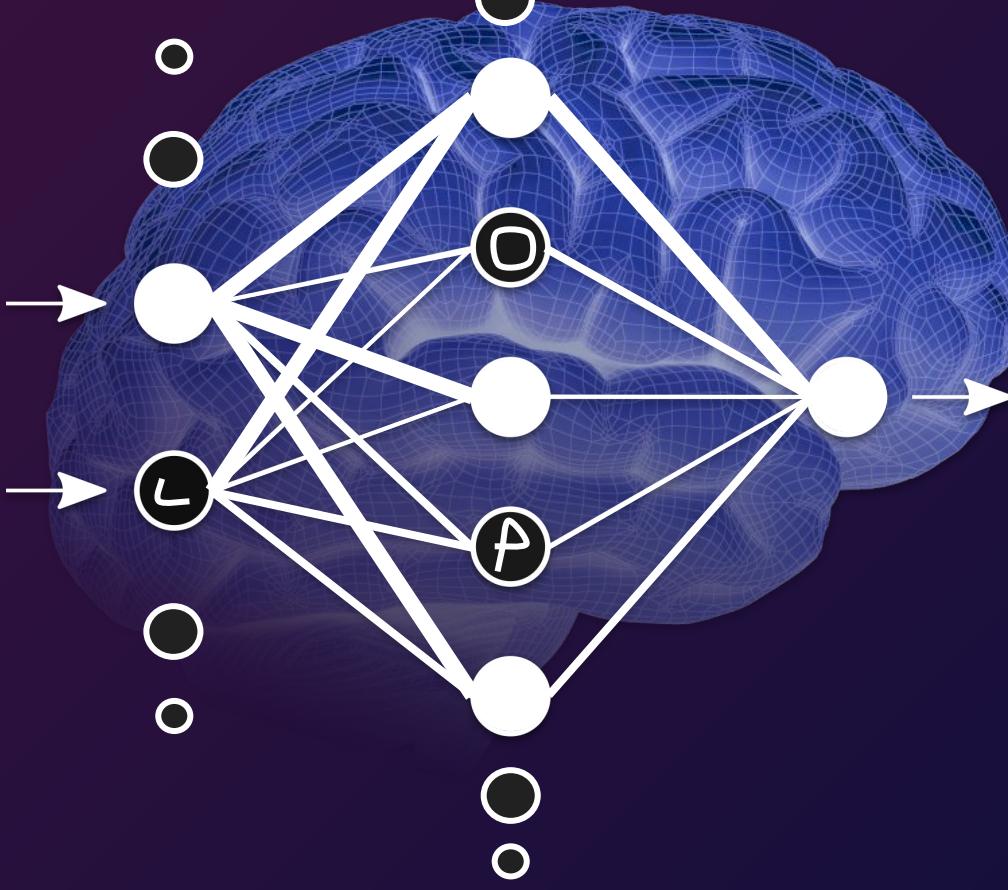
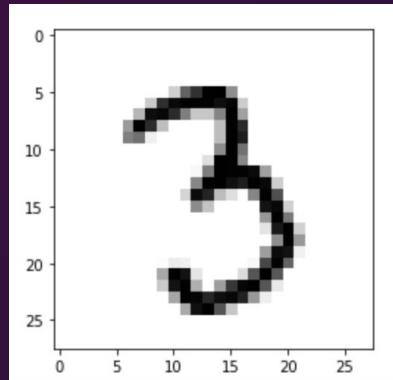
Number!



Corners &
Lines

Shapes

Number!



The Number is
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YouTube Originals

MindField

EPISODE 3



radius1	17.99
texture1	10.38
...	

