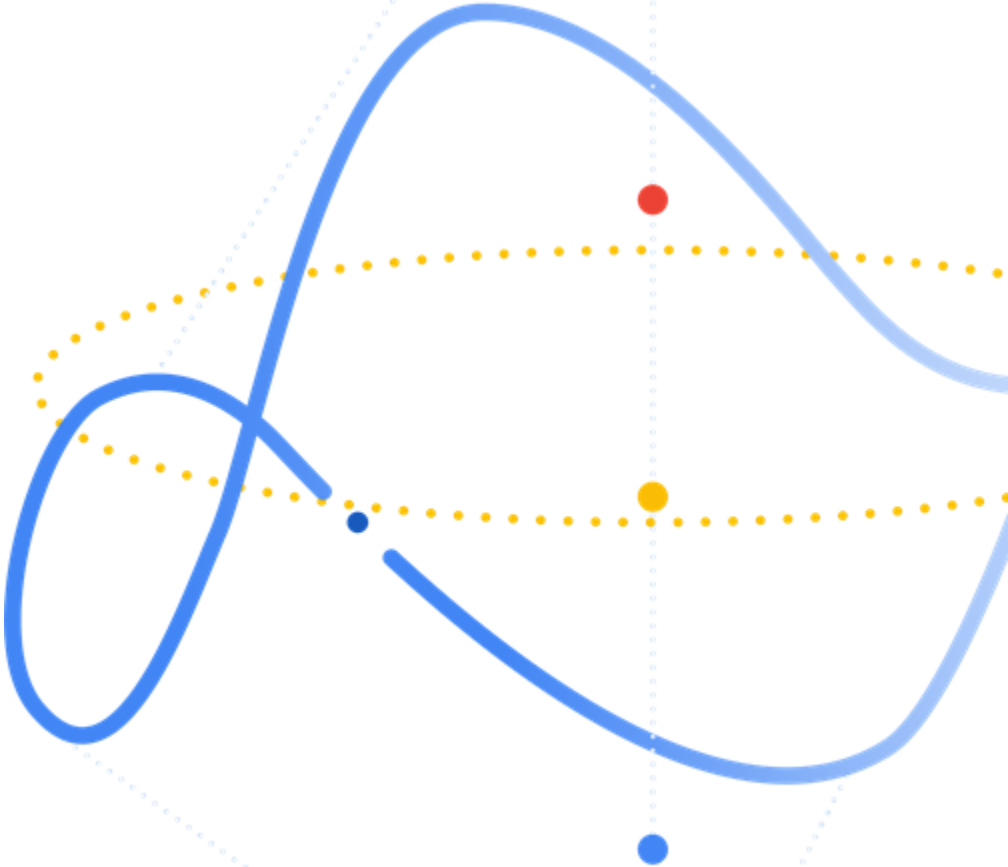
Neural Networks



Google AI

Crowdsource
By Google

Get your hands dirty!

