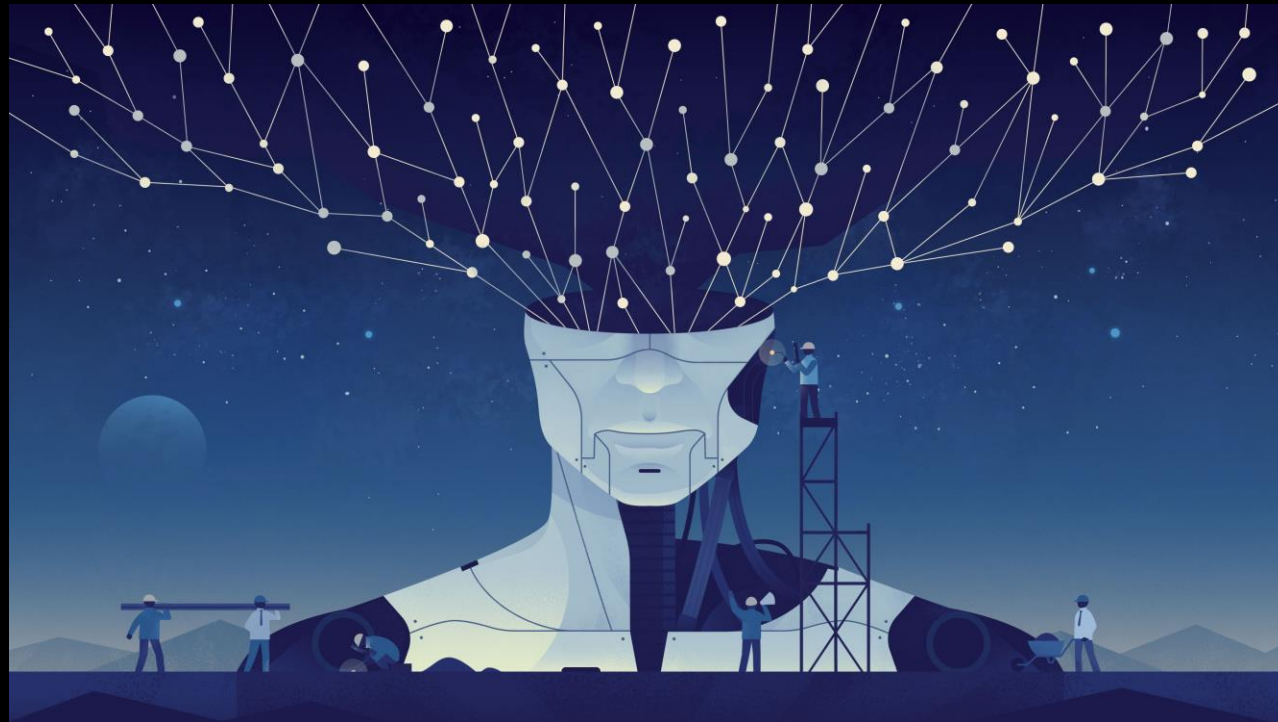


# A very brief introduction to **Neural Networks**



Picture by: <https://www.quantamagazine.org/foundations-built-for-a-general-theory-of-neural-networks-20190131/>

# What are Neural Networks?

Network of neurons.

Mathematical tool able to map heavily non linear functions.

“Mimicks how the human brain works”.

