REDES NEURAIS 101

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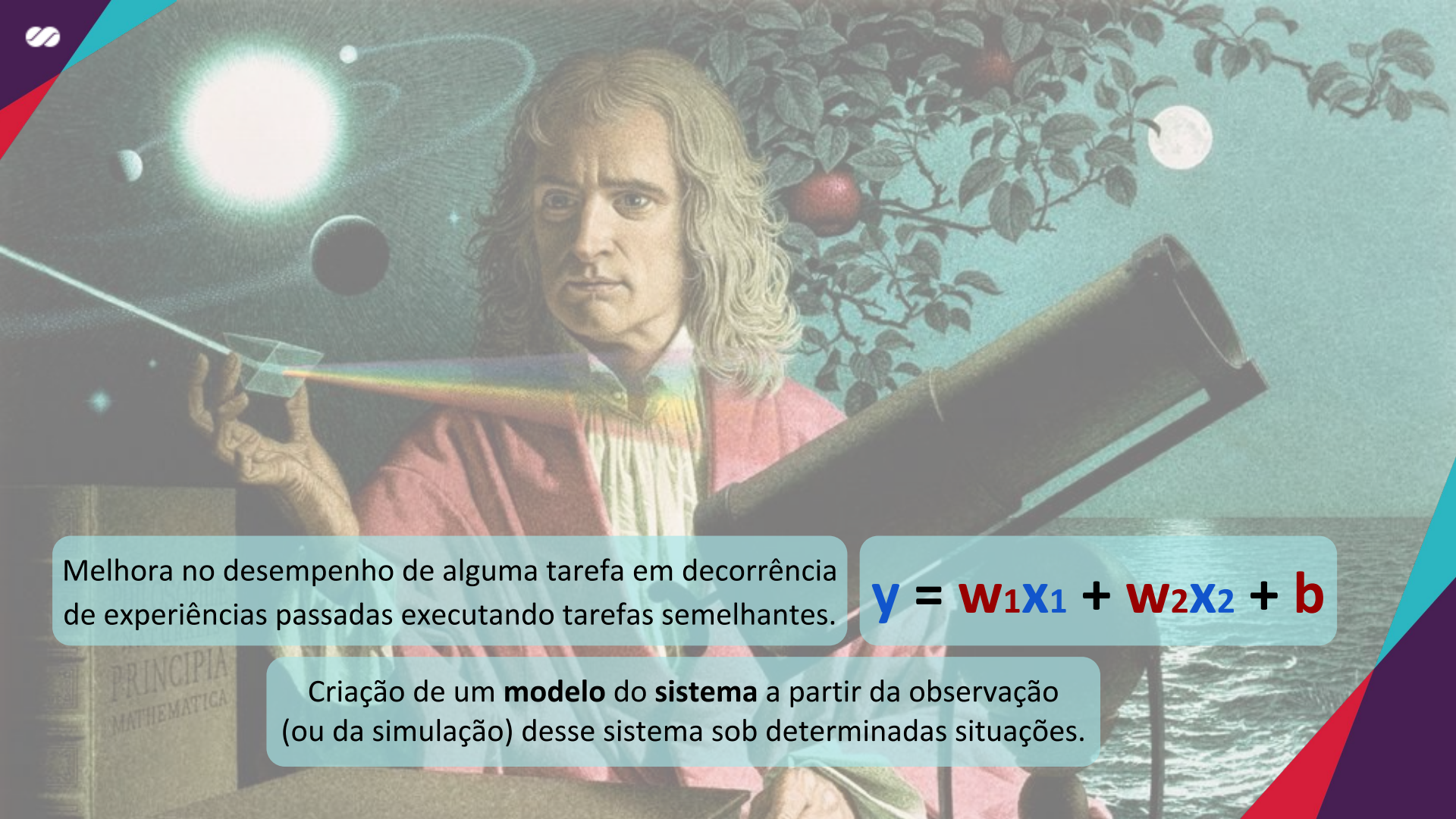
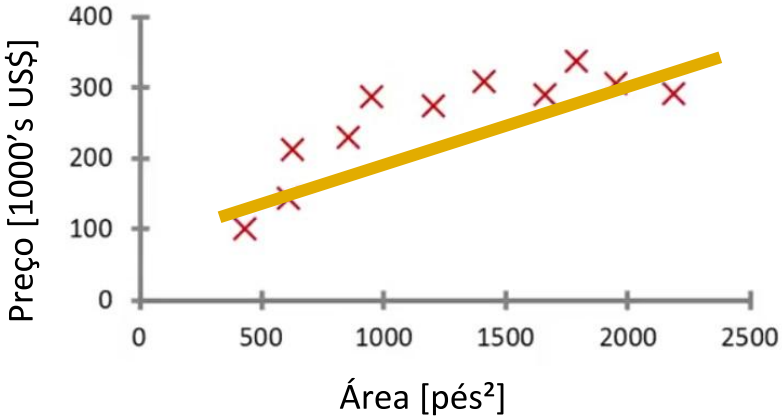


