

Machine Learning and Artificial Intelligence

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AlphaZero AI beats champion chess program after teaching itself in four hours

Google's artificial intelligence sibling DeepMind repurposes Go-playing AI to conquer chess and shogi without aid of human knowledge



📷 AlphaZero's victory is just the latest in a series of computer triumphs over human players since Computer programs have been able to beat the best IBM's Deep Blue defeated Garry Kasparov in 1997. Photograph: 18percentgrey / Alamy/Alamy

AlphaZero, the game-playing AI created by Google sibling [DeepMind](#), has beaten the world's best chess-playing computer program, having taught itself how to play in under four hours.

 Text

 Dokumente

 Websites

DEUTSCH – ERKANNT

DEUTSCH

ENGLISCH

FRANZÖSISCH



ENGLISCH

SPANISCH

DEUTSCH



Künstliche Intelligenz kann jetzt auch Sprachen
übersetzen



58 / 5.000



Artificial intelligence can now also translate
languages



Feedback geben

[nature](#) > [nature communications](#) > [articles](#) > article

Article | [Open Access](#) | [Published: 29 September 2022](#)

Deciphering microbial gene function using natural language processing

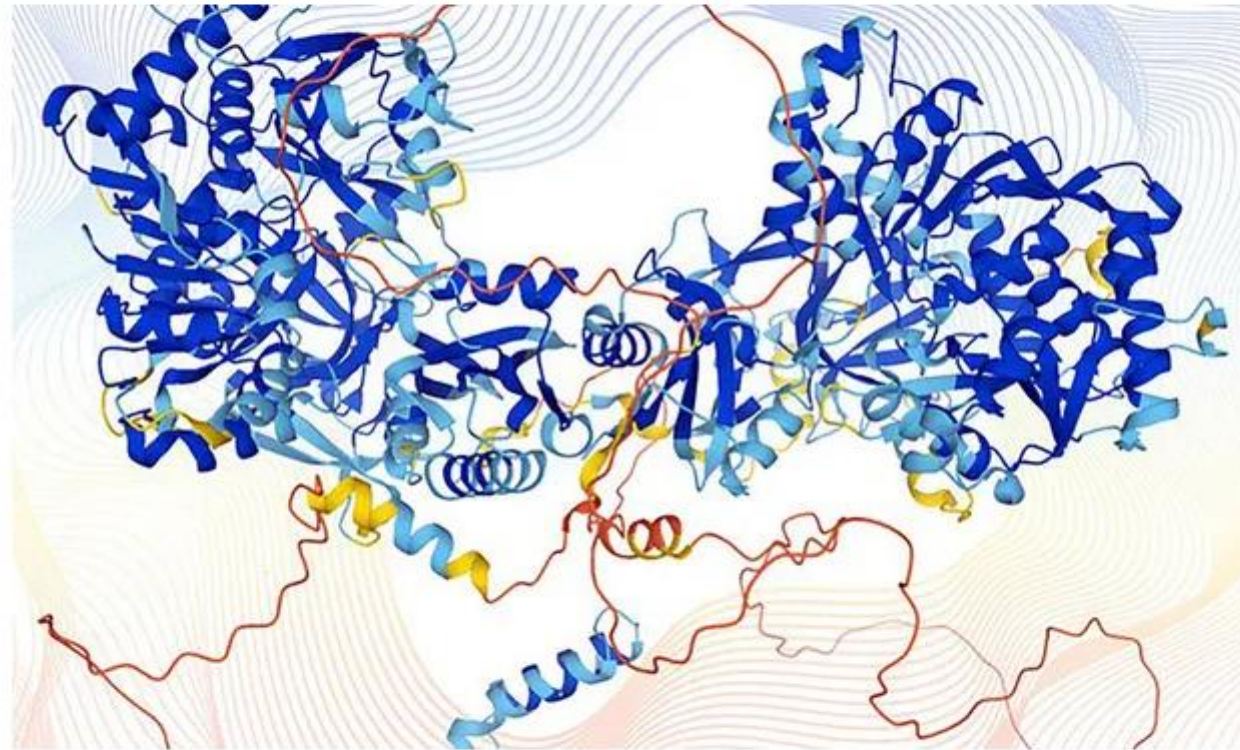
[Danielle Miller](#), [Adi Stern](#) & [David Burstein](#) 