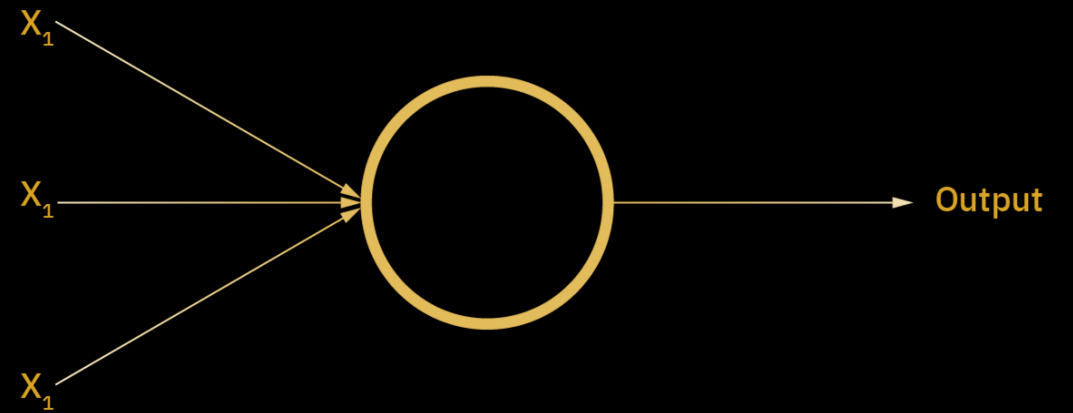
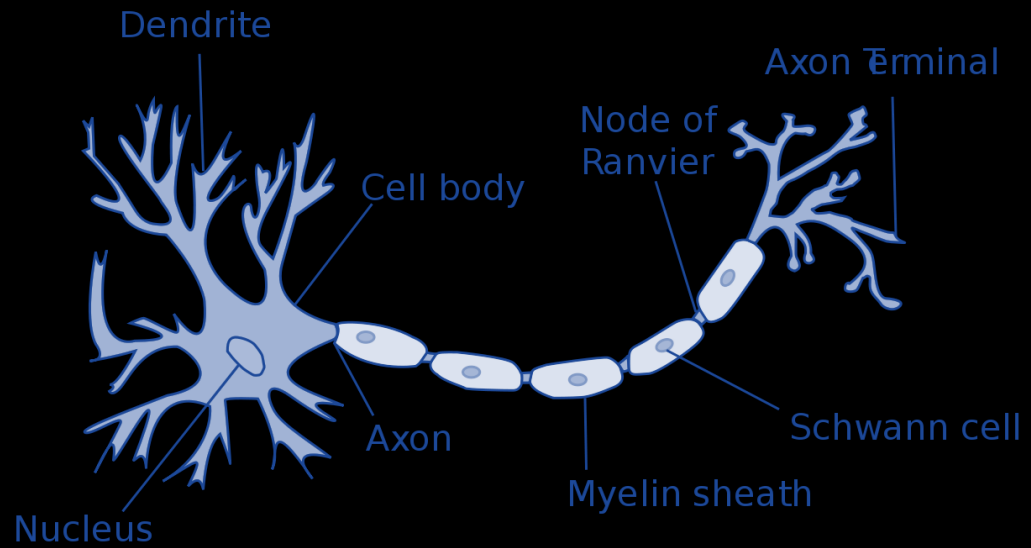
# What are Neural Networks?

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# What is a neuron?

