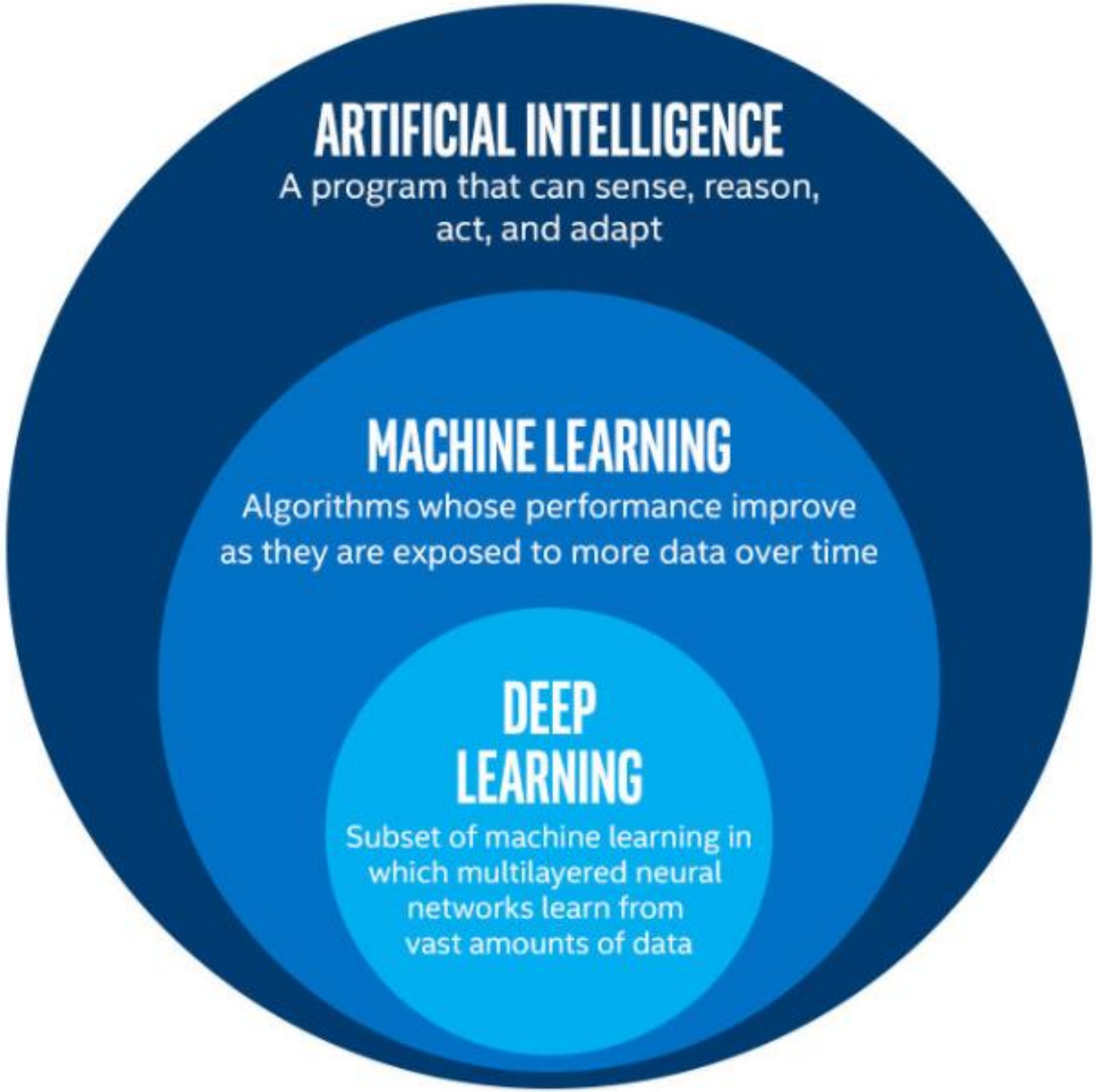