Melhora no desempenho de alguma tarefa em decorrência de experiências passadas executando tarefas semelhantes.

$$y = w_1x_1 + w_2x_2 + b$$

Criação de um **modelo** do **sistema** a partir da observação (ou da simulação) desse sistema sob determinadas situações.

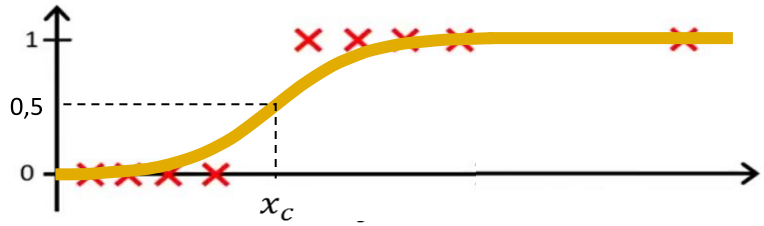
Regressão Linear



Modelo:

$$\hat{y} = wx + b$$

Regressão Logística

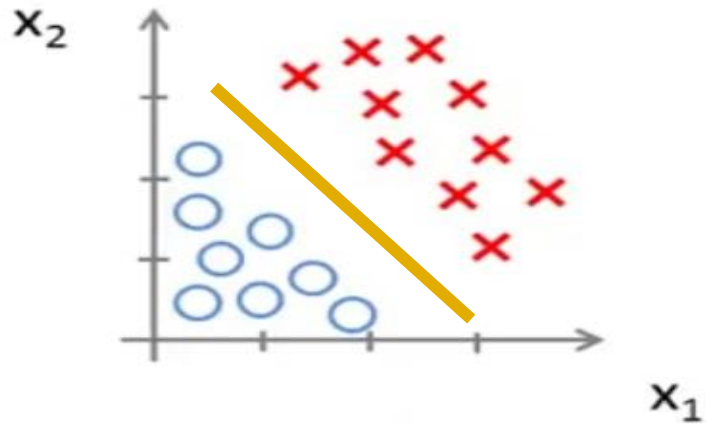


Modelo:

$$\hat{y} = \sigma(wx + b)$$

$$\sigma(x) = \frac{1}{1 + \tilde{e}}$$

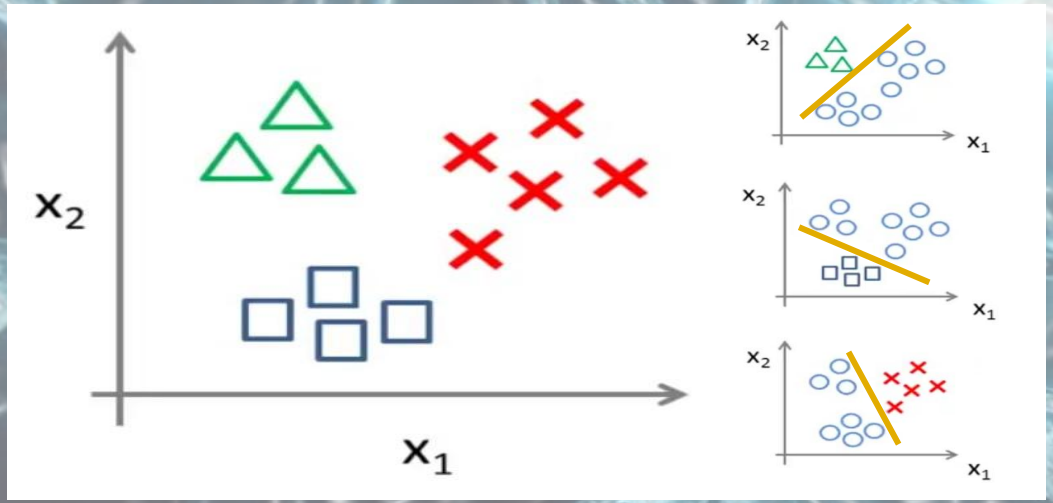
Regressão Logística



Modelo:

$$\hat{y} = \sigma(w_1 x_1 + w_2 x_2 + b)$$

Regressão Logística



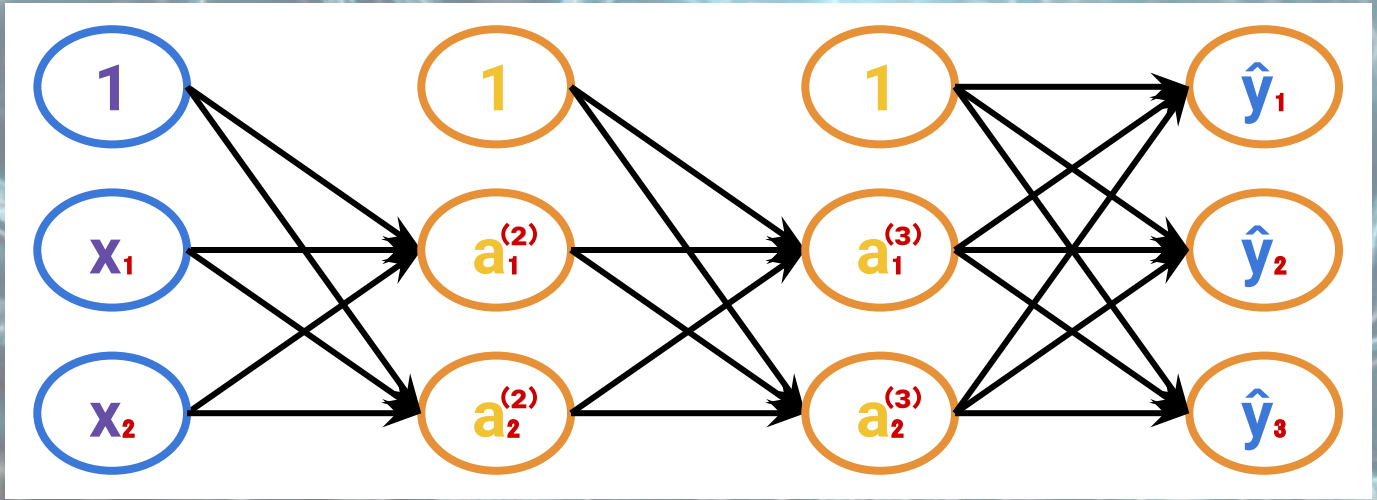
Modelo:

$$\hat{y} = \sigma(Wx)$$

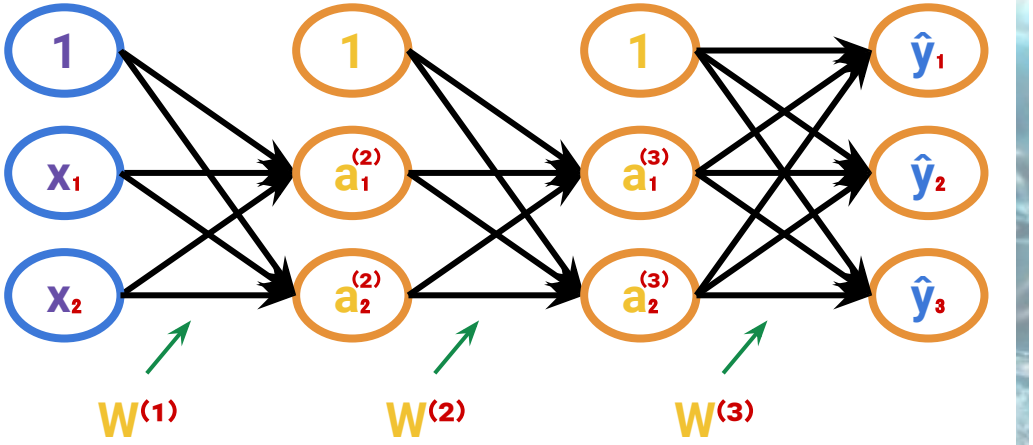
$$\hat{y} = \begin{bmatrix} [\hat{y}_1], \\ [\hat{y}_2], \\ [\hat{y}_3] \end{bmatrix} \qquad x = \begin{bmatrix} [1], \\ [x_1], \\ [x_2] \end{bmatrix}$$