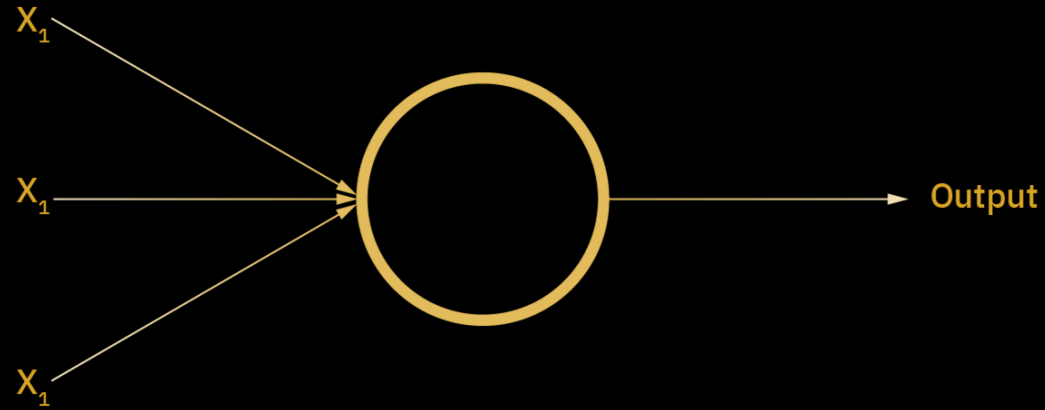


# What does a mathematical neuron do?



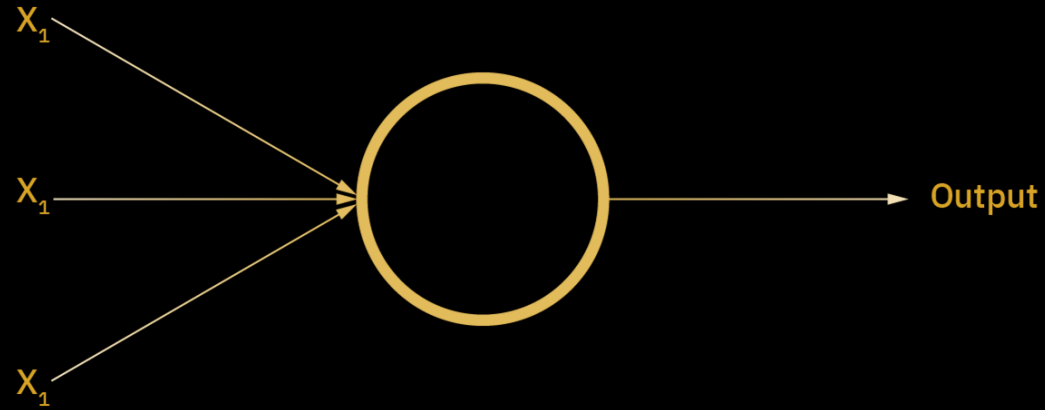
$x_i$

# What does a mathematical neuron do?



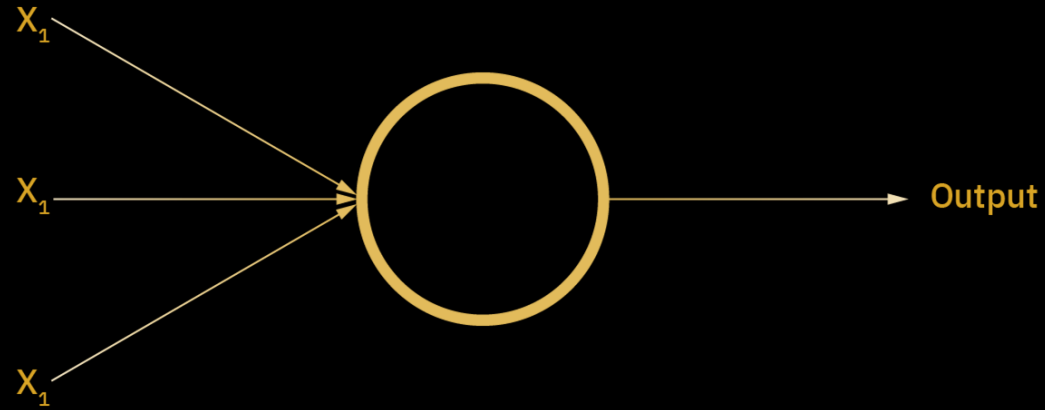
$$w_i X_i$$

# What does a mathematical neuron do?



$$\sum w_i X_i$$

# What does a mathematical neuron do?

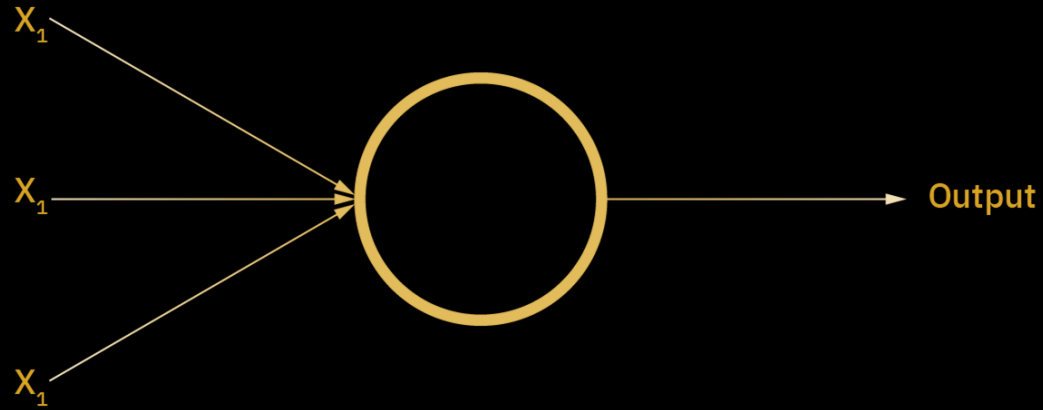