[Nature Communications](#) **13**, Article number: 5731 (2022) | [Cite this article](#)

4015 Accesses | **106** Altmetric | [Metrics](#)

DeepMind uncovers structure of 200m proteins in scientific leap forward

Success of AlphaFold program could have huge impact on global problems such as famine and disease



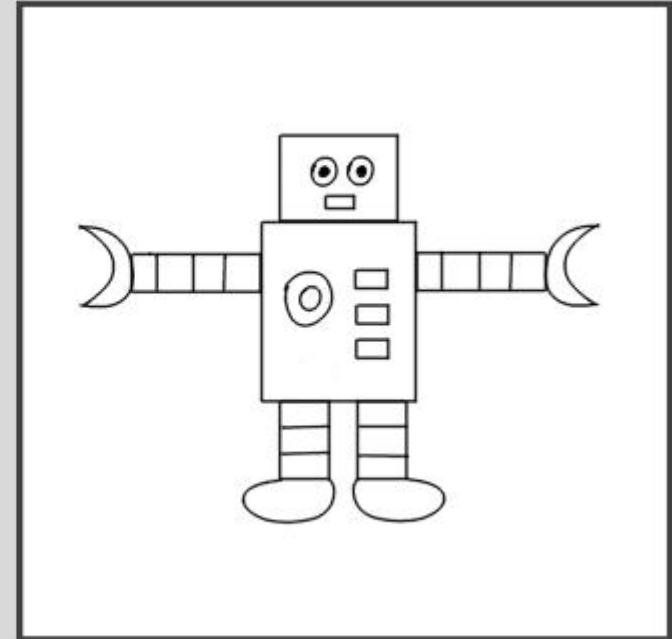
📷 The structure of a human protein modelled by the AlphaFold computer program. Photograph: EMBL-EBI/AFP/Getty Images

Artificial intelligence has deciphered the structure of virtually every protein known to science, paving the way for the development of new medicines or technologies to tackle global challenges such as famine or pollution.