$$W = \begin{bmatrix} [b_1, w_{11}, w_{12}], \\ [b_2, w_{21}, w_{22}], \\ [b_3, w_{31}, w_{32}] \end{bmatrix}$$

Redes Neurais



Forward Propagation



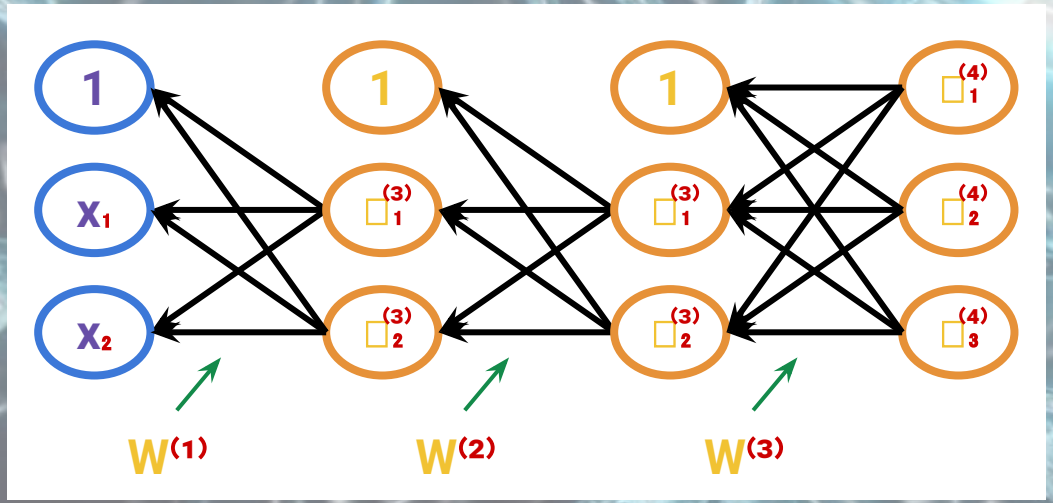
$$a^{(1)} = x$$

$$a^{(2)} = \sigma(W^{(1)}a^{(1)})$$

$$a^{(3)} = \sigma(W^{(2)}a^{(2)})$$

$$a^{(4)} = \sigma(W^{(3)}a^{(3)}) = \hat{y}$$

Backward Propagation



$$\delta^{(4)} = a^{(4)} - y = \hat{y} - y$$

$$\delta^{(3)} = \sigma(W^{(3)T}\delta^{(4)}).*a'^{(3)}$$

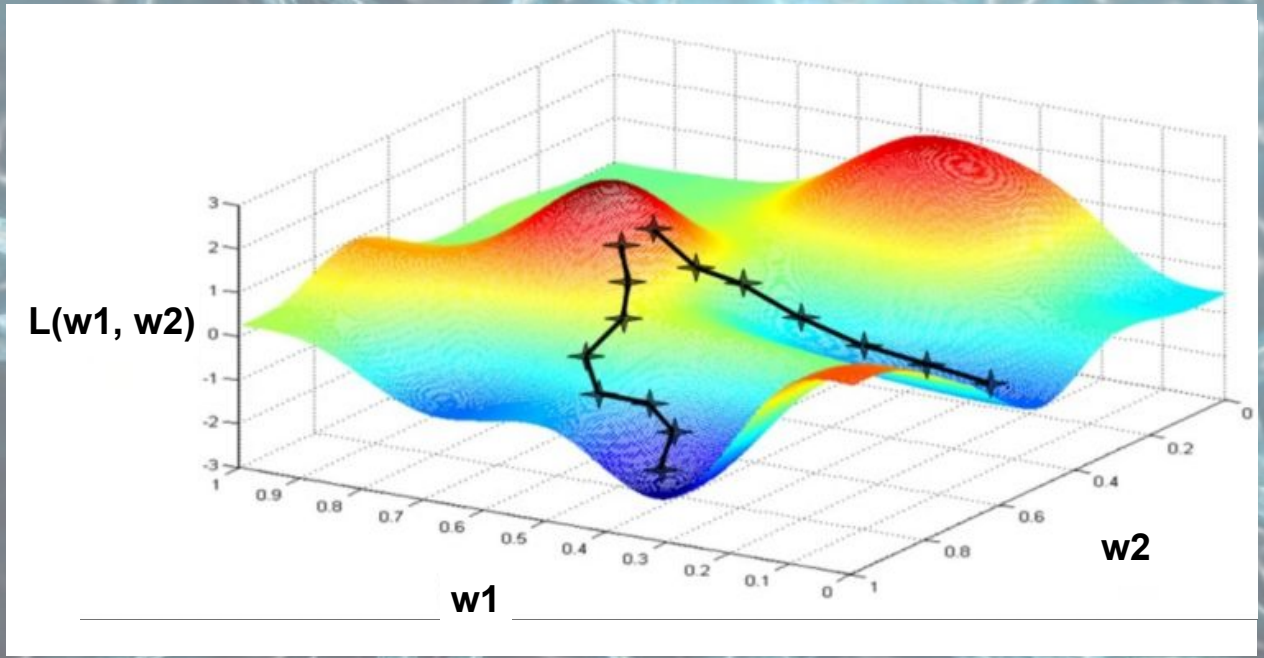
$$\delta^{(2)} = \sigma(W^{(2)T}\delta^{(3)}).*a'^{(2)}$$