https://www.tensorflow.org/js/demos

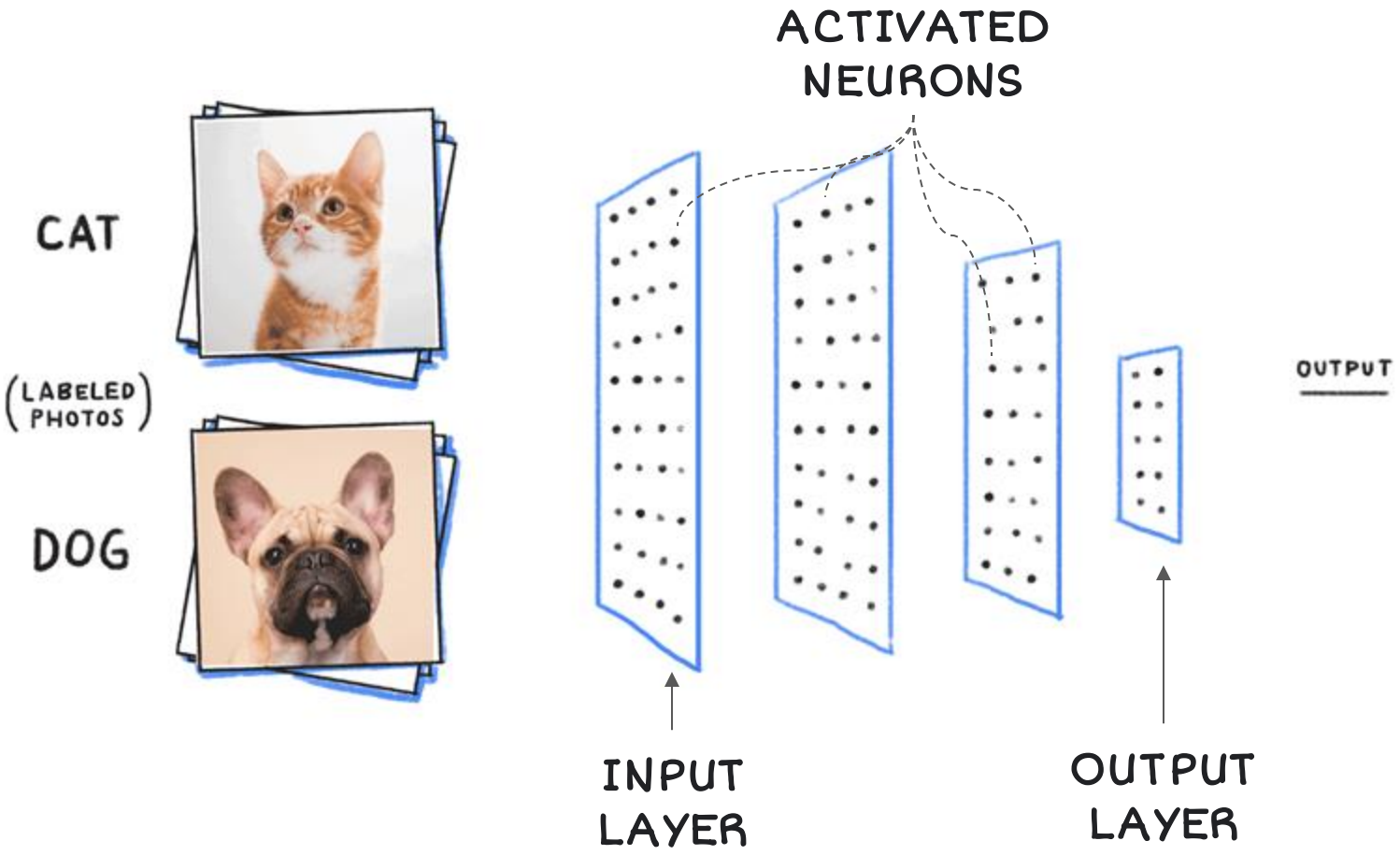
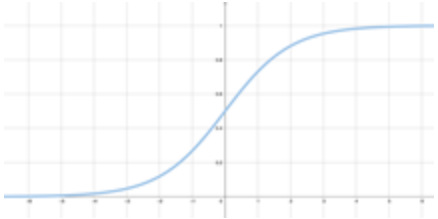


Image adapted from becominghuman.ai by Venkatesh Tata

Common Activation Functions

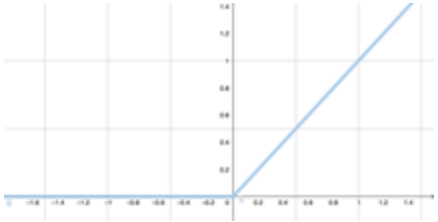
Sigmoid activation function converts the weighted sum to a value between **0** and **1**.