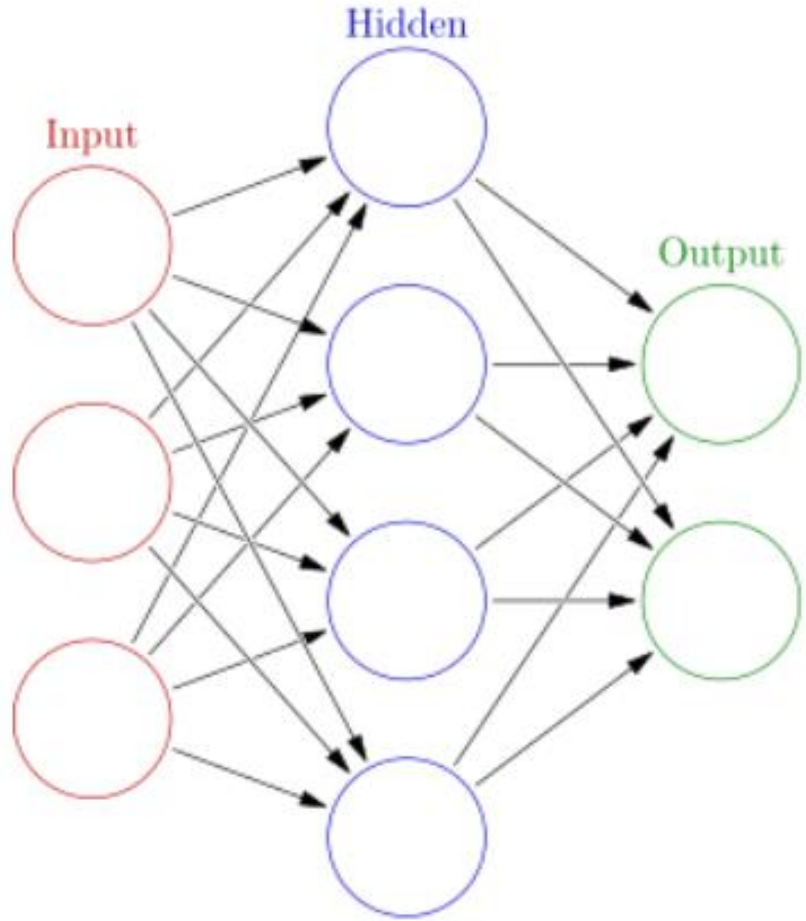
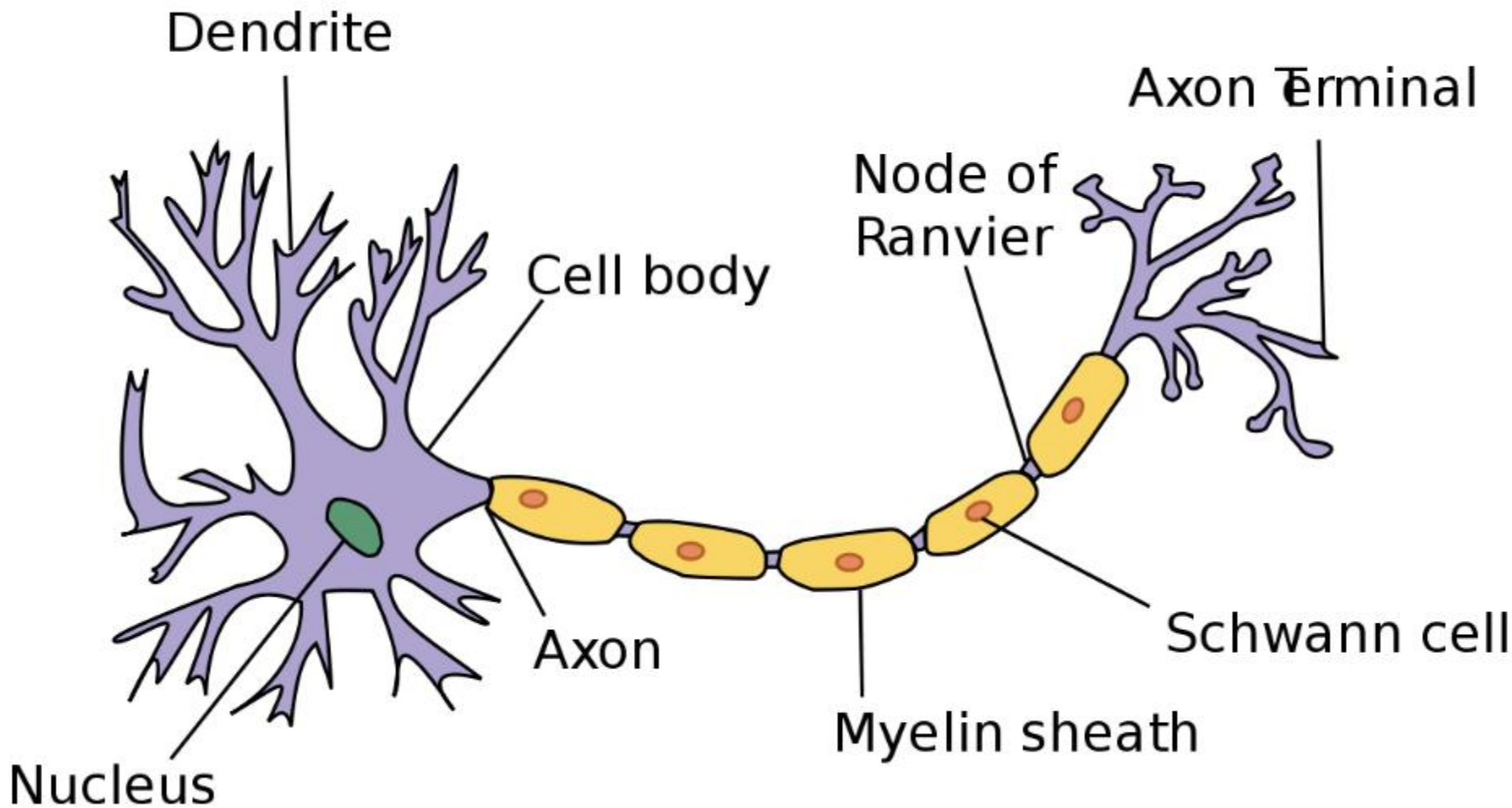