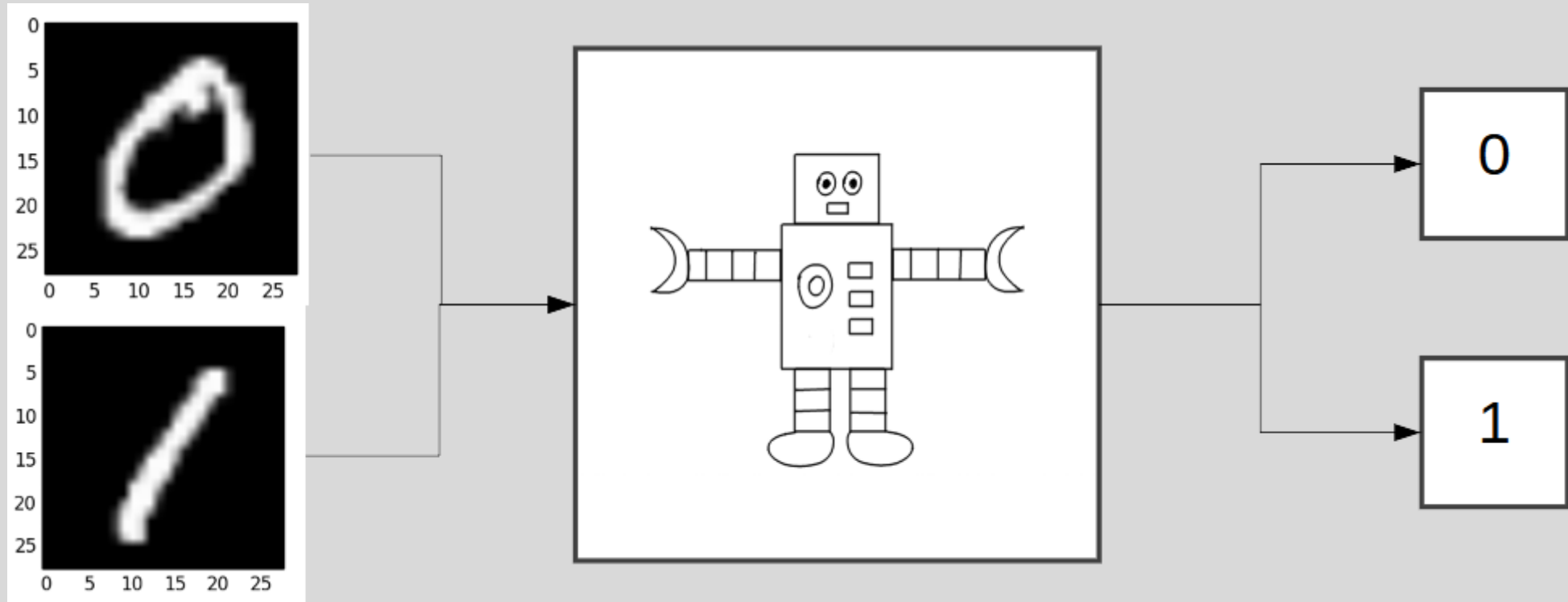
Machine Learning



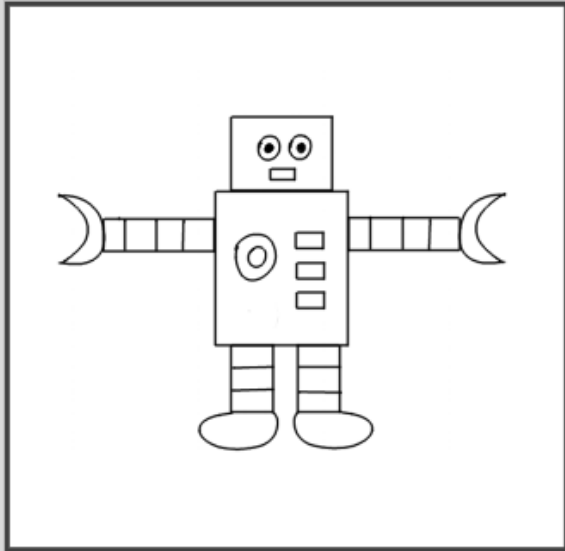
Big data