~~$\delta^{(1)}$~~

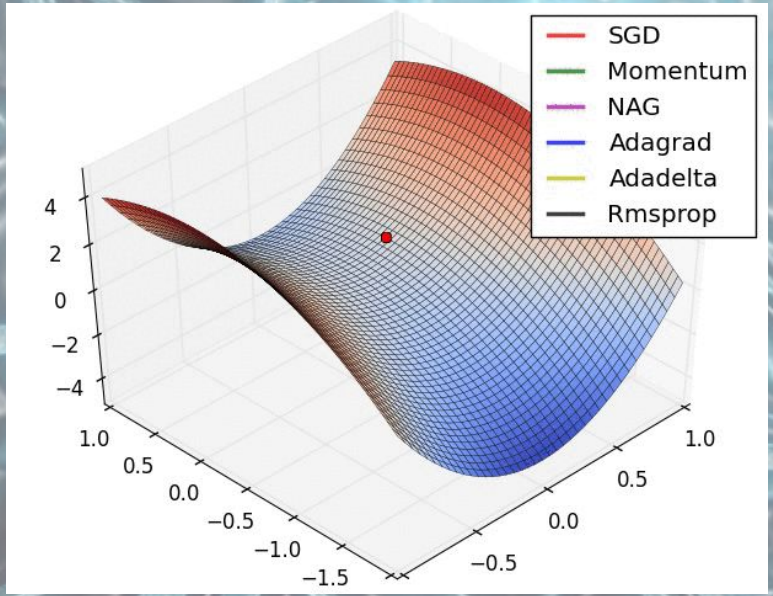
$$a'^{(L)} = a^{(L)}.*(1 - a^{(L)})$$

$$\frac{\partial L(W)}{\partial W^{(L)}} = \delta^{(L+1)}a^{(L)T}$$

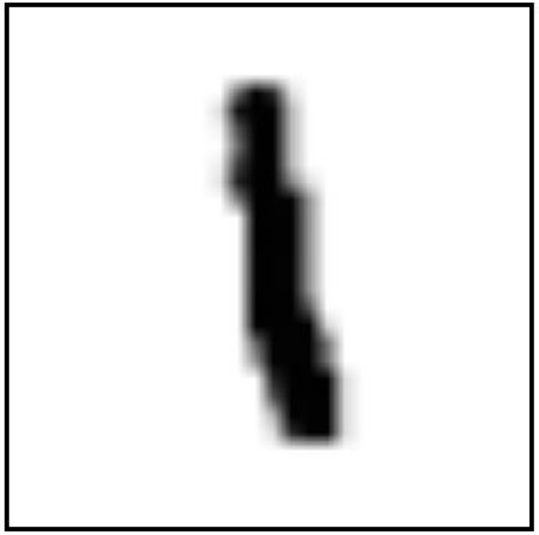
Método do Gradiente (Gradient Descent)



Otimizadores usados em Redes Neurais



DEMO: TensorFlow e MNIST



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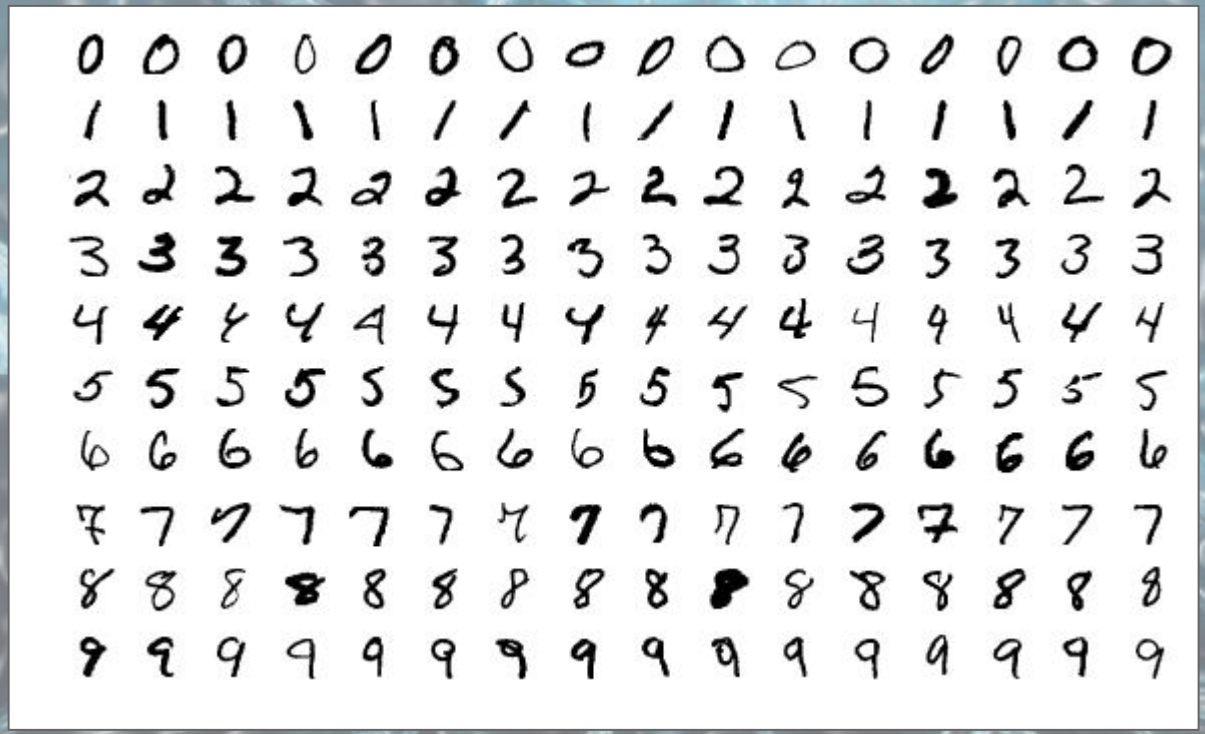
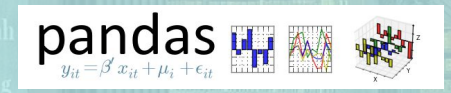
$$
\begin{bmatrix}
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & .6 & .8 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & .7 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & .7 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & .5 & 1 & .4 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & .4 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & .4 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & .7 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & .9 & 1 & .1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & .3 & 1 & .1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0
\end{bmatrix}
$$