$$F(x) = \frac{1}{1 + e^{-x}}$$

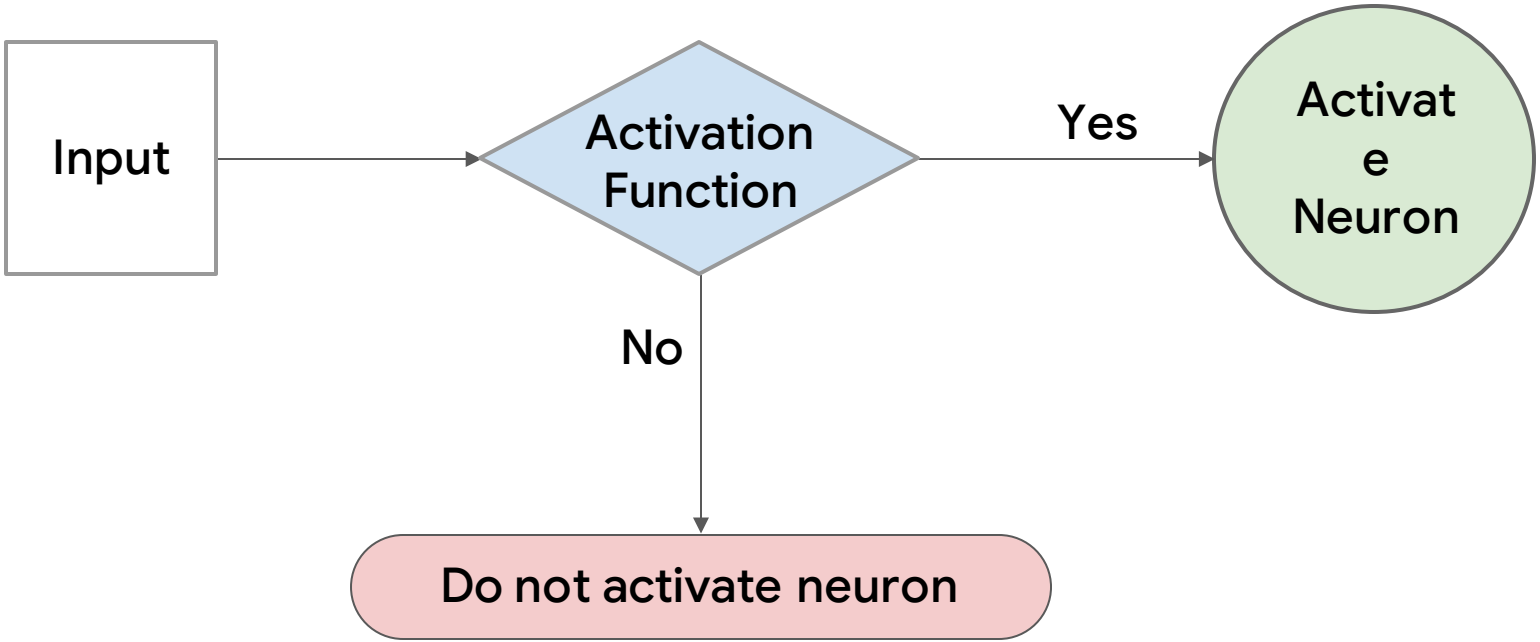


ReLU (Rectified Linear Unit) activation function often works a little better than a smooth function like the sigmoid, while also being significantly easier to compute.

$$F(x) = max(0, x)$$



Perception of Artificial Neuron with ReLU



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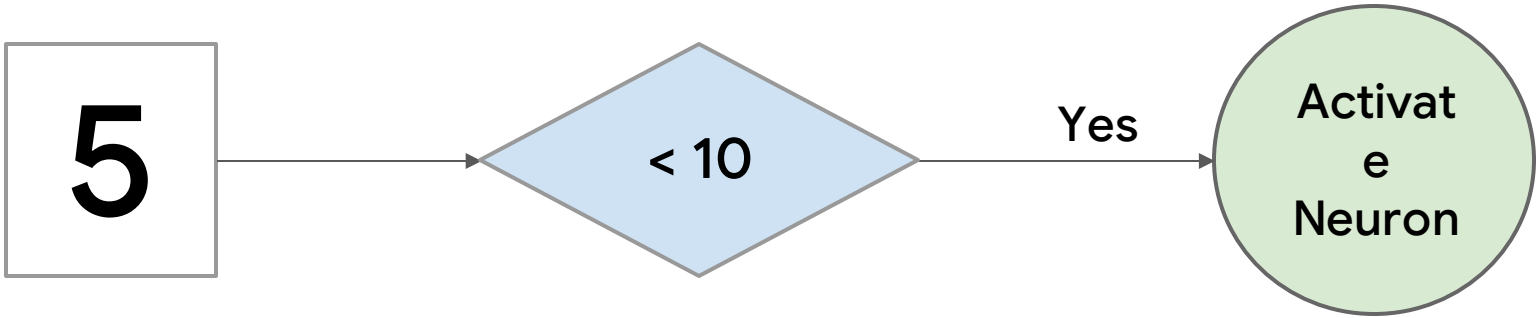
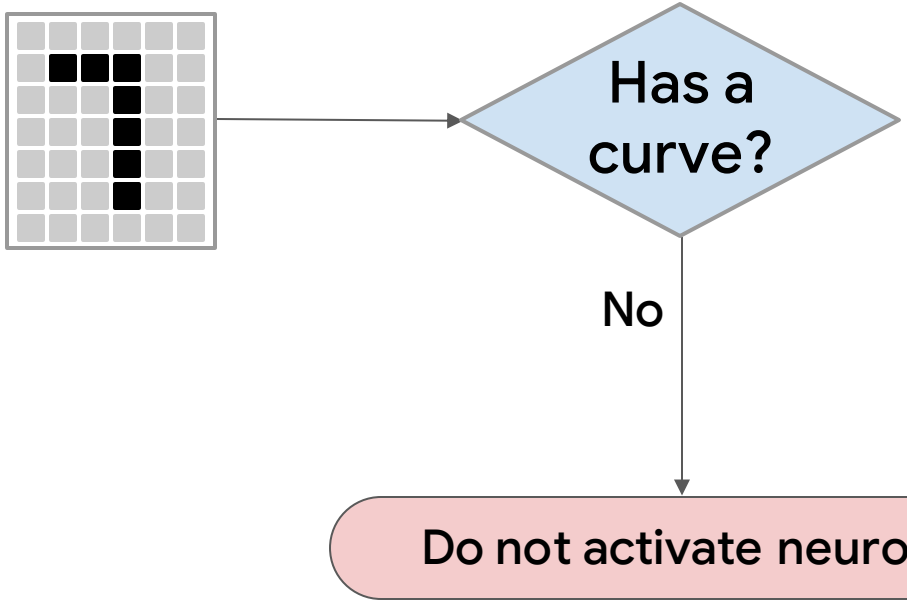