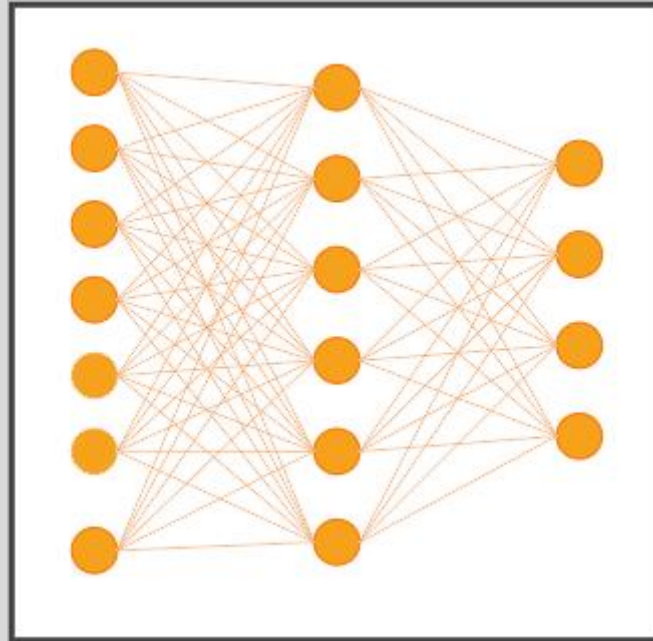
Machine Learning



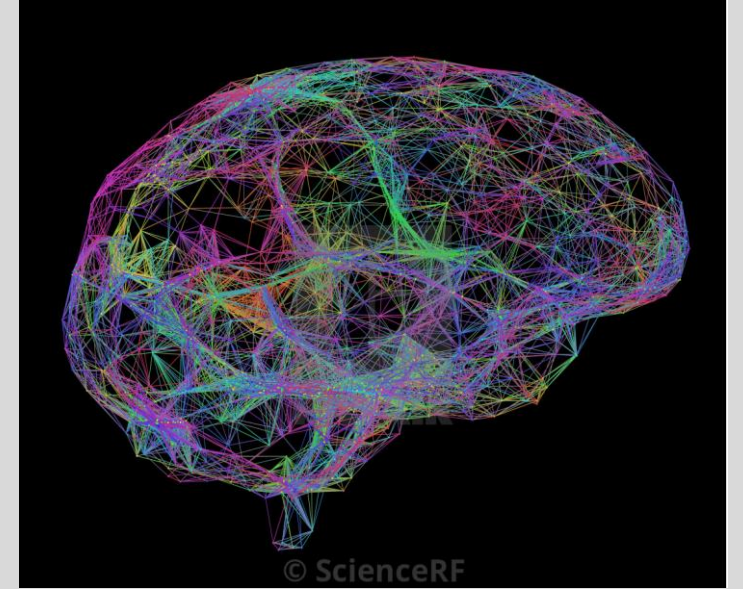
Machine Learning



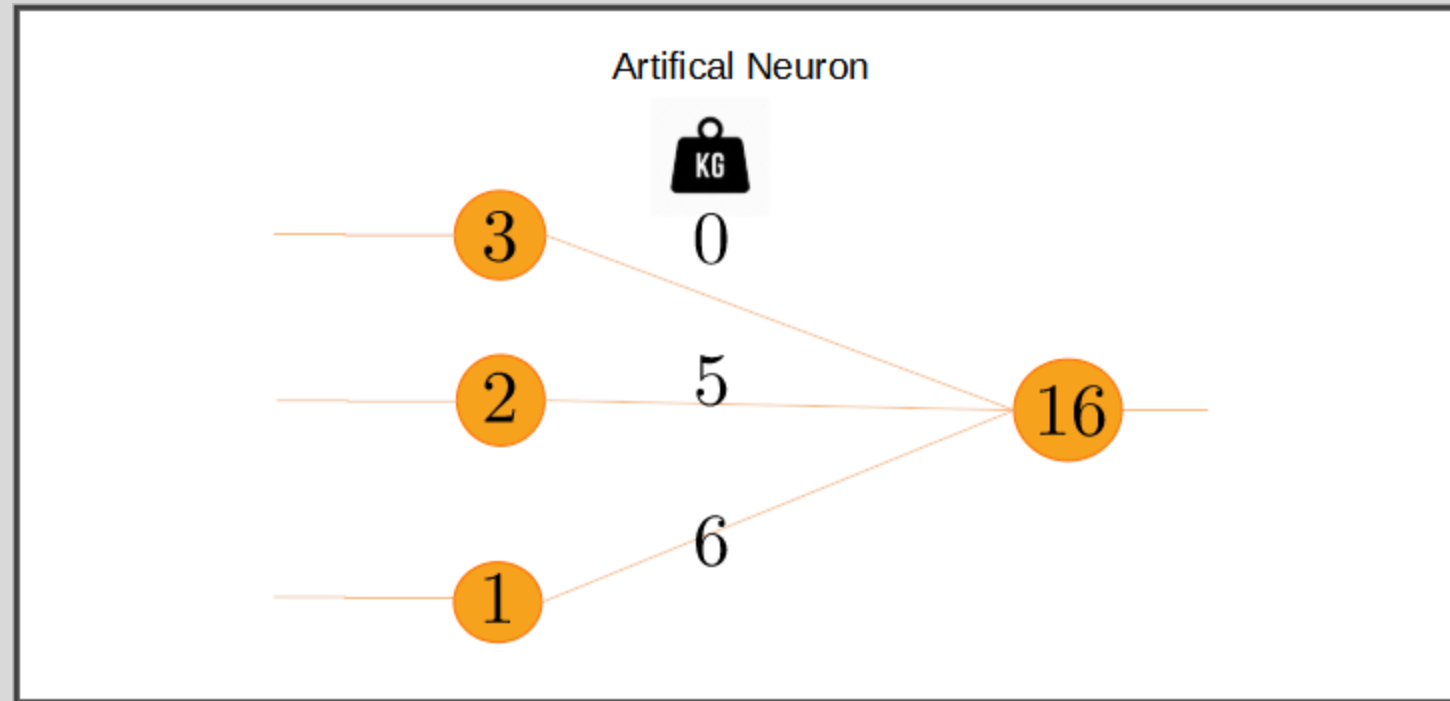
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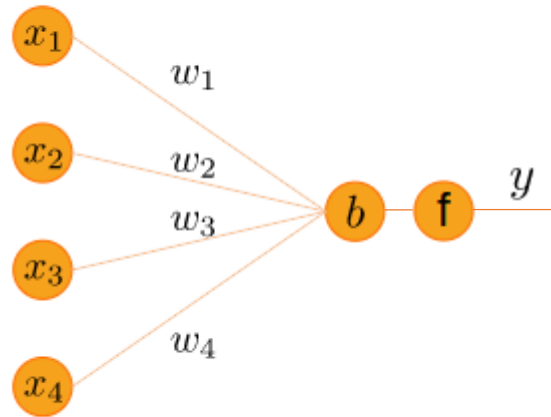
Machine Learning