Parameters

$$\sum w_i X_i + b$$

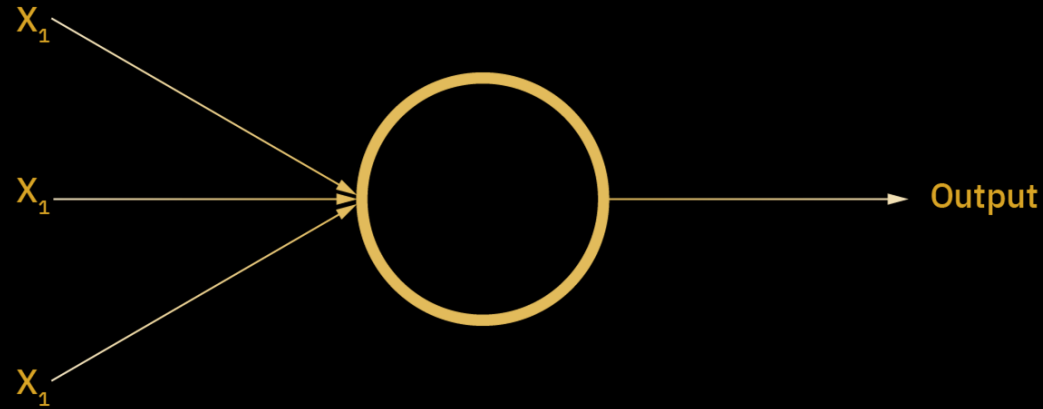


# What does a mathematical neuron do?



$$\text{Output} = f(\sum w_i X_i + b)$$

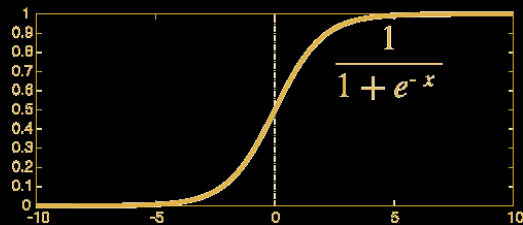
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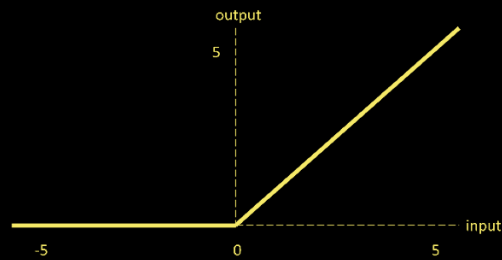
$$\text{Output} = f(\sum w_i X_i + b)$$

Where  $f(x)$ :