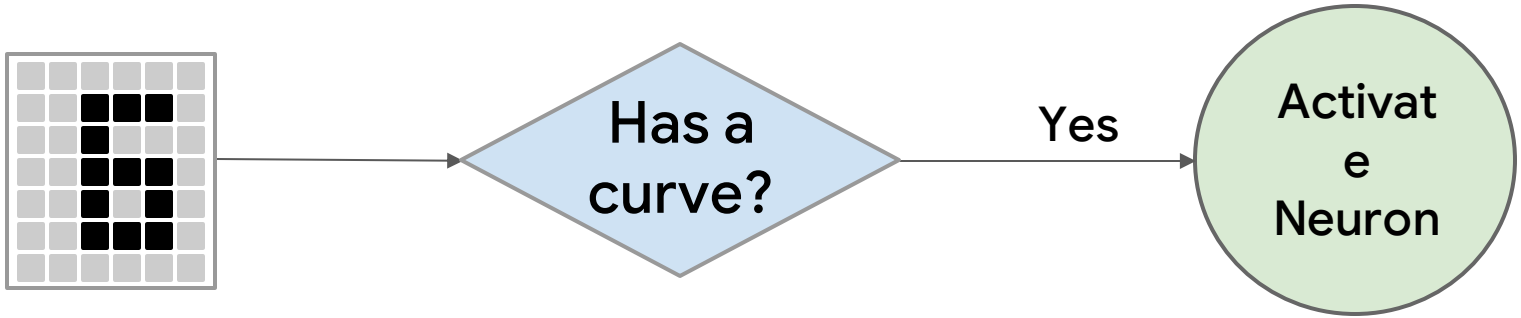
Do not activate neuron

Perception of Artificial Neuron with ReLU



Activat
e
Neuron