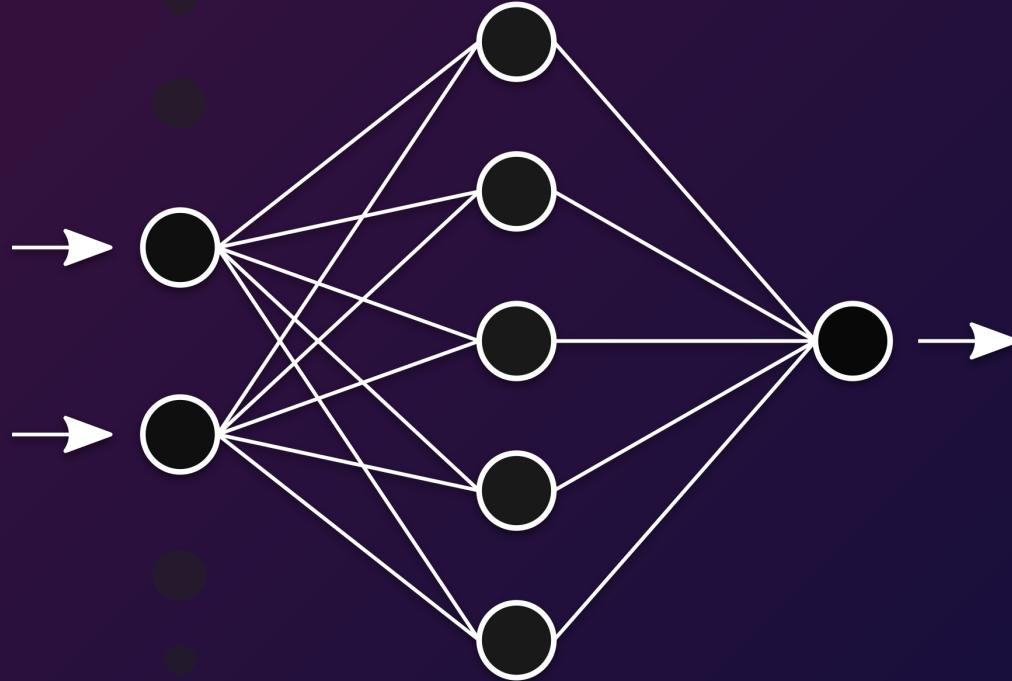


**Very Cool
Prediction
Machine**

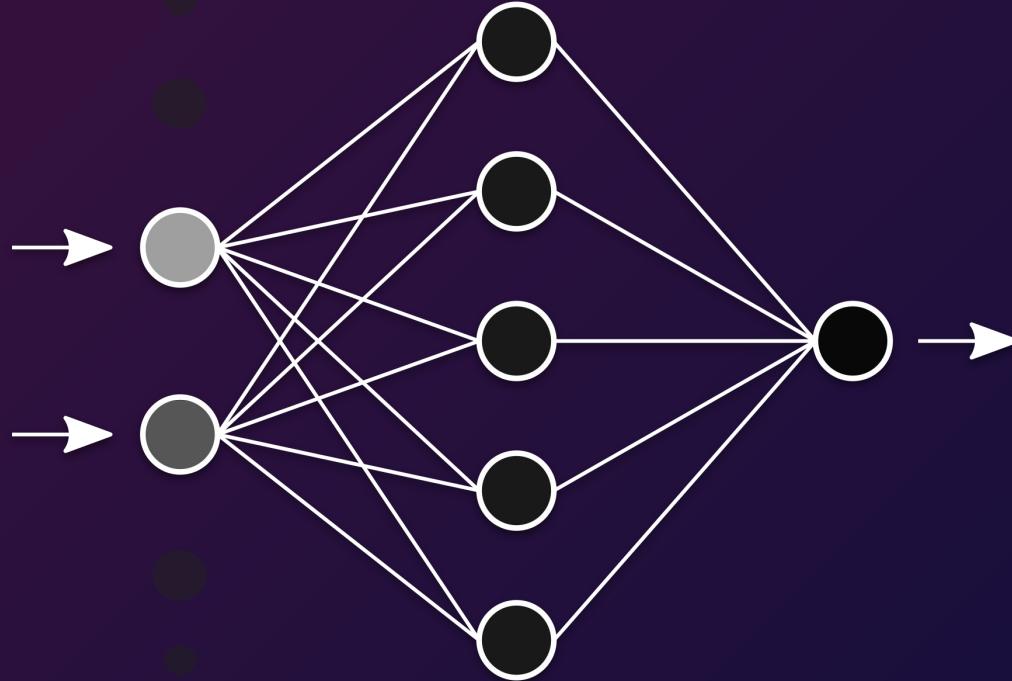
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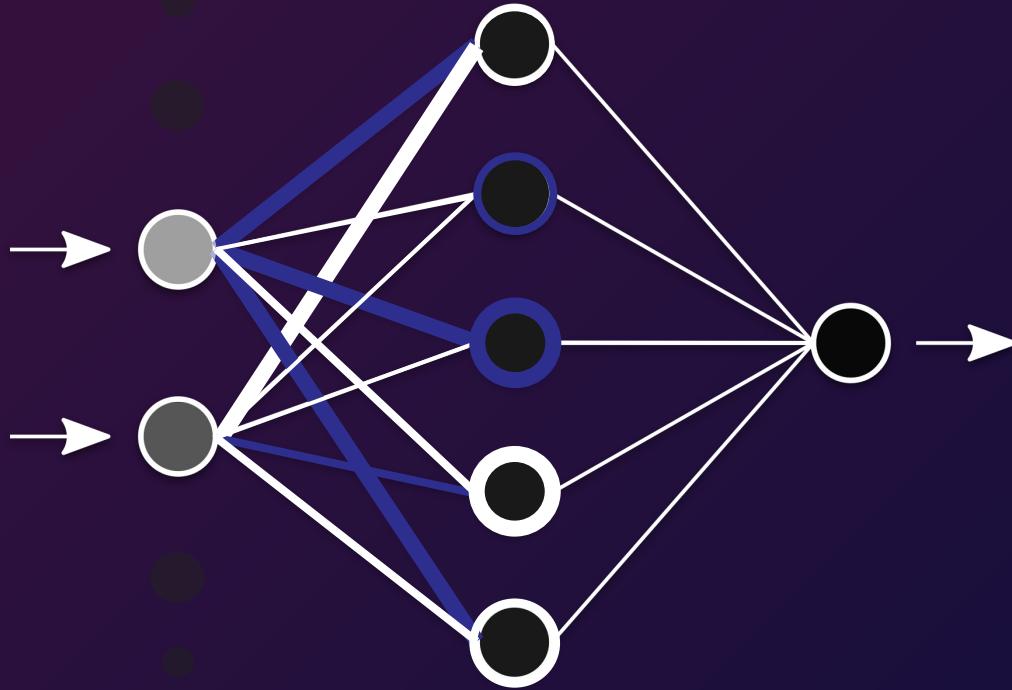
17.99
10.38
...



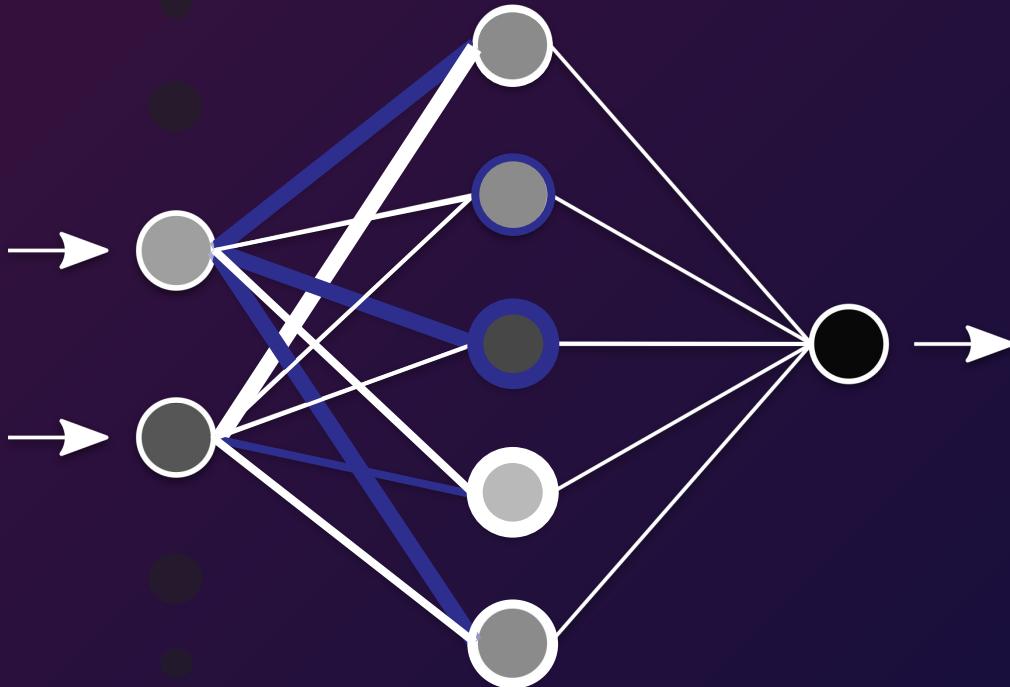
17.99
10.38
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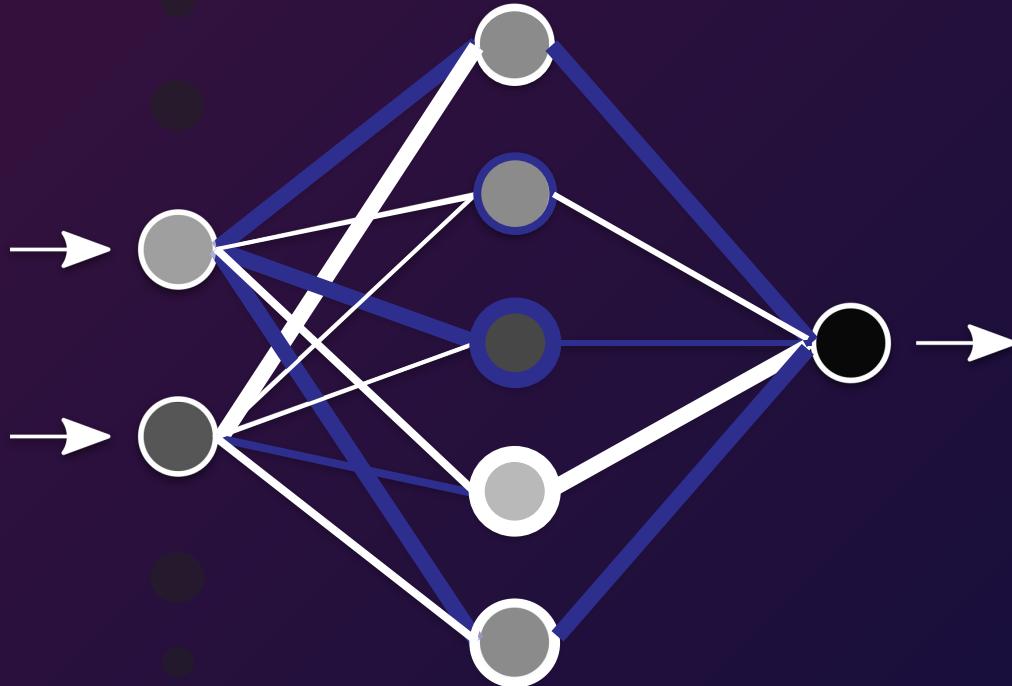
17.99
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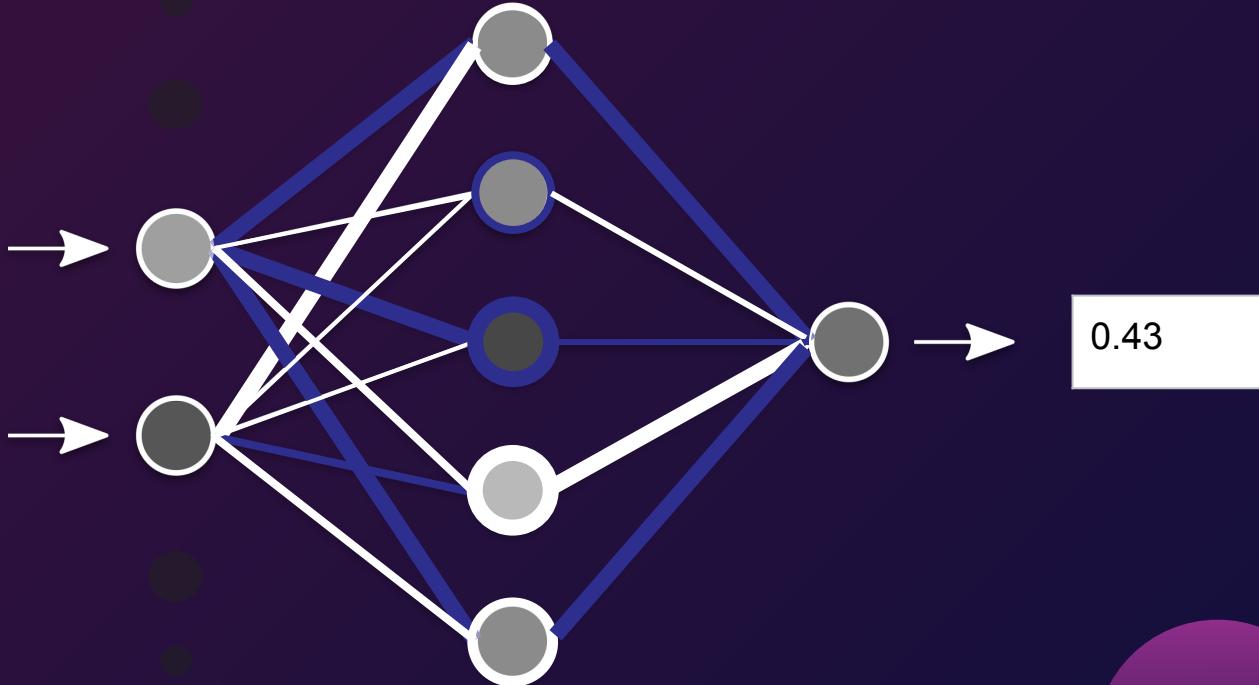
17.99
10.38
...