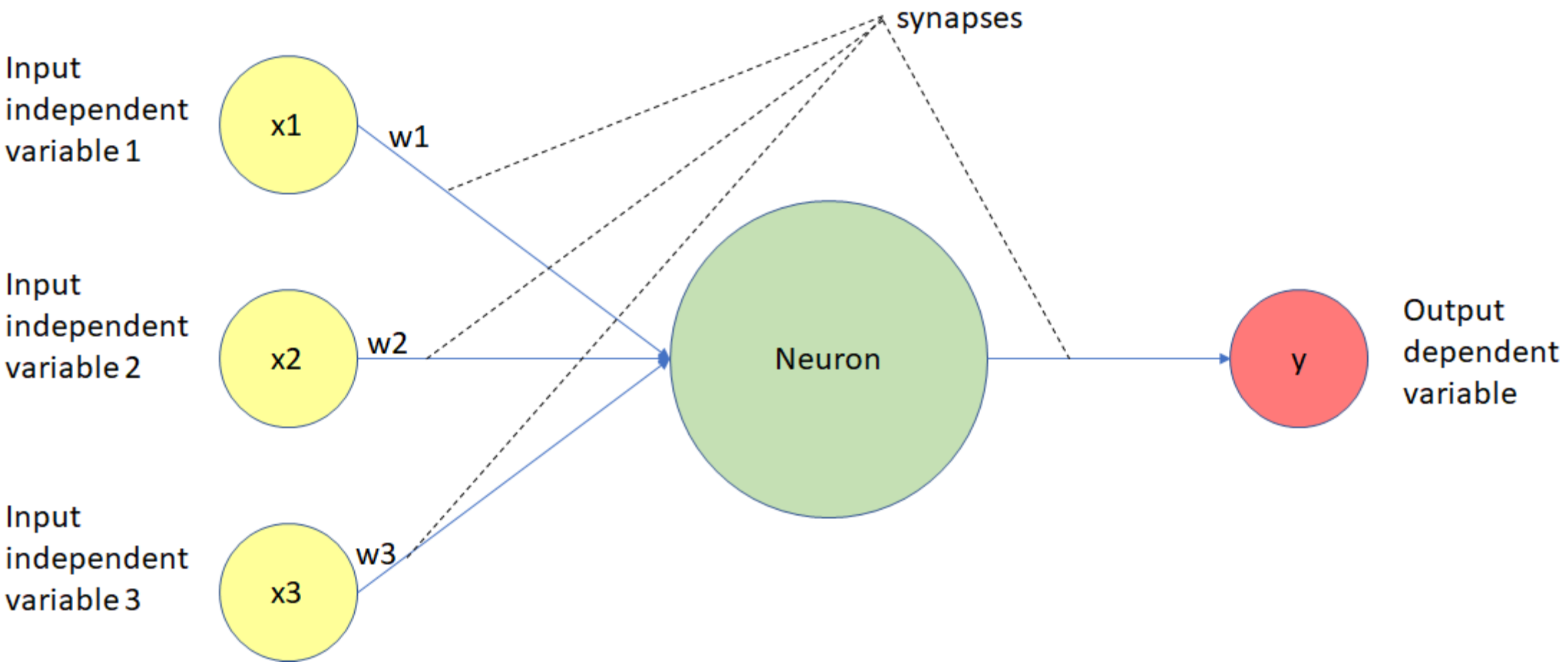