Perception of Artificial Neuron with ReLU

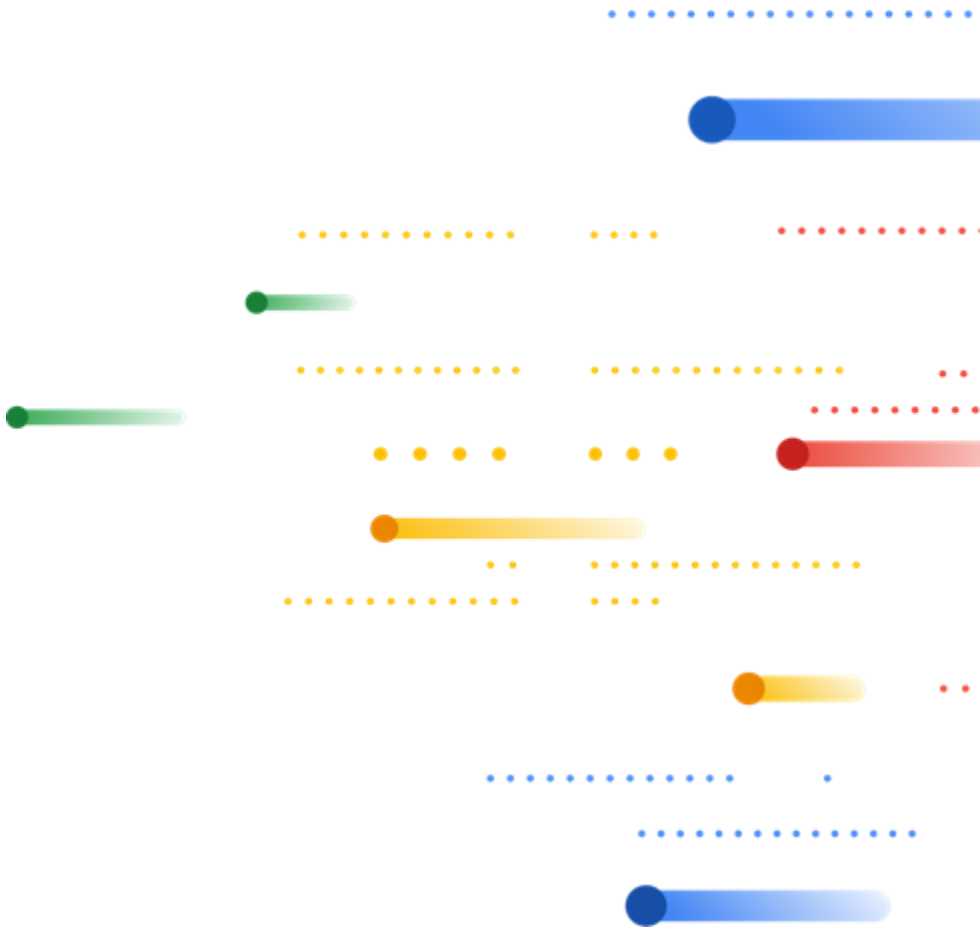


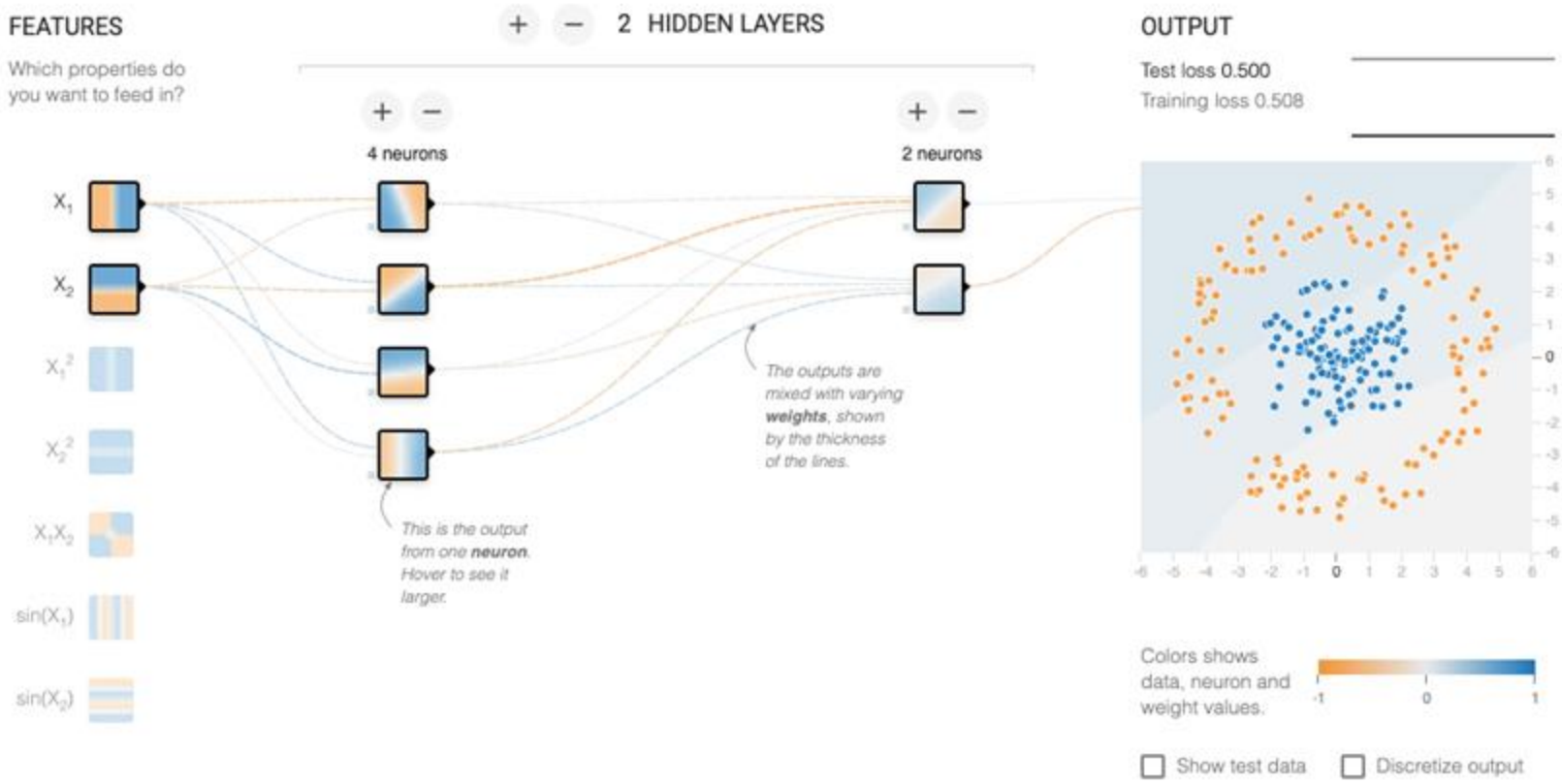