17.99
10.38
...



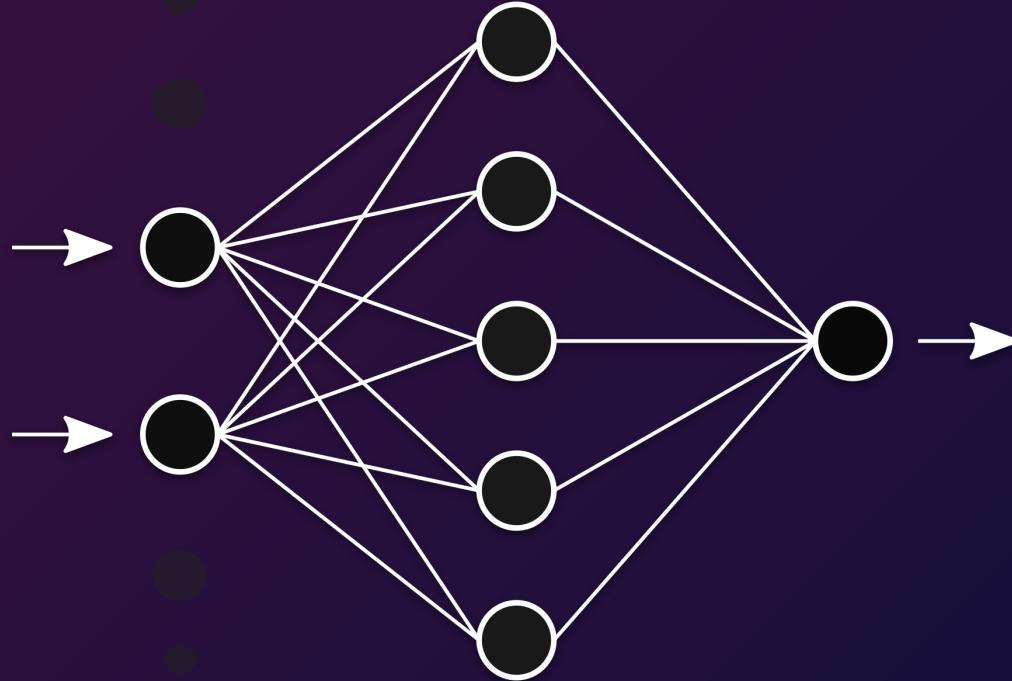
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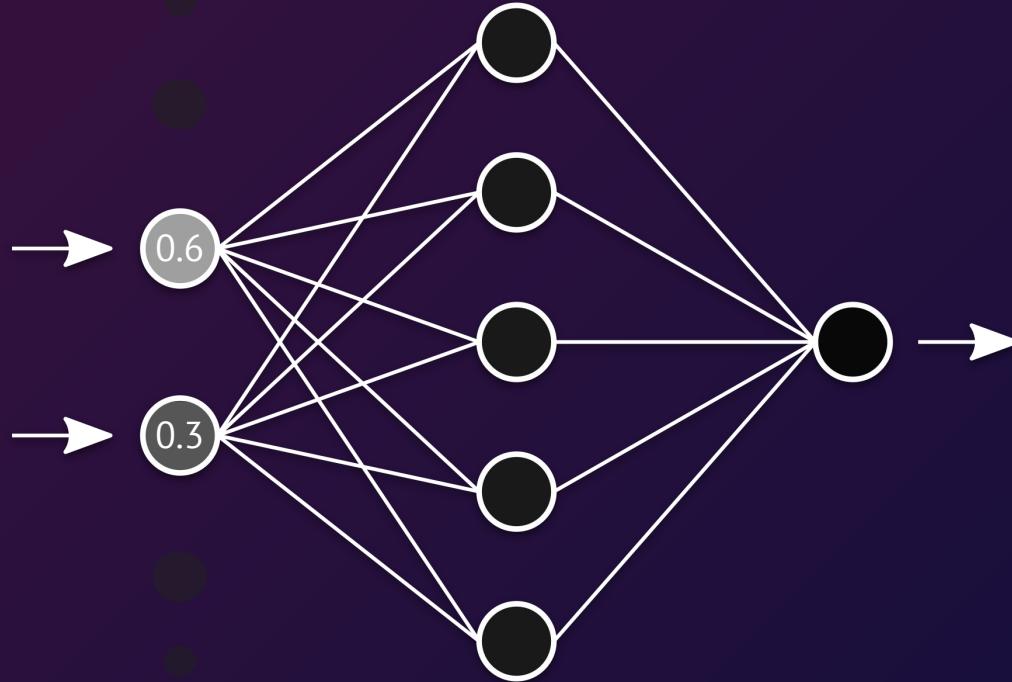
03

“OH...
IT’S MATH.”