ARTIFICIAL INTELLIGENCE
A program that can sense, reason, act, and adapt
MACHINE LEARNING
Algorithms whose performance improve as they are exposed to more data over time
DEEP LEARNING
Subset of machine learning in which multilayered neural networks learn from vast amounts of data

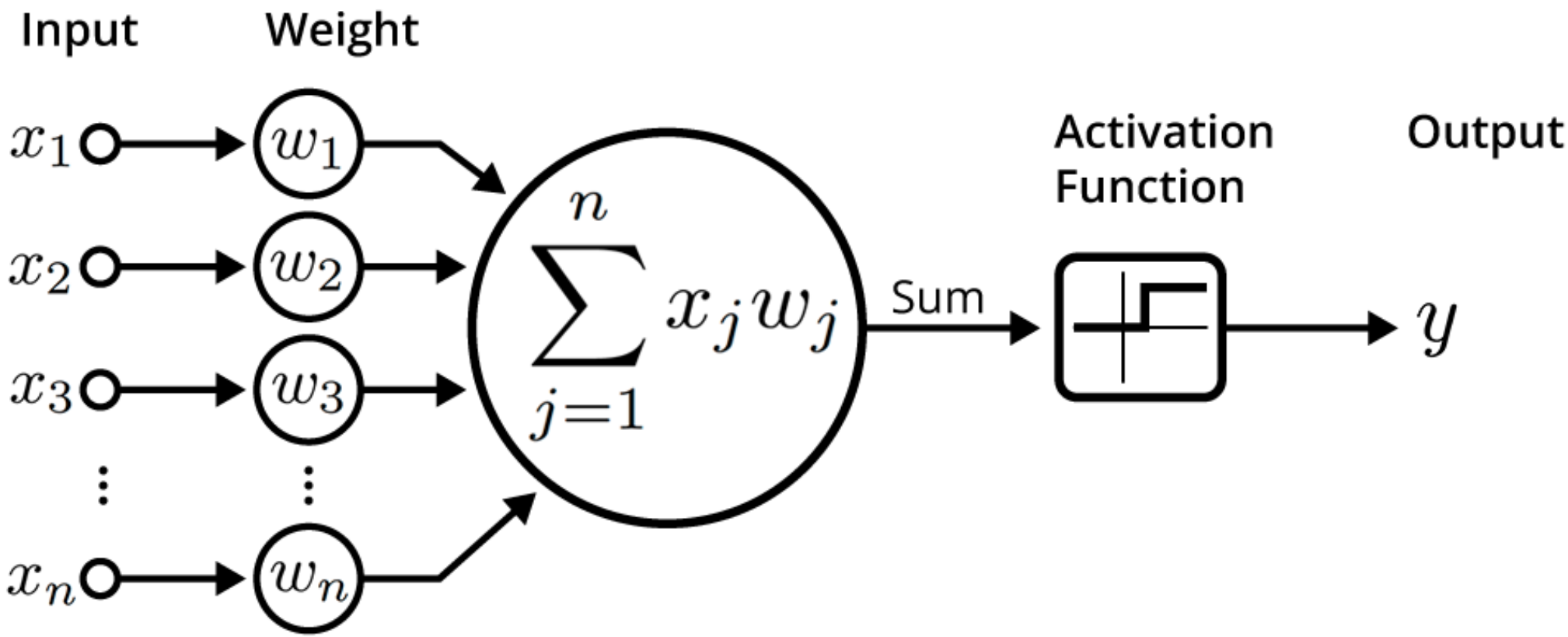