Do not activate neuron

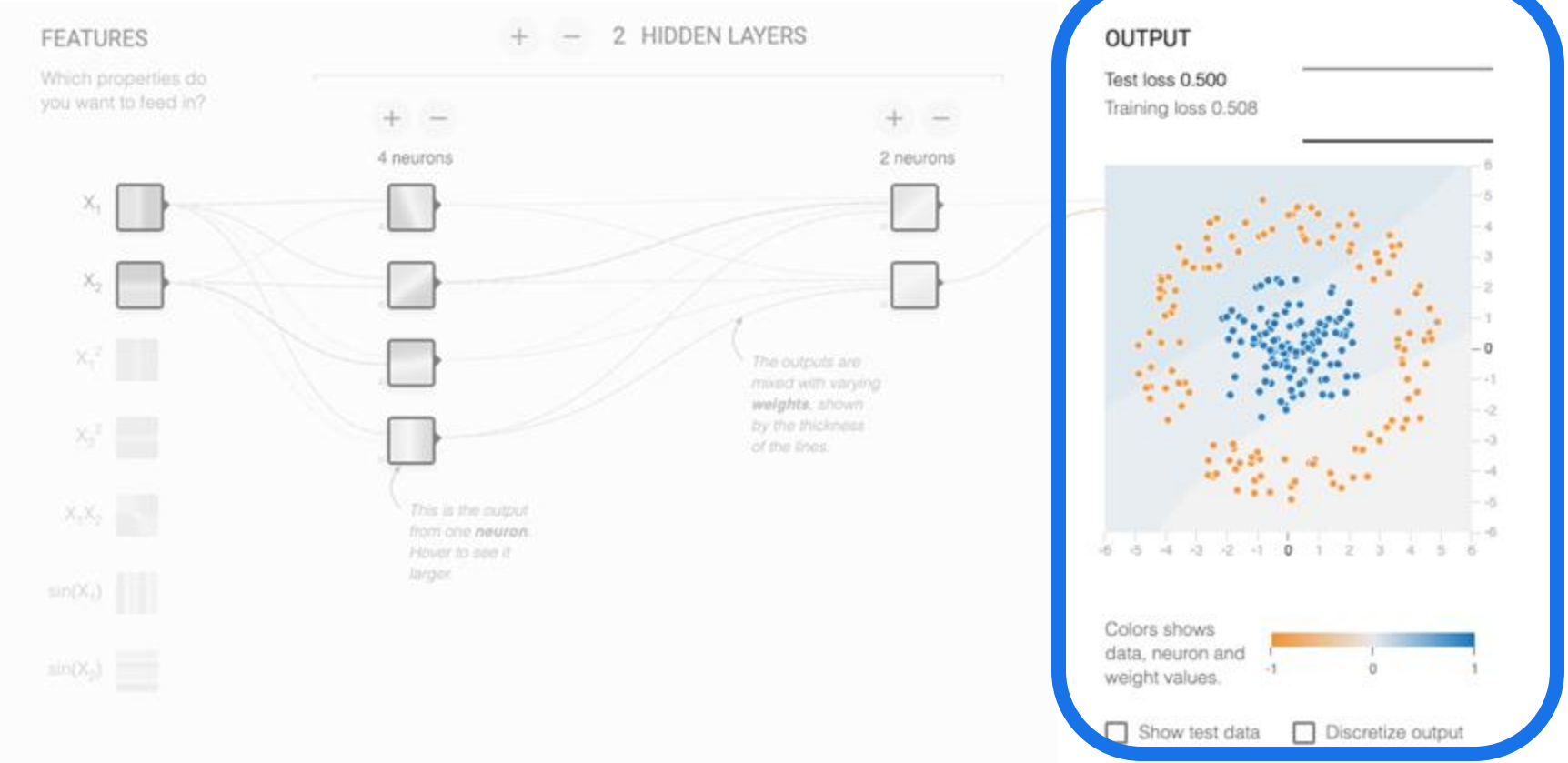
Image adapted from [Distill.pub article](#) by Chris Olah et al.