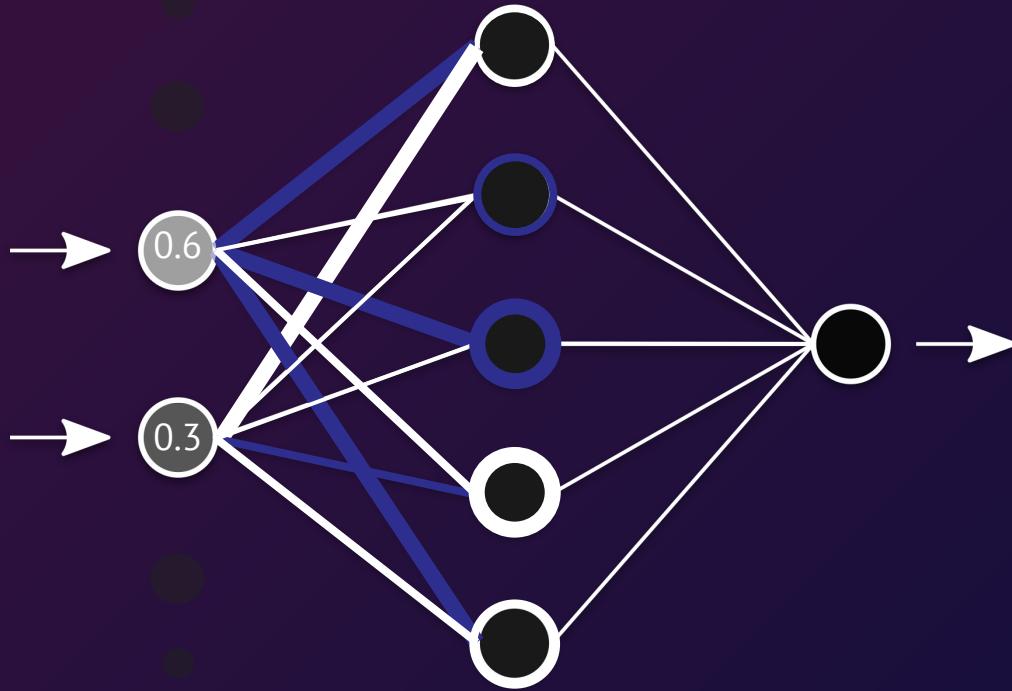
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10.38
...



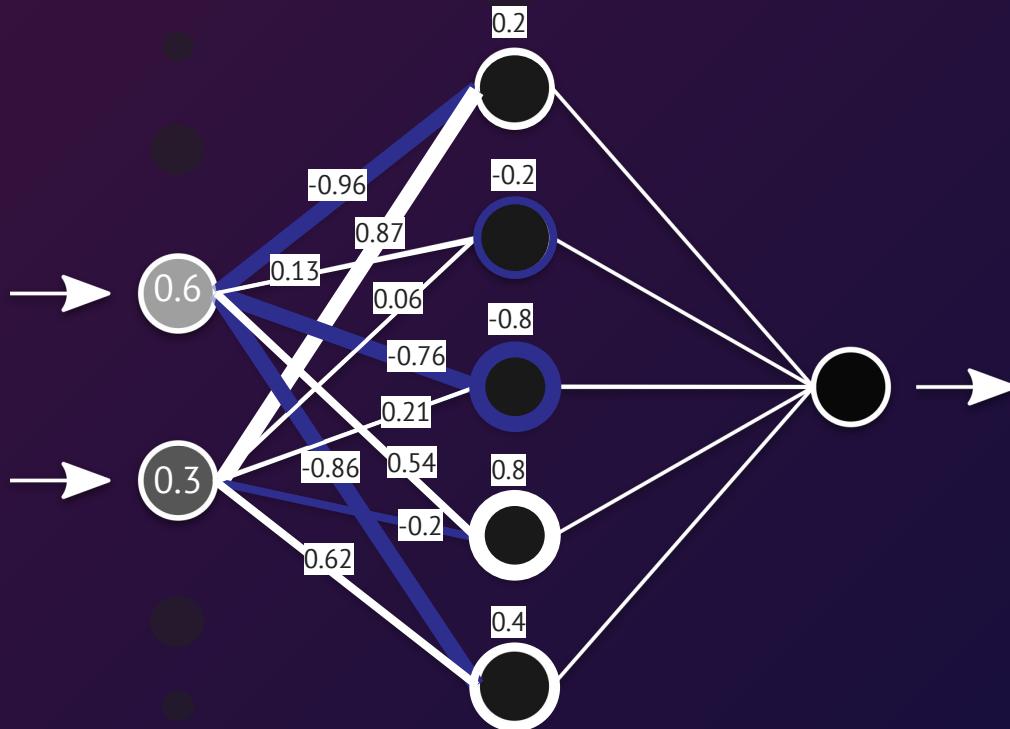
17.99
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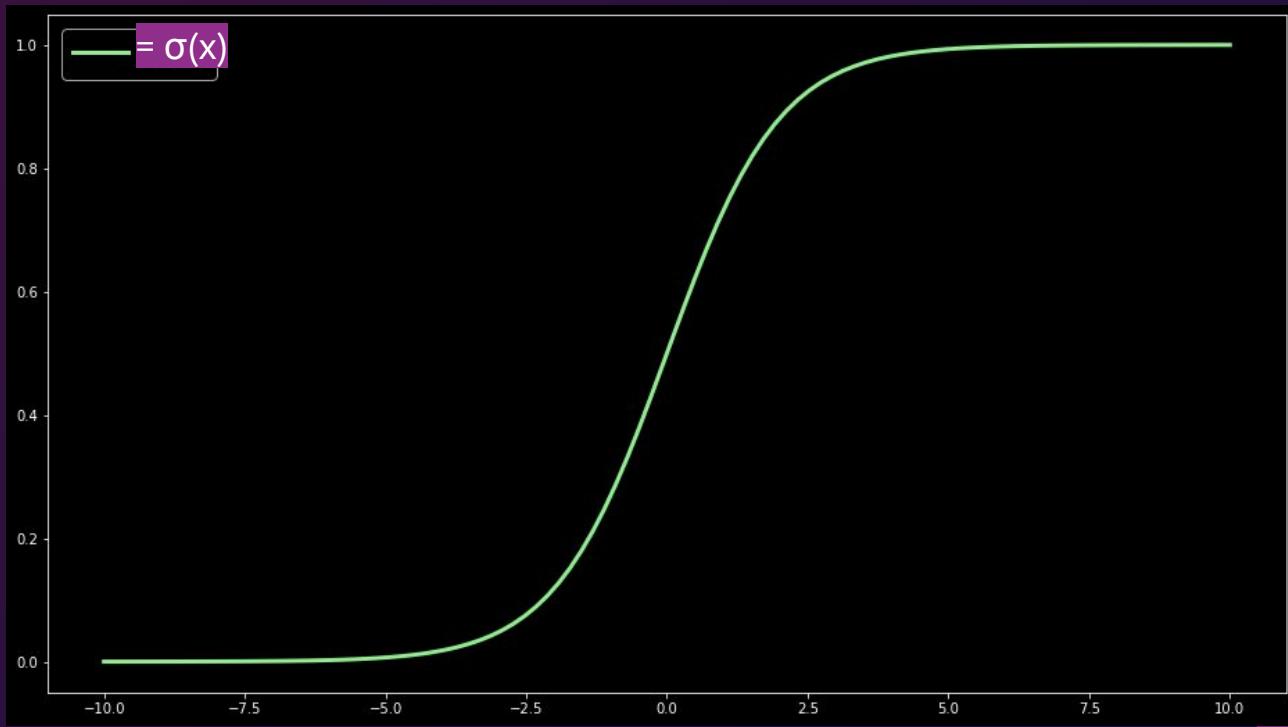