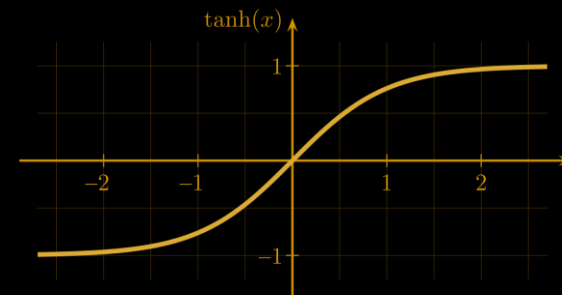
*Sigmoid*



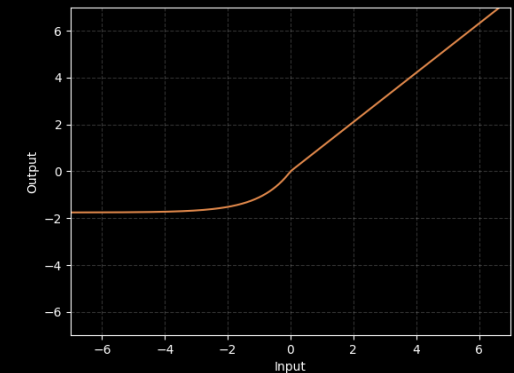
*Relu*



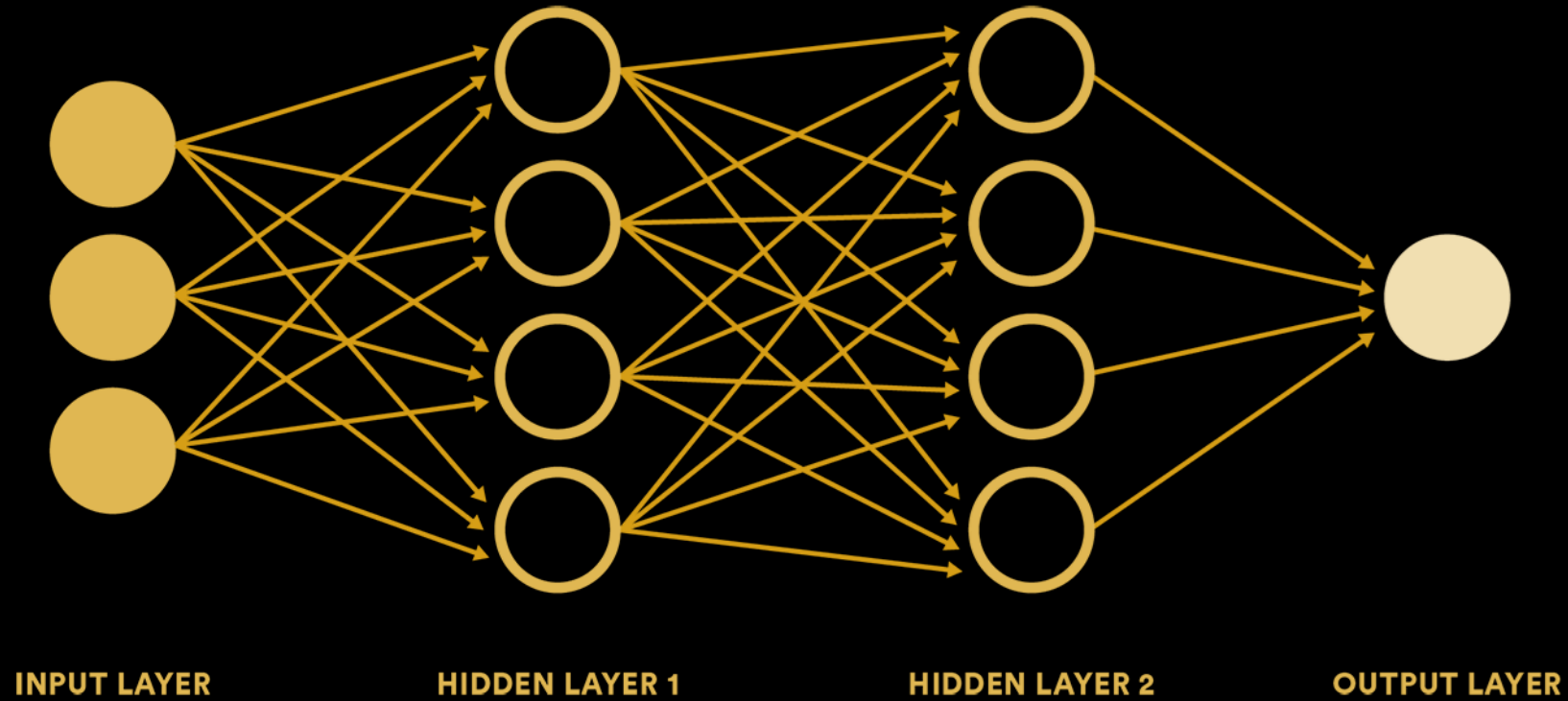
*Tanh*



*Selu*



# What does the network bring?



## 3 layers NN

# What data can NN tackle?

Timeseries

Audio

Text

Images

...