Let's Play

Go to
https://playground.tensorflow.org/
https://cs.stanford.edu/people/karpathy/convnetjs/




FEATURES
Which properties do you want to feed in?
+ − 2 HIDDEN LAYERS
4 neurons
2 neurons
X1
X2
X1²
X2²
X1X2
sin(X1)
sin(X2)
This is the output from one neuron. Hover to see it larger.
The outputs are mixed with varying weights, shown by the thickness of the lines.
OUTPUT
Test loss 0.500
Training loss 0.508
Colors shows data, neuron and weight values.
-1
0
1
Show test data
Discretize output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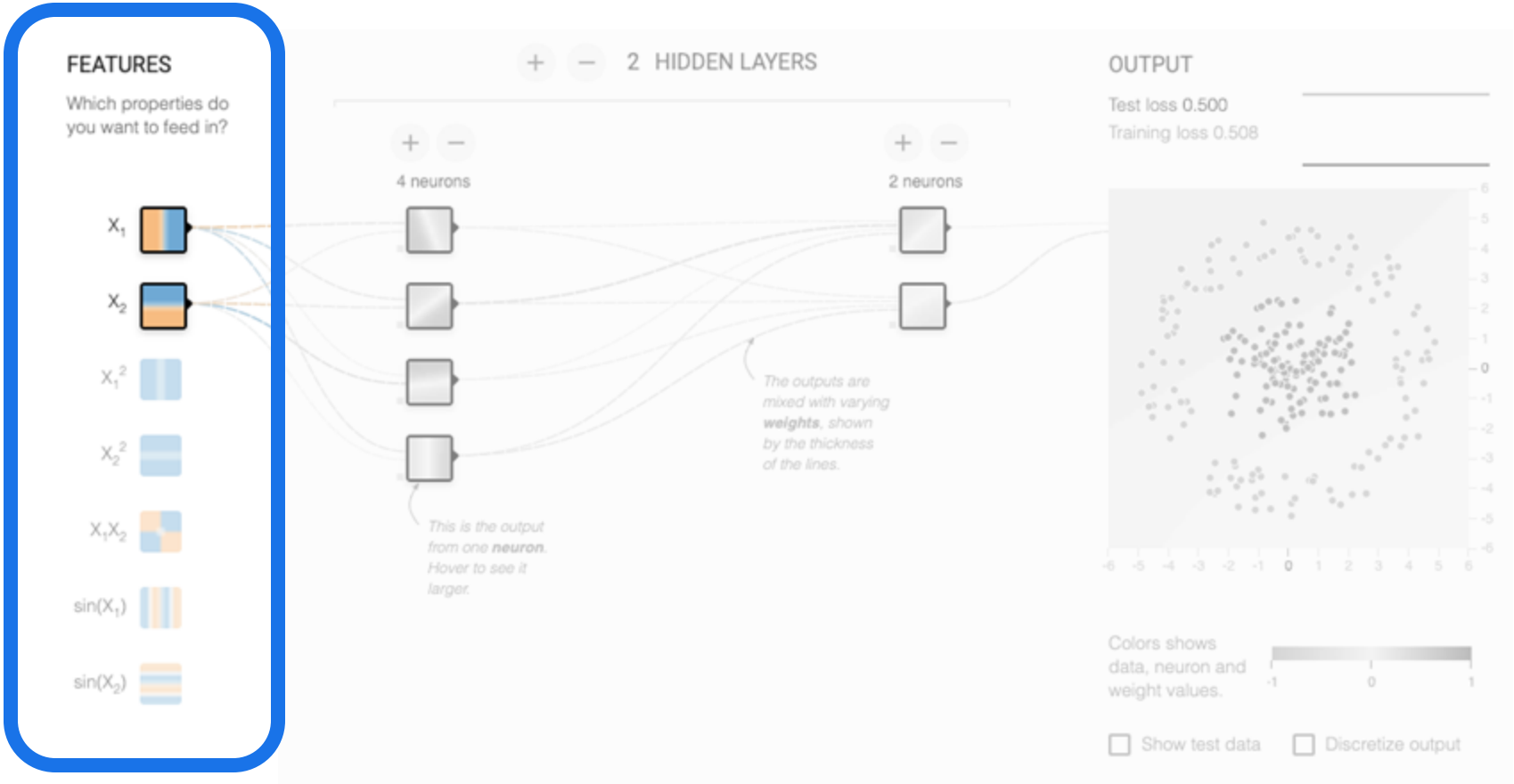