17.99
10.38
...

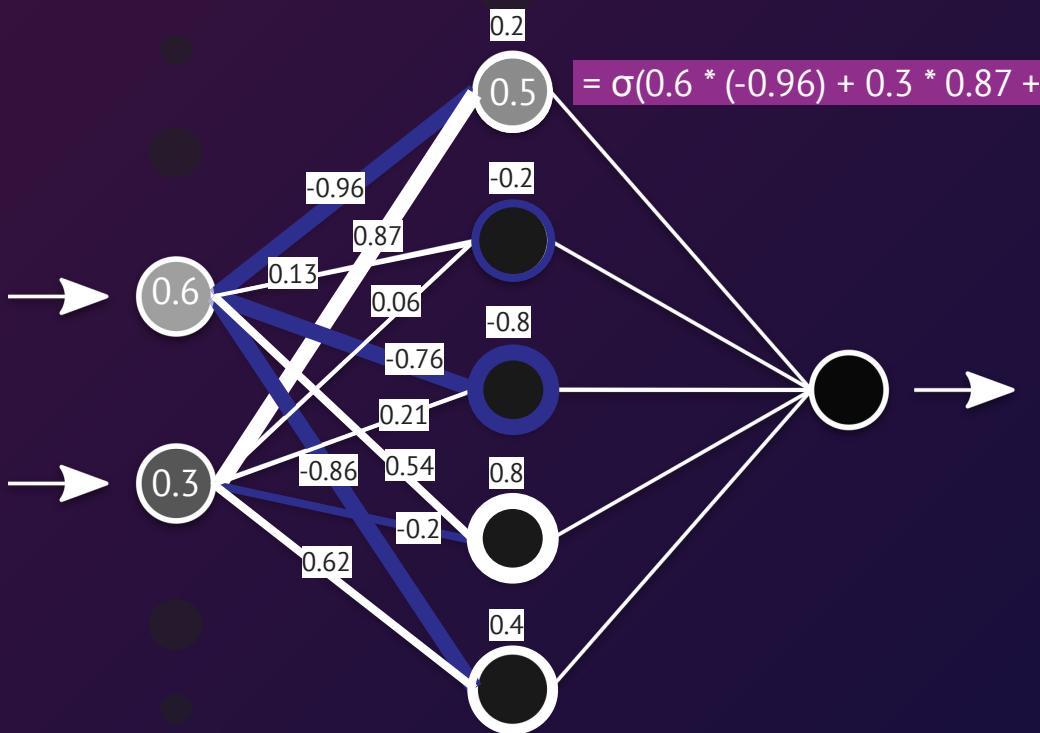


17.99
10.38
...



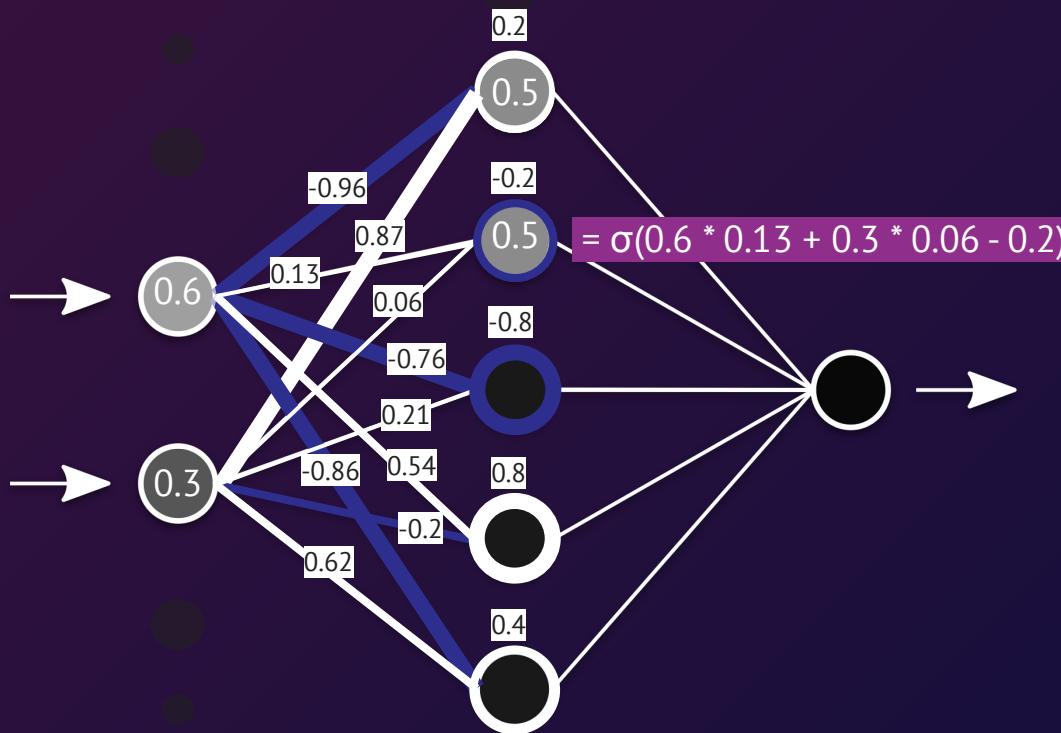


17.99
10.38
...