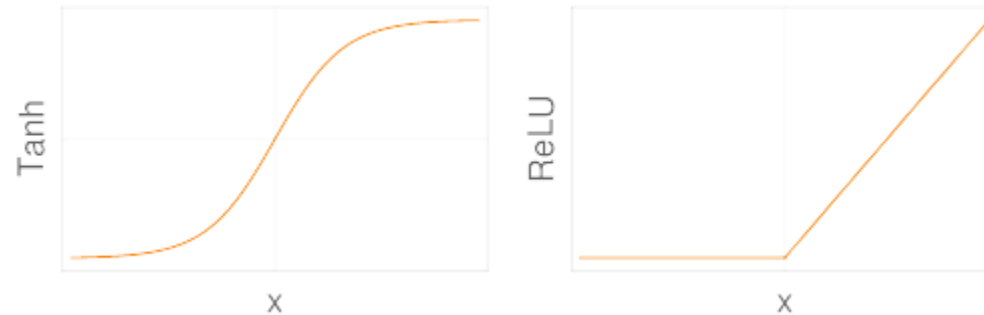
$$\begin{aligned} &3 * 0 + 2 * 5 + 1 * 6 \\ &= 0 + 10 + 6 = 16 \end{aligned}$$

Machine Learning

Artificial Neuron

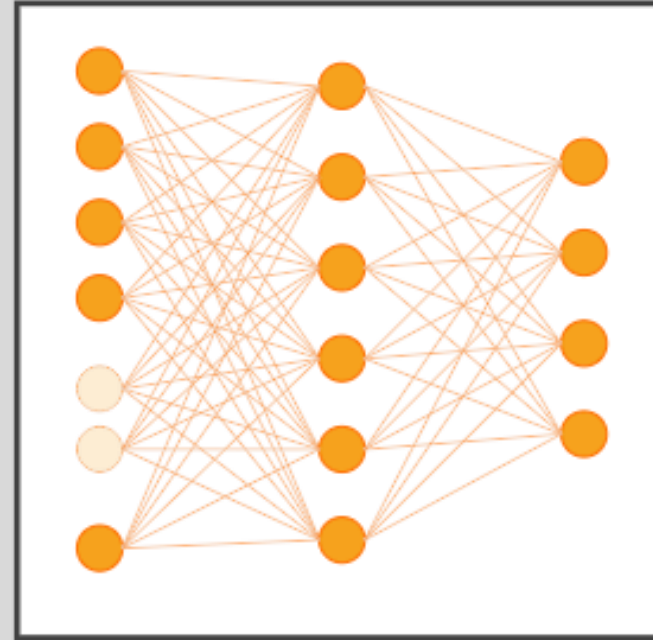
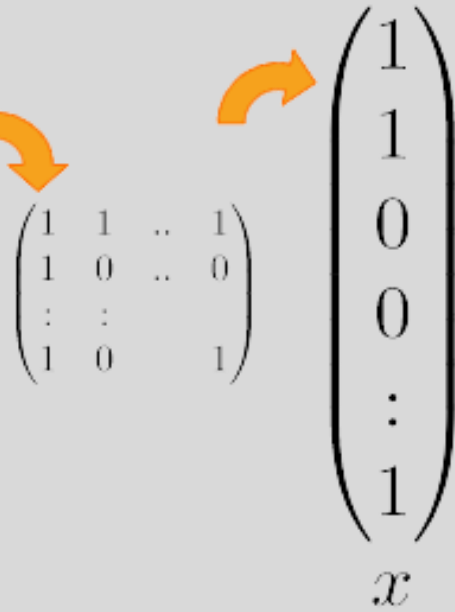
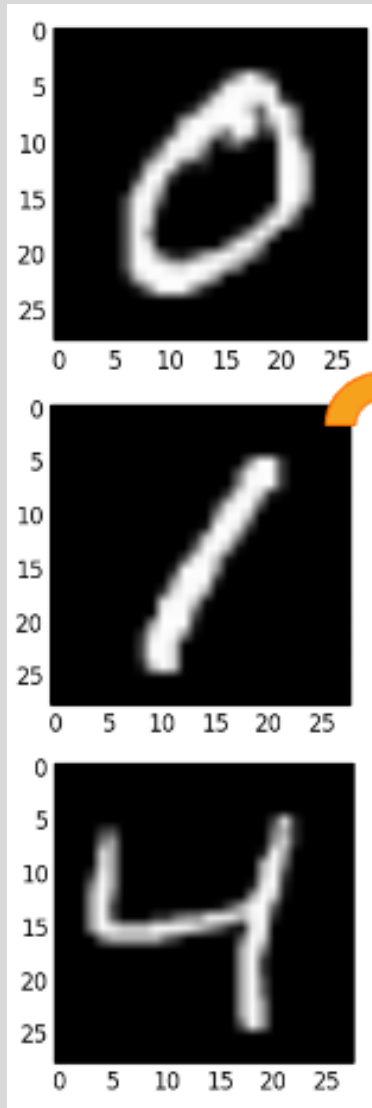


$$y(\vec{x}) = f \left(\sum_{i=1}^4 x_i w_i - b \right)$$



$$\sum_{i=1}^4 x_i w_i = x_1 w_1 + x_2 w_2 + x_3 w_3 + x_4 w_4$$

Machine Learning



$$\begin{pmatrix} 0.1 \\ 0.6 \\ 0.2 \\ 0.1 \end{pmatrix} \neq \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}$$