Deep Learning Applications

- Self-driving cars
- Natural Language Processing
- Healthcare
- Virtual assistants
- Fraud detection
- Image recognition
- Entertainment
- etc.


Hidden
Input
Output

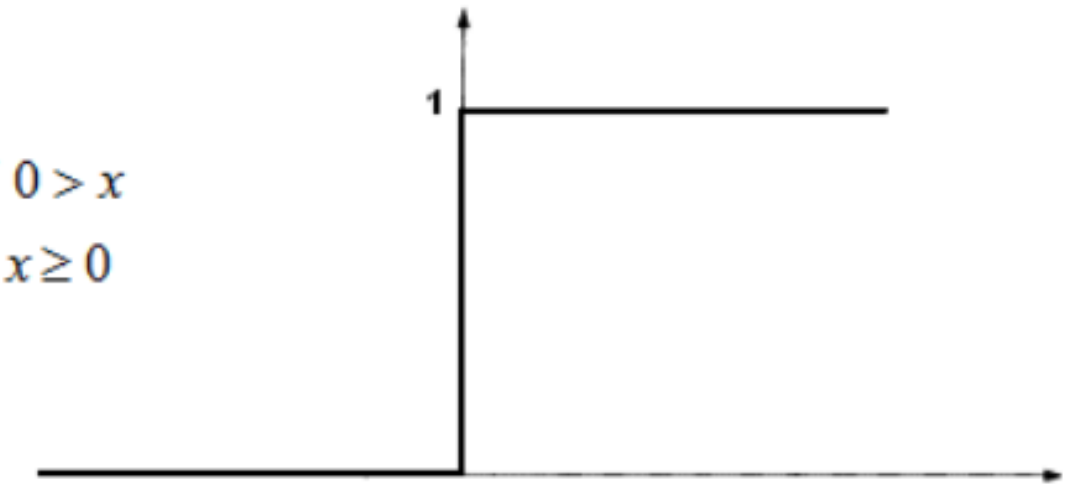

Dendrite
Axon Terminal
Node of Ranvier
Cell body
Axon
Schwann cell
Myelin sheath
Nucleus