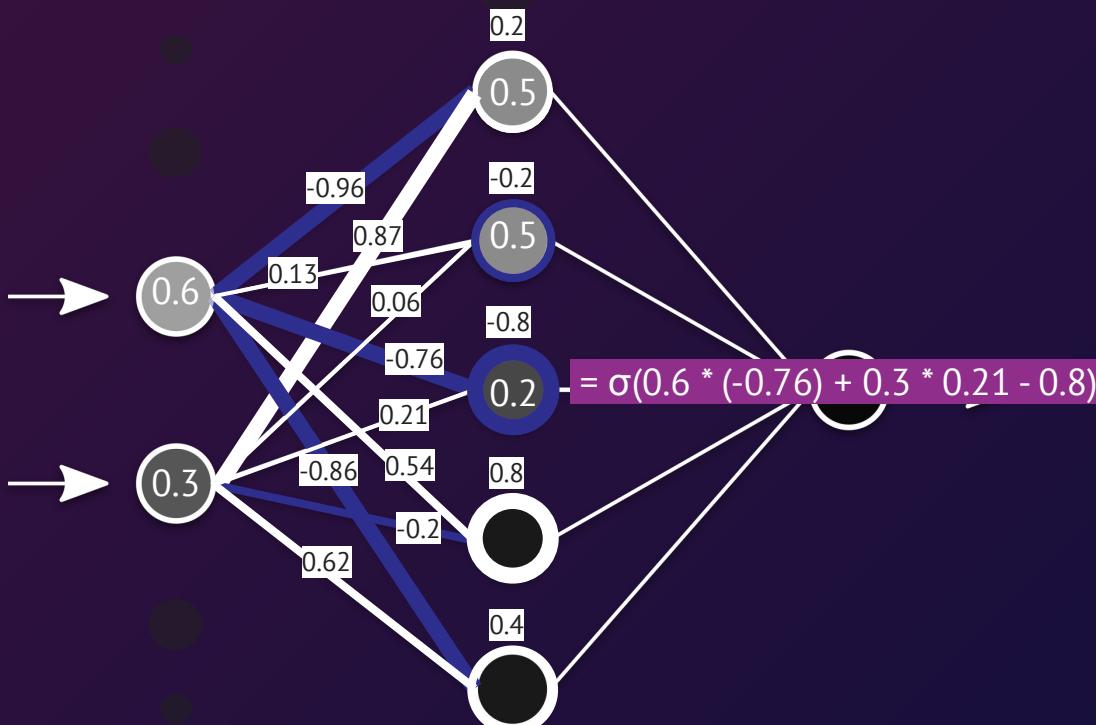


$$= \sigma(0.6 * (-0.96) + 0.3 * 0.87 + 0.2)$$

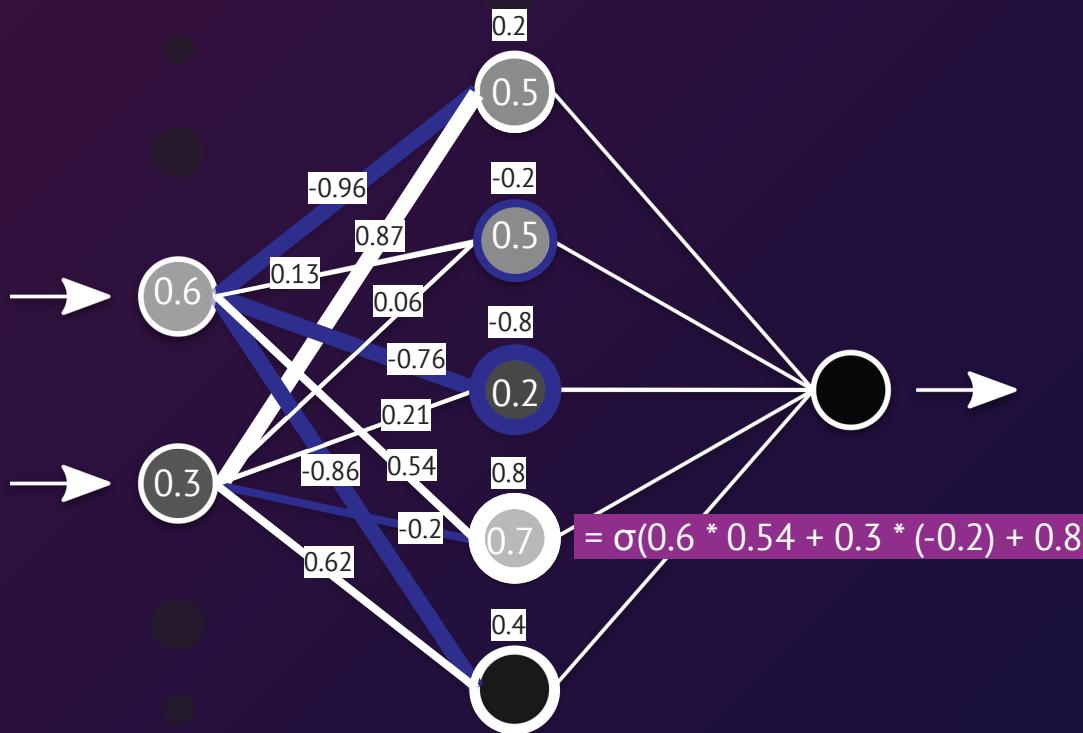
17.99
10.38
...



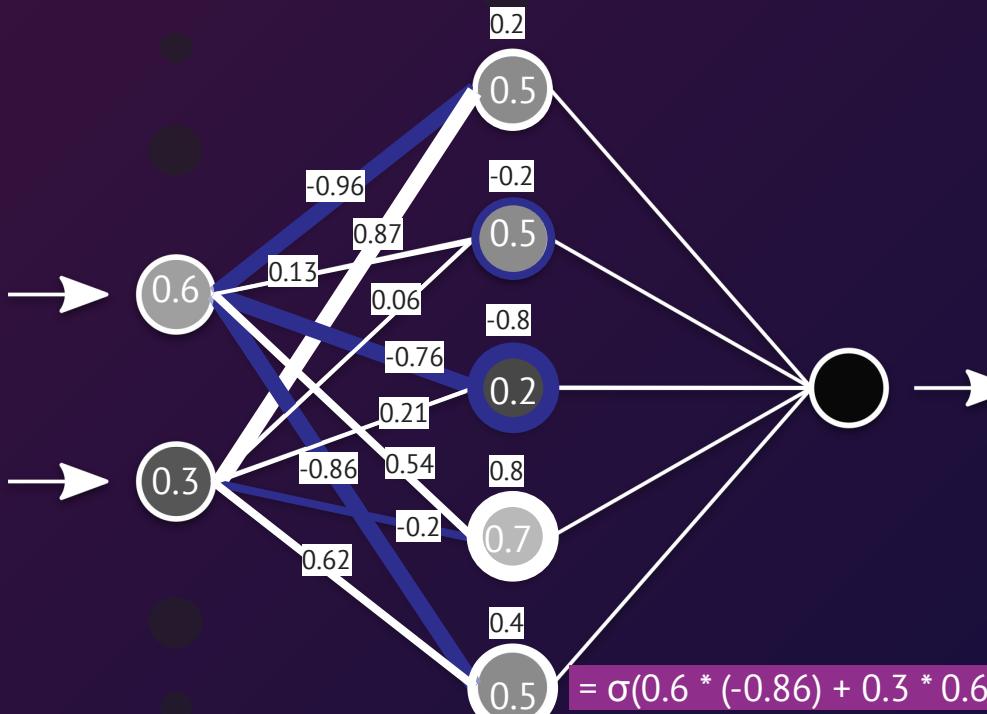
17.99
10.38
...



17.99
10.38
...