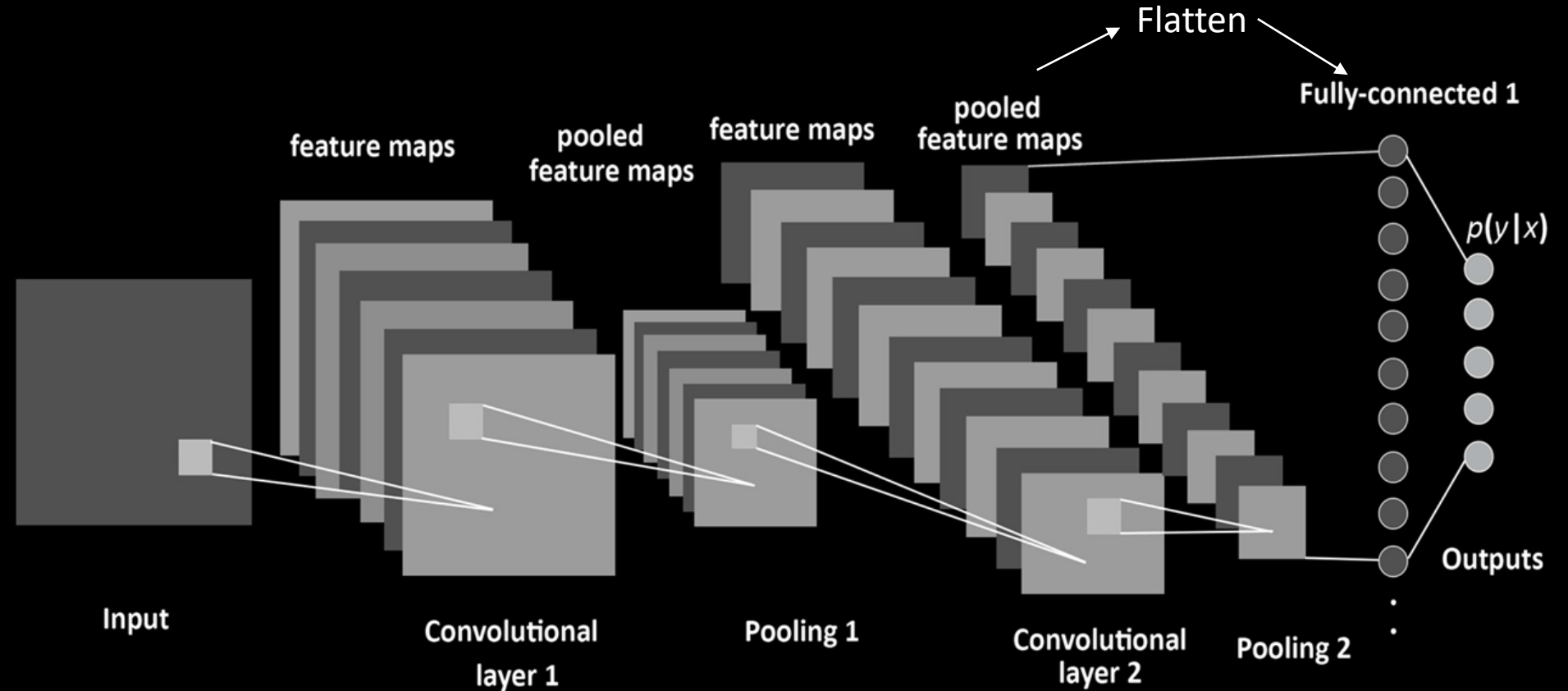
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<https://www.mdpi.com/1099-4300/19/6/242>