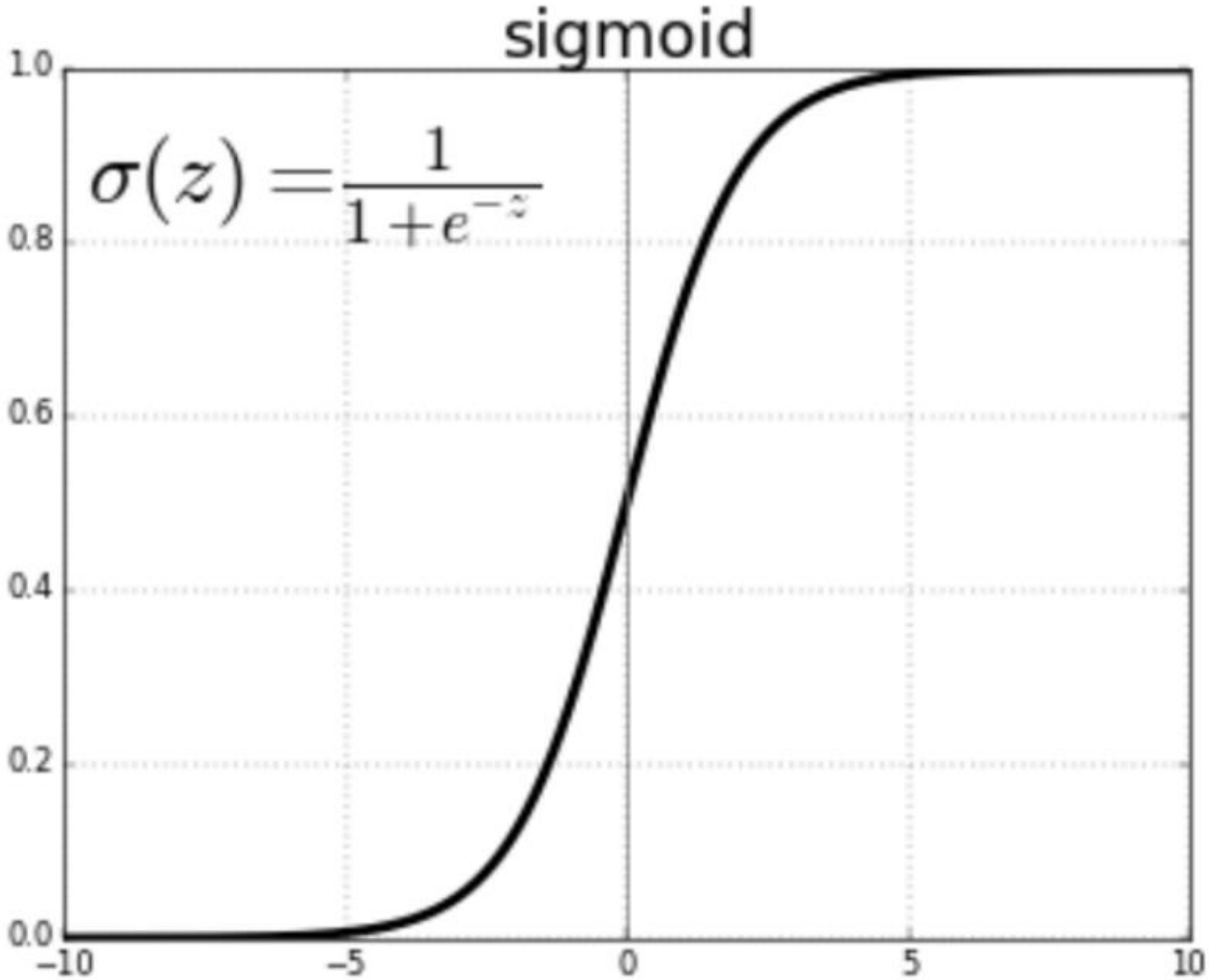

Input independent variable 1
x1
w1
synapses
Input independent variable 2
x2
w2
Neuron
y
Output dependent variable
Input independent variable 3
x3
w3