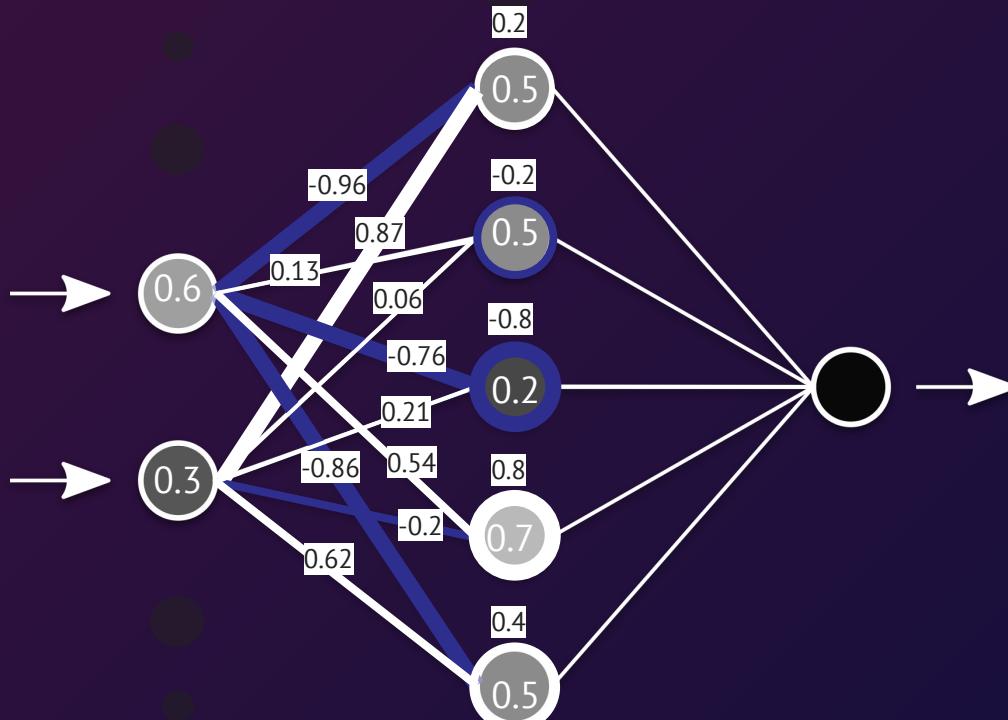


17.99
10.38
...

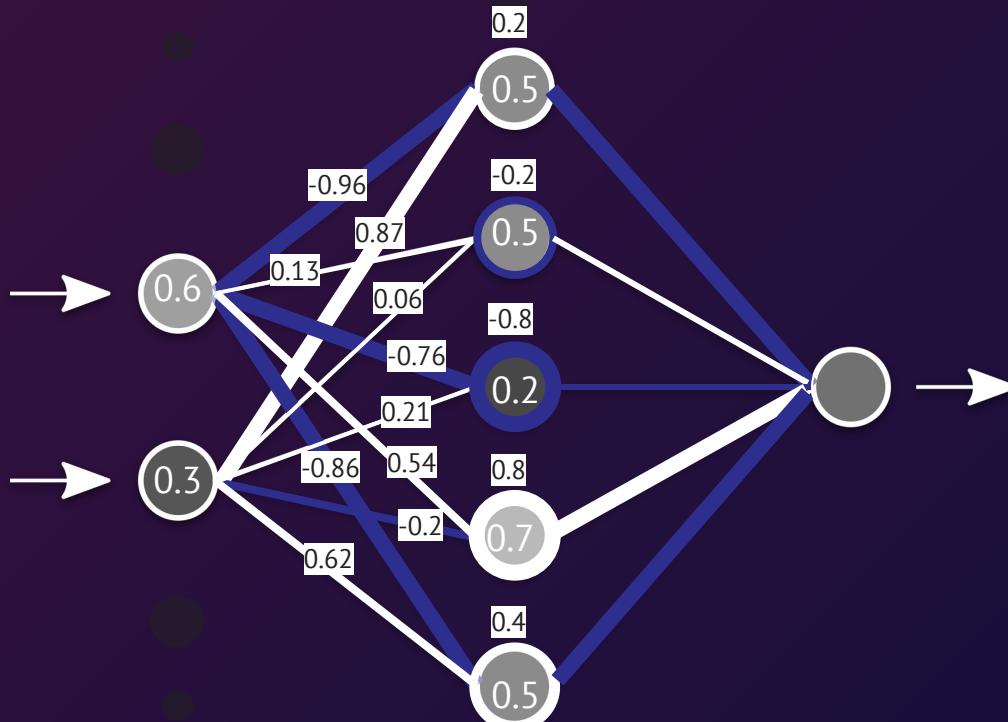


$$= \sigma(0.6 * (-0.86) + 0.3 * 0.62 + 0.4)$$

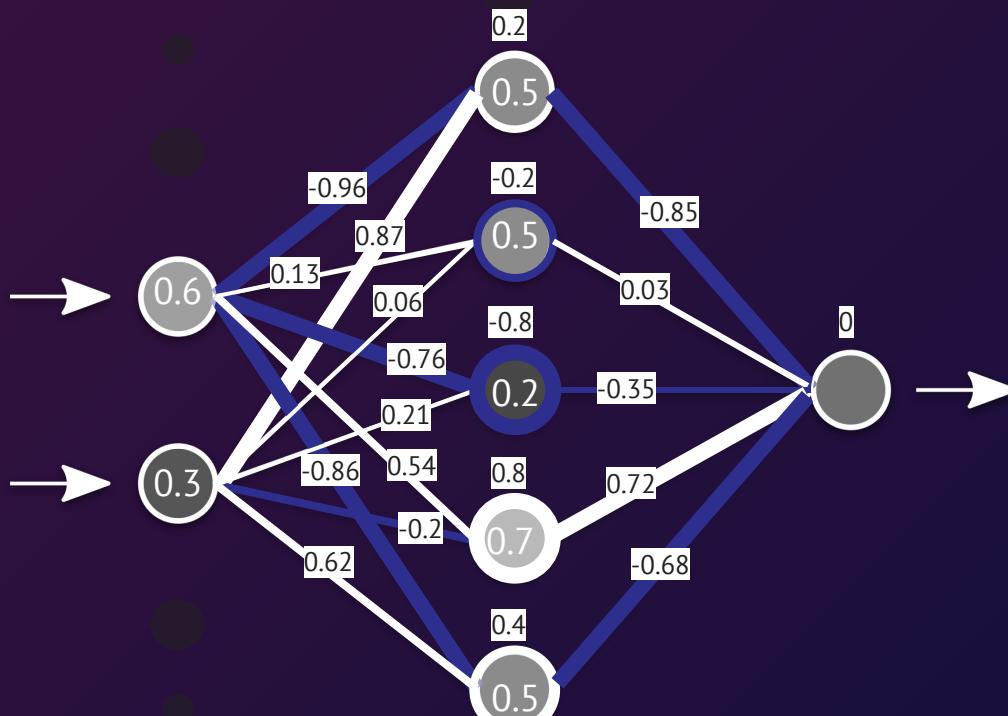
17.99
10.38
...