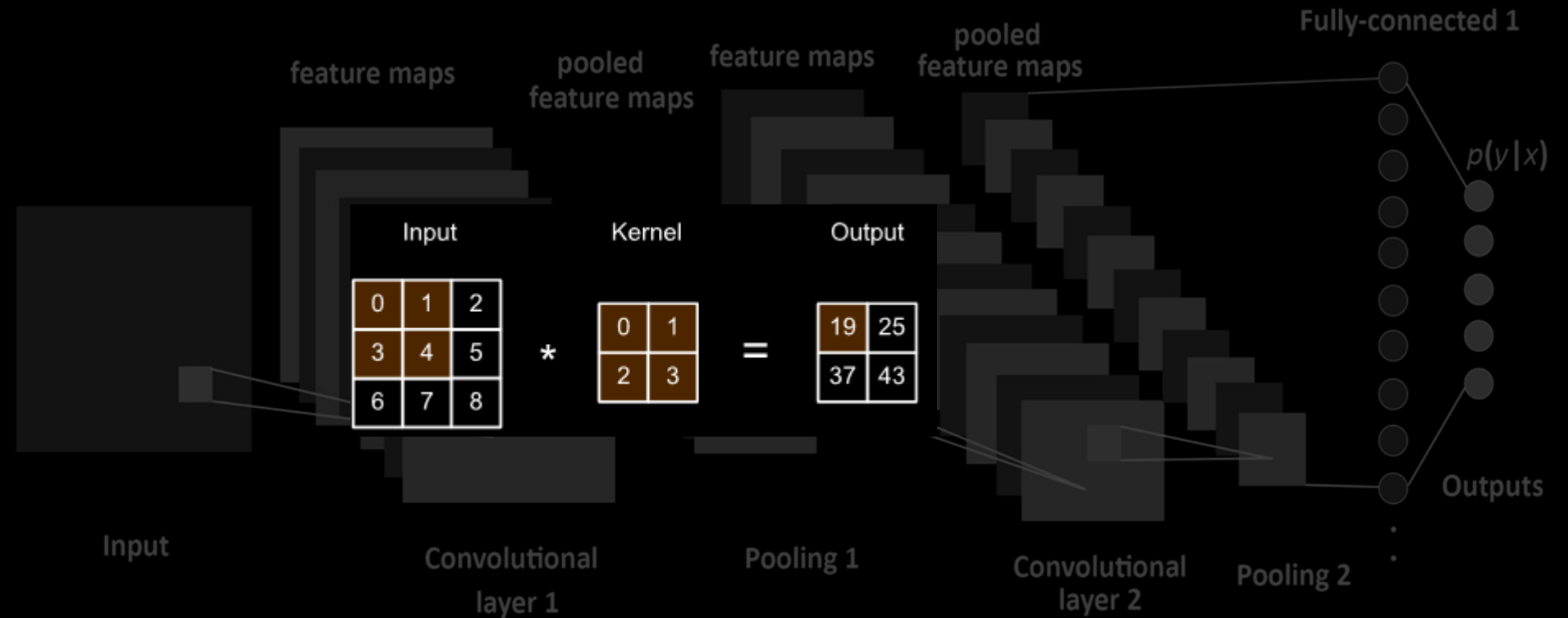
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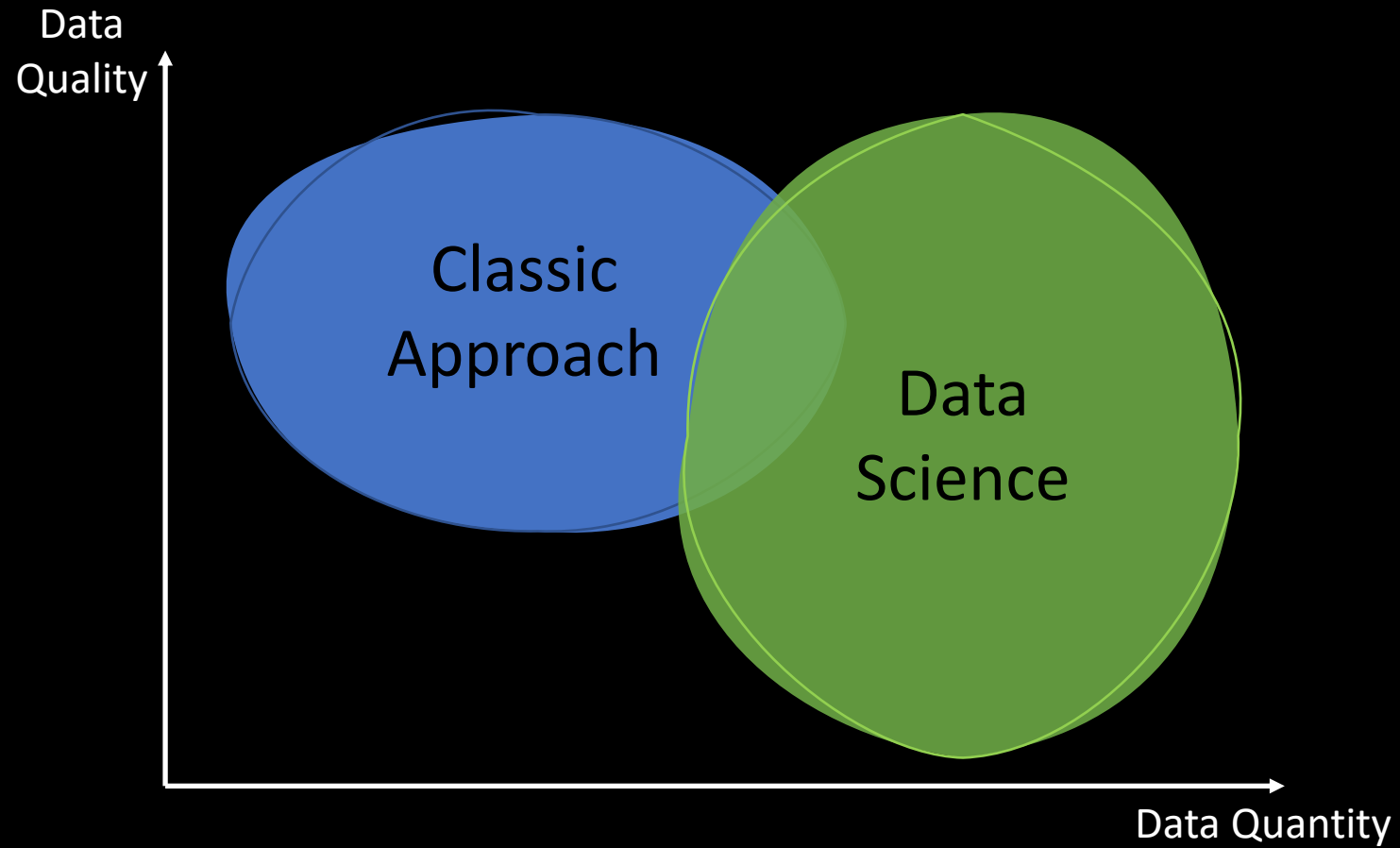
Audio