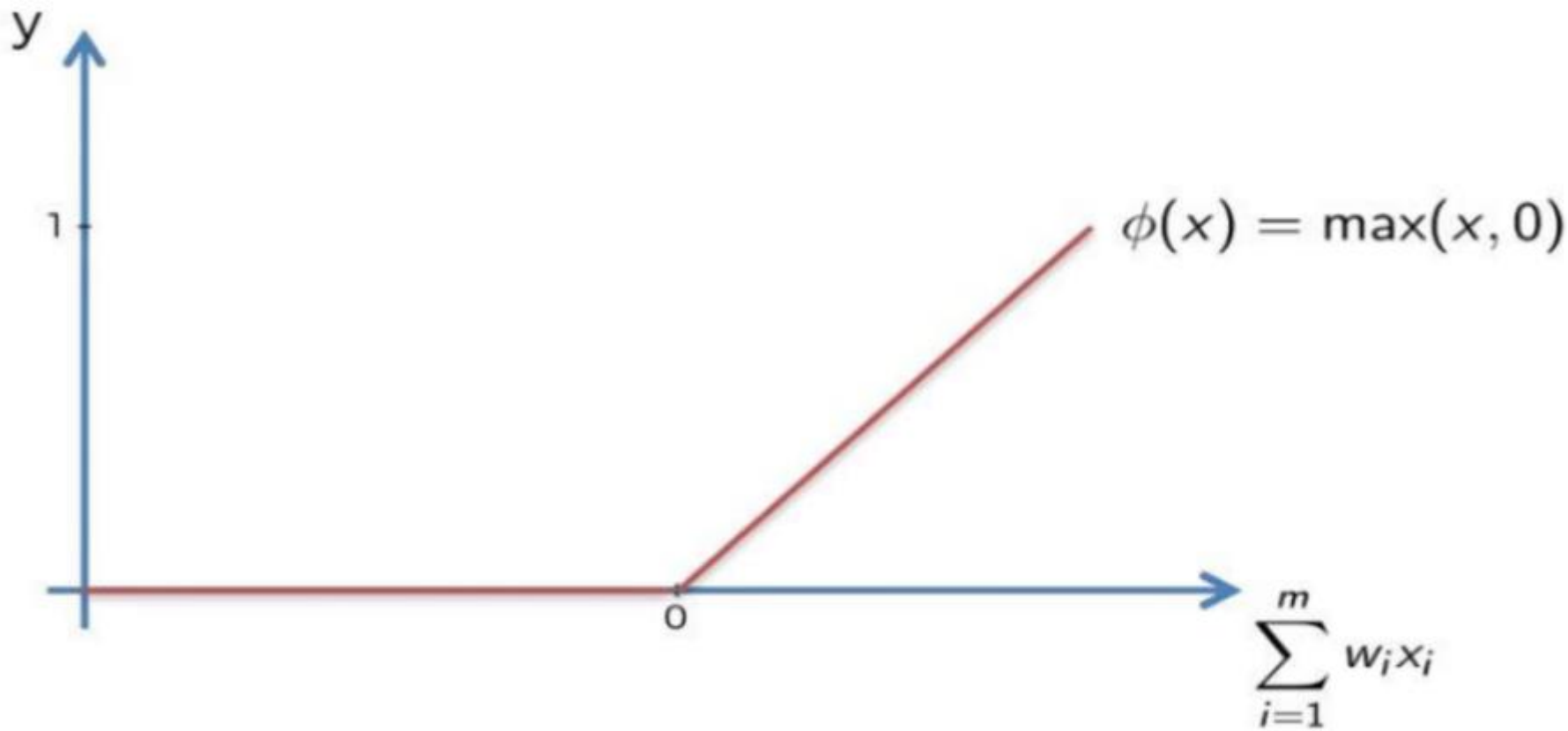

Input
Weight
x_1
x_2
x_3
x_n
w_1
w_2
w_3
w_n
$\sum_{j=1}^{n} x_j w_j$
Sum
Activation Function
Output
y