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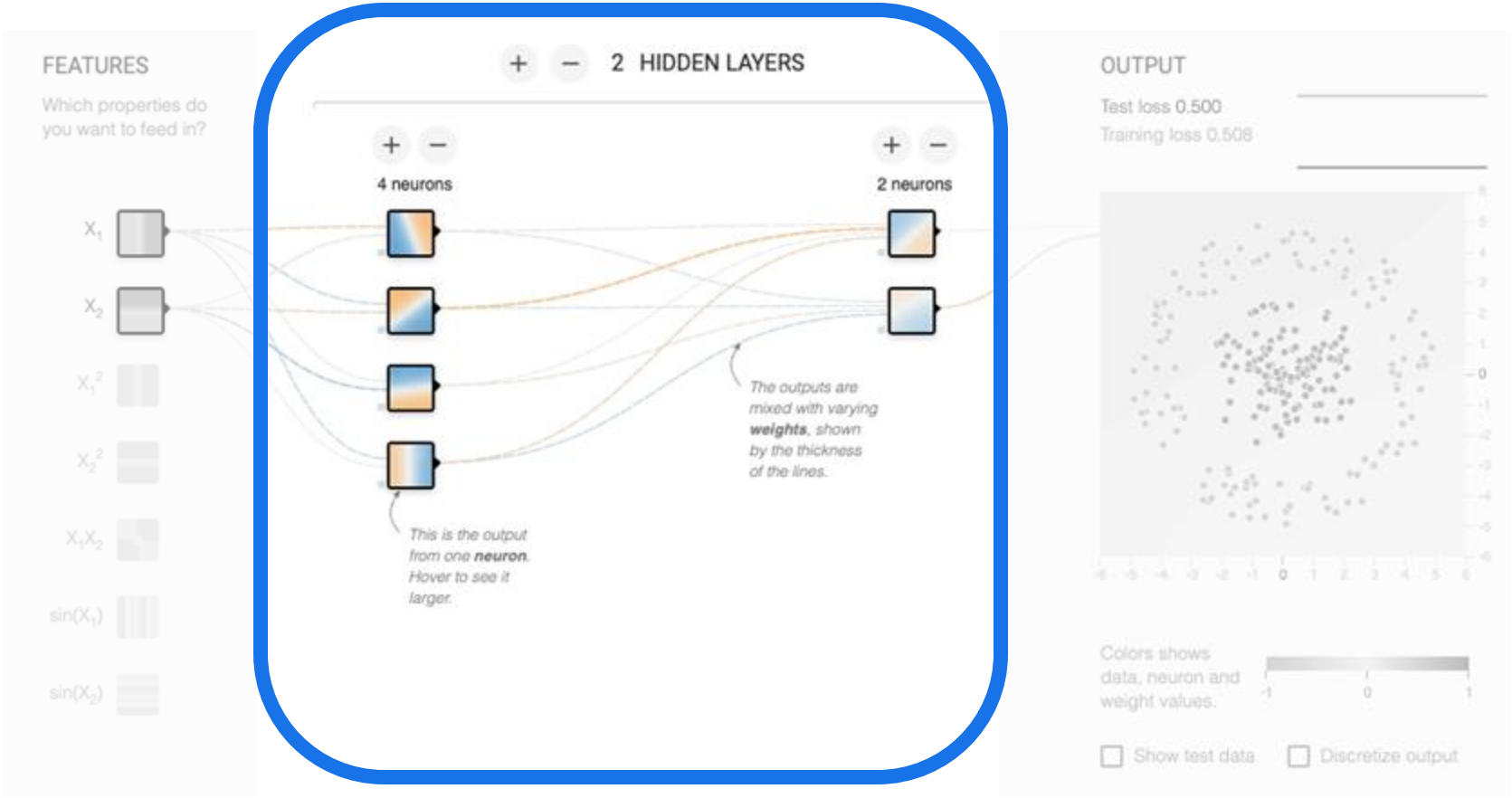
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