Text

Images

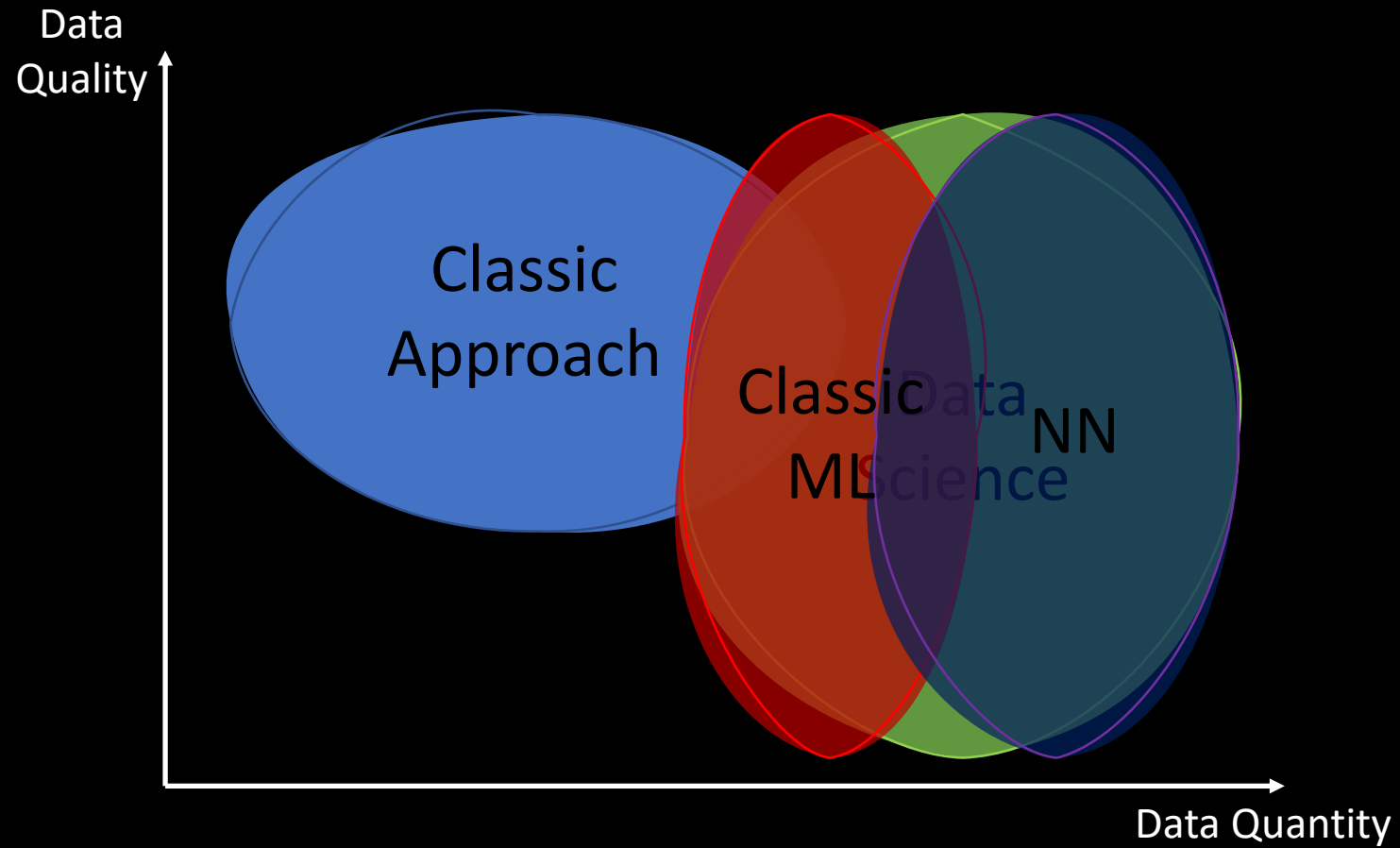


# When to use NN?





# When to use NN?



# How to use NN with Python?



# How to use NN with Python?



Keras



TensorFlow

PYTORCH