DEMO: TensorFlow e MNIST

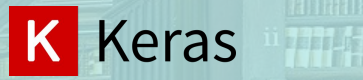


Principais



Notebook

Machine Learning



Visualização

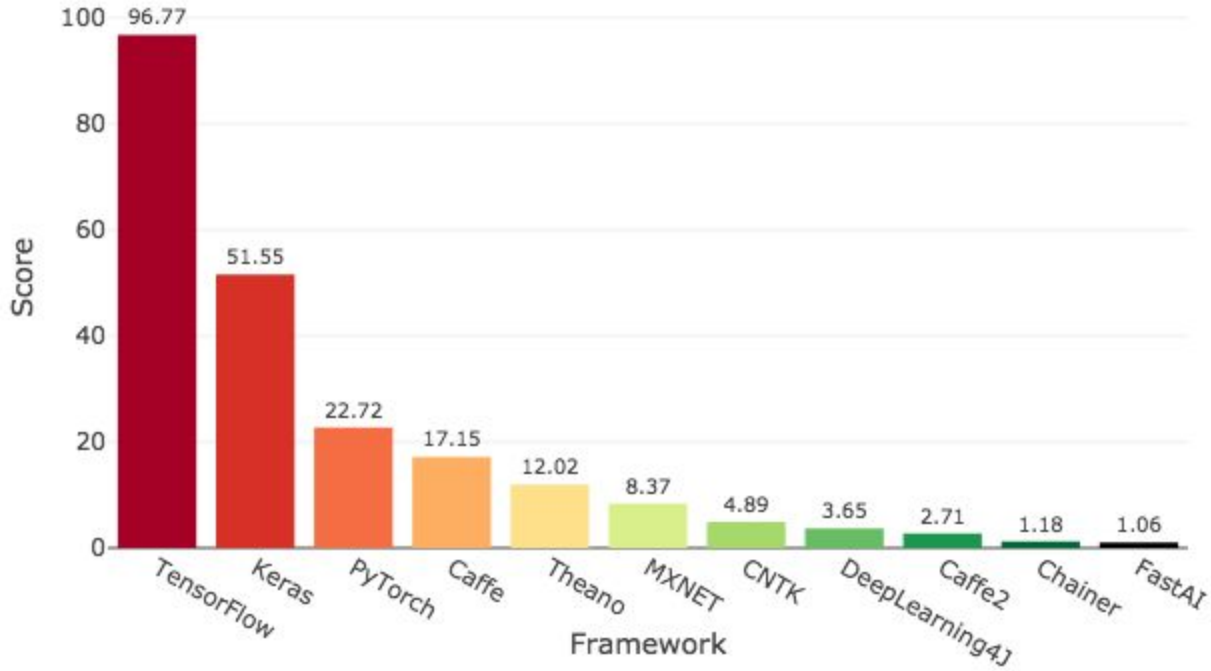
NLP

Visão Computacional

Estatística

Big Data

Web Scraping


Deep Learning Framework Power Scores 2018
Score
100
80
60
40
20
0
96.77
51.55
22.72
17.15
12.02
8.37
4.89
3.65
2.71
1.18
1.06
TensorFlow
Keras
PyTorch
Caffe
Theano
MXNET
CNTK
DeepLearning4J
Caffe2
Chainer
FastAI
Framework

Canal no YouTube do Siraj Raval – root:~$Siraj Raval Artificial Intelligence Education
https://www.youtube.com/channel/UCWN3xxRkmTPmbKwht9FuE5A

Intro to TensorFlow for Deep Learning – UDACITY
https://www.udacity.com/course/intro-to-tensorflow-for-deep-learning--ud187

Introduction to TensorFlow for AI, ML, and DL – coursera
https://www.coursera.org/learn/introduction-tensorflow

Machine Learning Crash Course – Google
https://developers.google.com/machine-learning/crash-course

Machine Learning – coursera
https://www.coursera.org/learn/machine-learning/

Get Started – TensorFlow
https://www.tensorflow.org/tutorials

Hands-On Machine Learning with Scikit-Learn and TensorFlow
https://github.com/ageron/handson-ml2

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https://forms.gle/kubUGSSPPJZHWtTx9

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