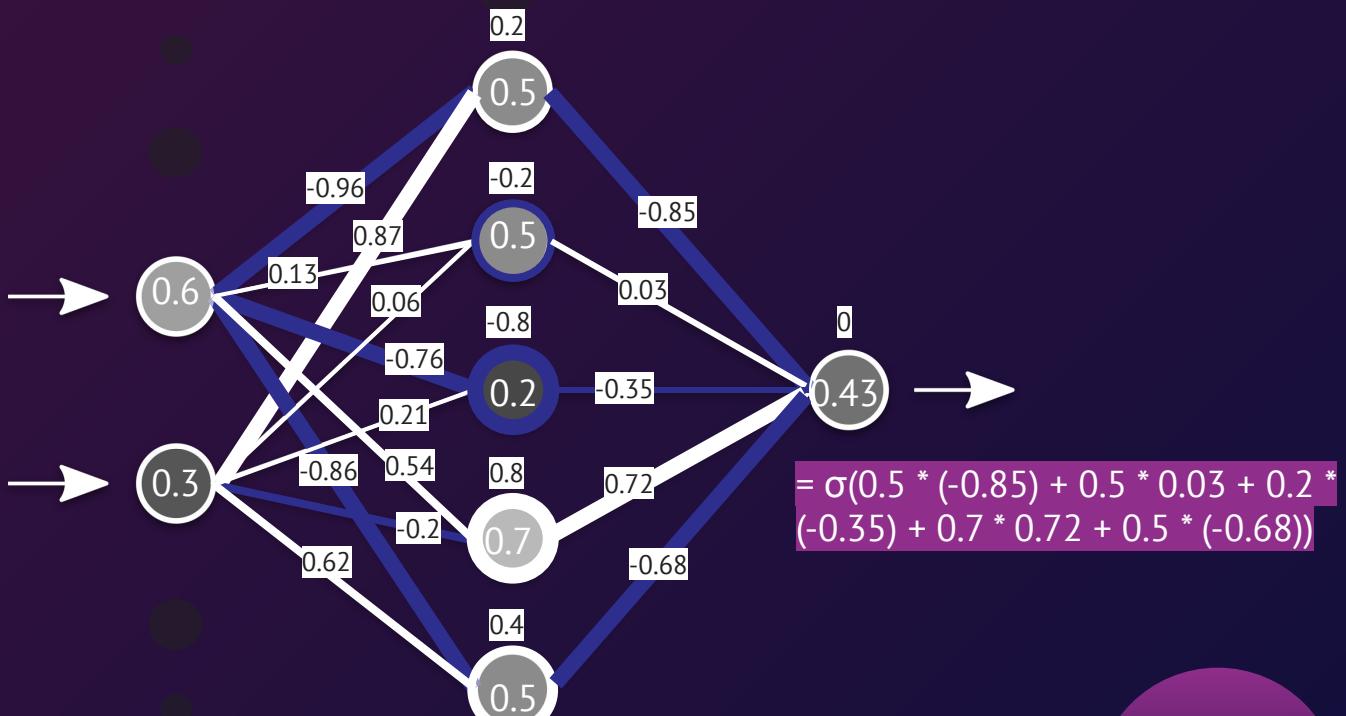
17.99
10.38
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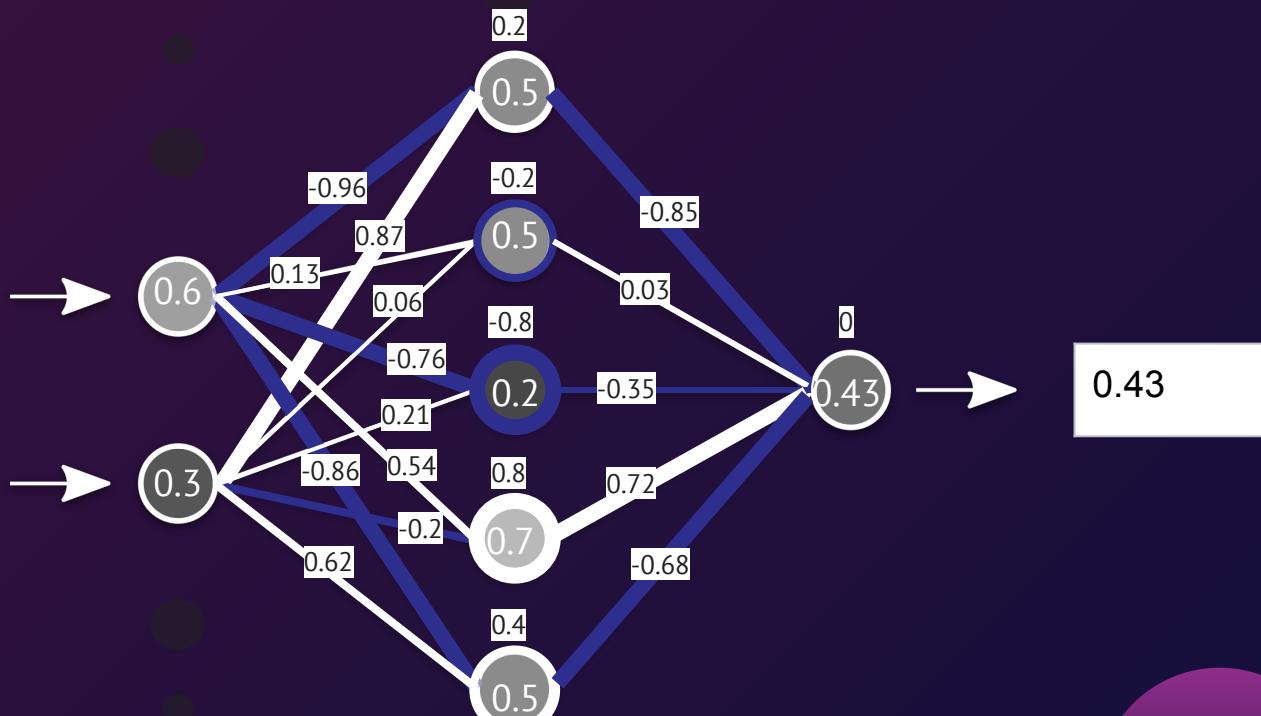
17.99
10.38
...



17.99
10.38
...



17.99
10.38
...



Output = σ (Input \times W + B)

Layer 1 = $\sigma($

0.6
0.3

\times

Input

W

B

-0.96	0.87
0.13	0.06
-0.76	0.21
0.54	-0.2
-0.86	0.62

$+$

0.2
-0.2
-0.8
0.8
0.4

)

Output = σ (

Layer 1

0.5
0.5
0.2
0.7
0.5

x

W

-0.85
0.03
-0.35
0.72
-0.68

B

+)

Okay, but how do we come up with the weights and biases?

We don't! The machine "learns".

BASIC TRAINING PROCESS

STEP 1

Initialize the weights and biases

STEP 2

Test it on a bunch of training data!

STEP 3

Calculate the score (the difference)

STEP 6

REPEAT!

STEP 5

Updates the weights and biases towards a better score

STEP 4

Calculate the differences for each weight and bias

Resources (GitHub)

<https://github.com/ConnorUsaty/MacAIEducation2023>

Today's Kahoot!

<https://createkahootitdetails/3ae4c6b9-4314-4e0f-81e3-68dc710ff2ec>

Thank you for attending the Intro to Neural Networks: Dive into the Brain of AI workshop