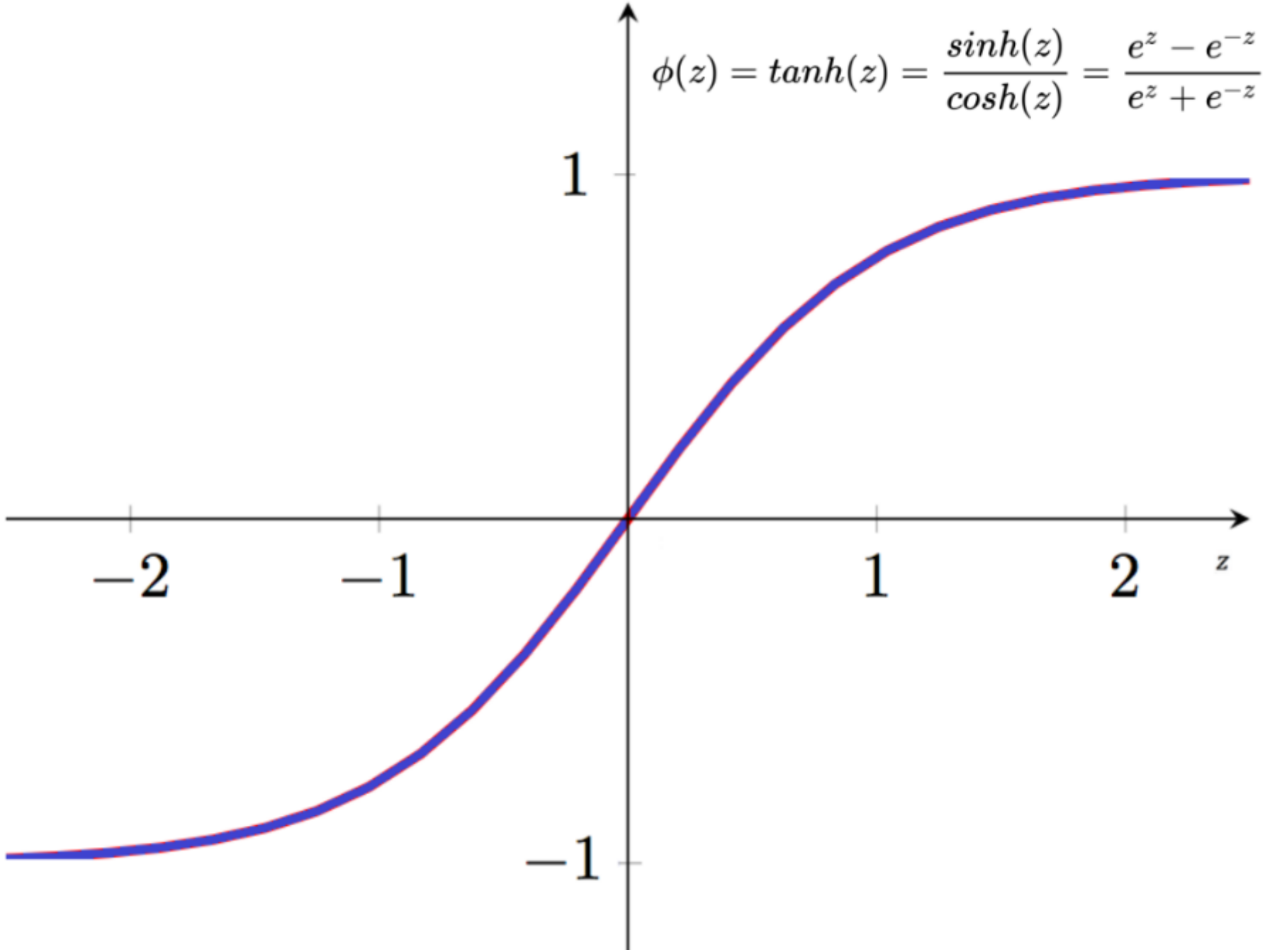
Unit step (threshold)

$$f(x) = \begin{cases} 0 \text{ if } 0 > x \\ 1 \text{ if } x \geq 0 \end{cases}$$




sigmoid
$\sigma(z) = \frac{1}{1+e^{-z}}$
1.0
0.8
0.6
0.4
0.2
0.0
−10
−5
0
5
10


y
1
0
$\phi(x) = \max(x, 0)$
$\sum_{i=1}^{m} w_i x_i$


$\phi(z) = tanh(z) = \frac{sinh(z)}{cosh(z)} = \frac{e^z - e^{-z}}{e^z + e^{-z}}$
1
−1
−2
−1
1
2
z

- **Neuron**: A building block of ANN. It is responsible for accepting input data, performing calculations, and producing output.
- **Input data**: Information or data provided to the neurons.
- **Artificial Neural Network(ANN)**: A computational system inspired by the way biological neural networks in the human brain process information.
- **Deep Neural Network**: An ANN with many layers placed between the input layer and the output layer.
- **Weights**: The strength of the connection between two neurons. Weights determine what impact the input will have on the output.
- **Bias**: An additional parameter used along with the sum of the product of weights and inputs to produce an output.
- **Activation Function**: Determines the output of a neural network.

AI Ethics

- The Dataset does not reflect the reality
- Gender Imbalances In Datasets
- The implicit bias problem
- The reason-effect problem
- The inhumanity of the artificial neural network
- No way to acquire new datasets
- AI ethics policy and governance initiatives