$y_{\text{NN}}(x) \quad y_x$

$$L(w, b) = \sum_x |y_{\text{NN}}(x) - y_x|^2$$

$$\min_{w, b} L(w, b)$$

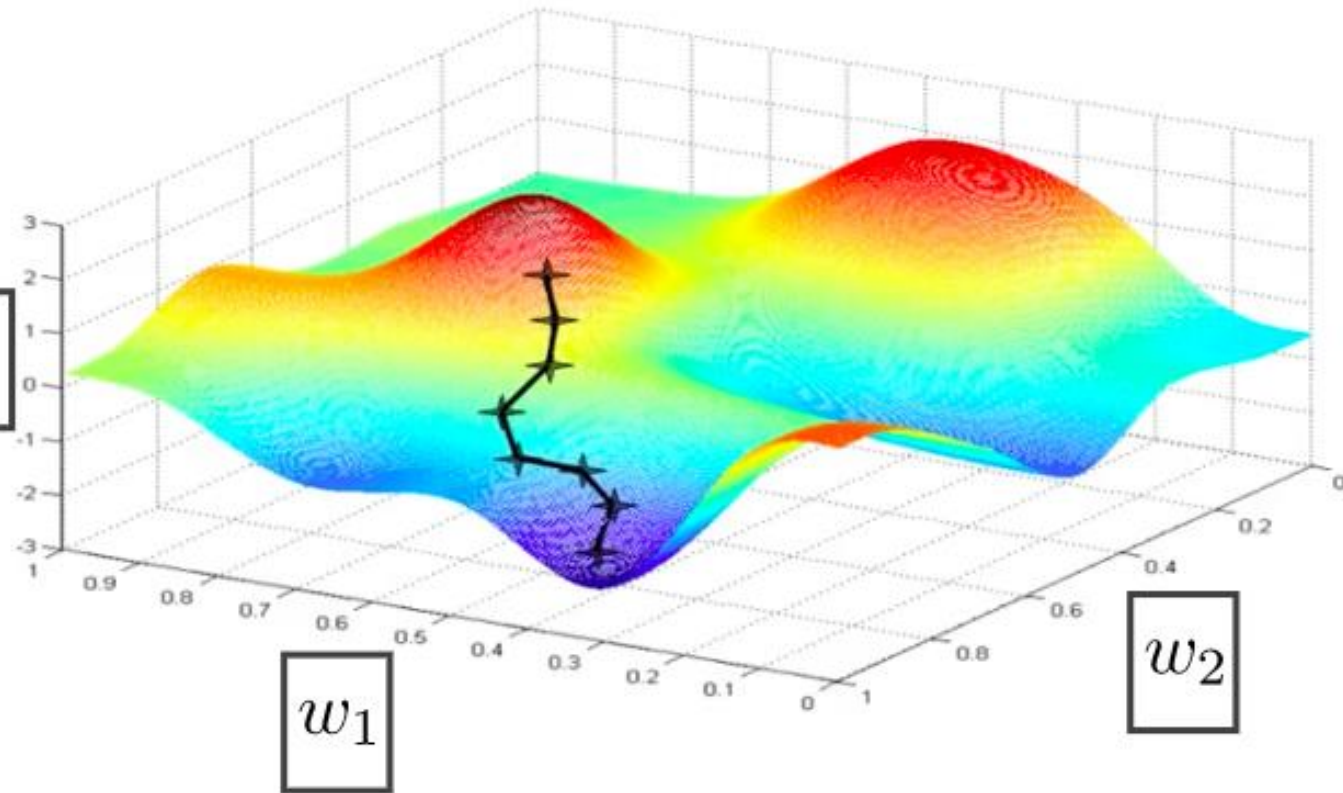


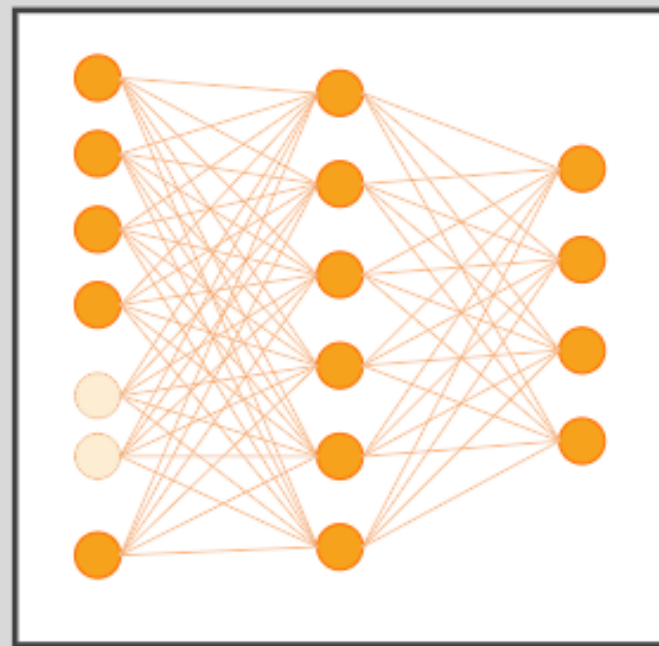
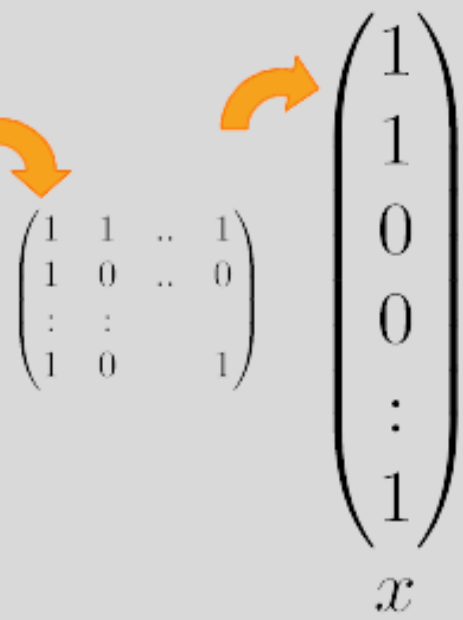
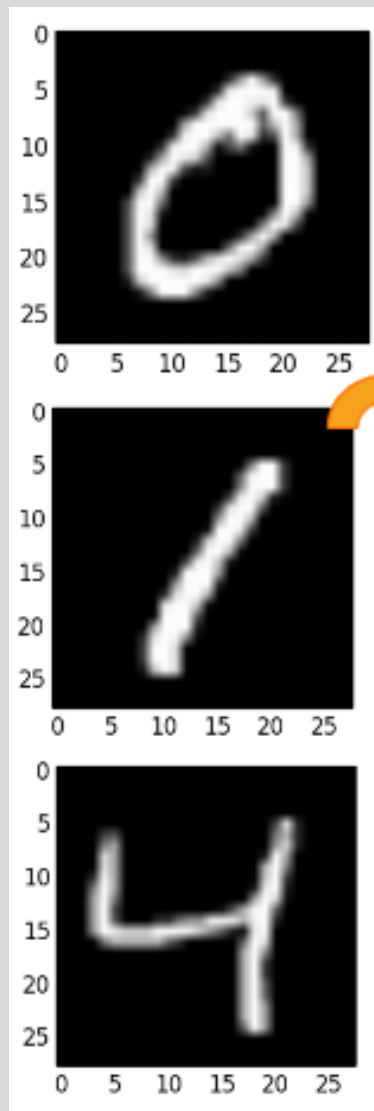
Machine Learning

$$\min_{w_1, w_2} L(w_1, w_2)$$



$L(w_1, w_2)$





$$\begin{pmatrix} 0.1 \\ 0.6 \\ 0.2 \\ 0.1 \end{pmatrix} \stackrel{!}{=} \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}$$

$y_{\text{NN}}(x) \qquad y_x$

$$L(w, b) = \sum_x |y_{\text{NN}}(x) - y_x|^2$$

$$\min_{w, b} L(w, b)$$

AD + GPU

Very High level
Builds on pytorch

The logo for fast.ai, featuring the text "fast.ai" in a white, lowercase, serif font with a double underline, set against a black rectangular background.

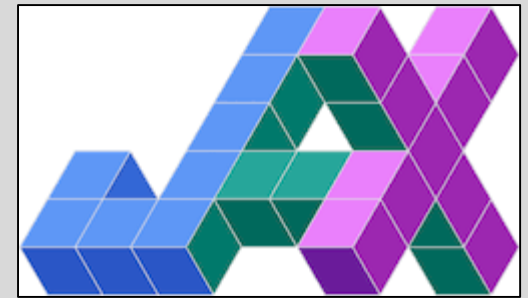
Research
Modular
Online Resources
Online Support

The PyTorch logo, consisting of a red circular icon with a flame-like shape inside, followed by the word "PyTorch" in a black, sans-serif font.The PyTorch Foundation logo, featuring the words "PYTORCH" and "FOUNDATION" in white, uppercase, sans-serif font, centered on a purple-to-black gradient rectangular background.

High level
Commercial production

The TensorFlow logo, featuring an orange stylized "TF" icon above the word "TensorFlow" in a dark blue, sans-serif font, all within a white rectangular box.

Very low level
Research
Highly customizable

The Google logo, featuring the word "Google" in its multi-colored, sans-serif font, positioned below a bracket that connects the TensorFlow and XLA logos.

We will focus on **concepts**,
As the **implementations** are
Changing daily