



IA LEMANS STUDYGROUP

Batch 00



A group of approximately ten people are gathered around a campfire in a desert setting. They are sitting on wooden logs and a stone wall, holding mugs and bottles. The background features red rock formations and a clear sky.

STUDYGROUP

#BATCH00





Intelligence Artificielle

Machine Learning

Deep Learning

Démos



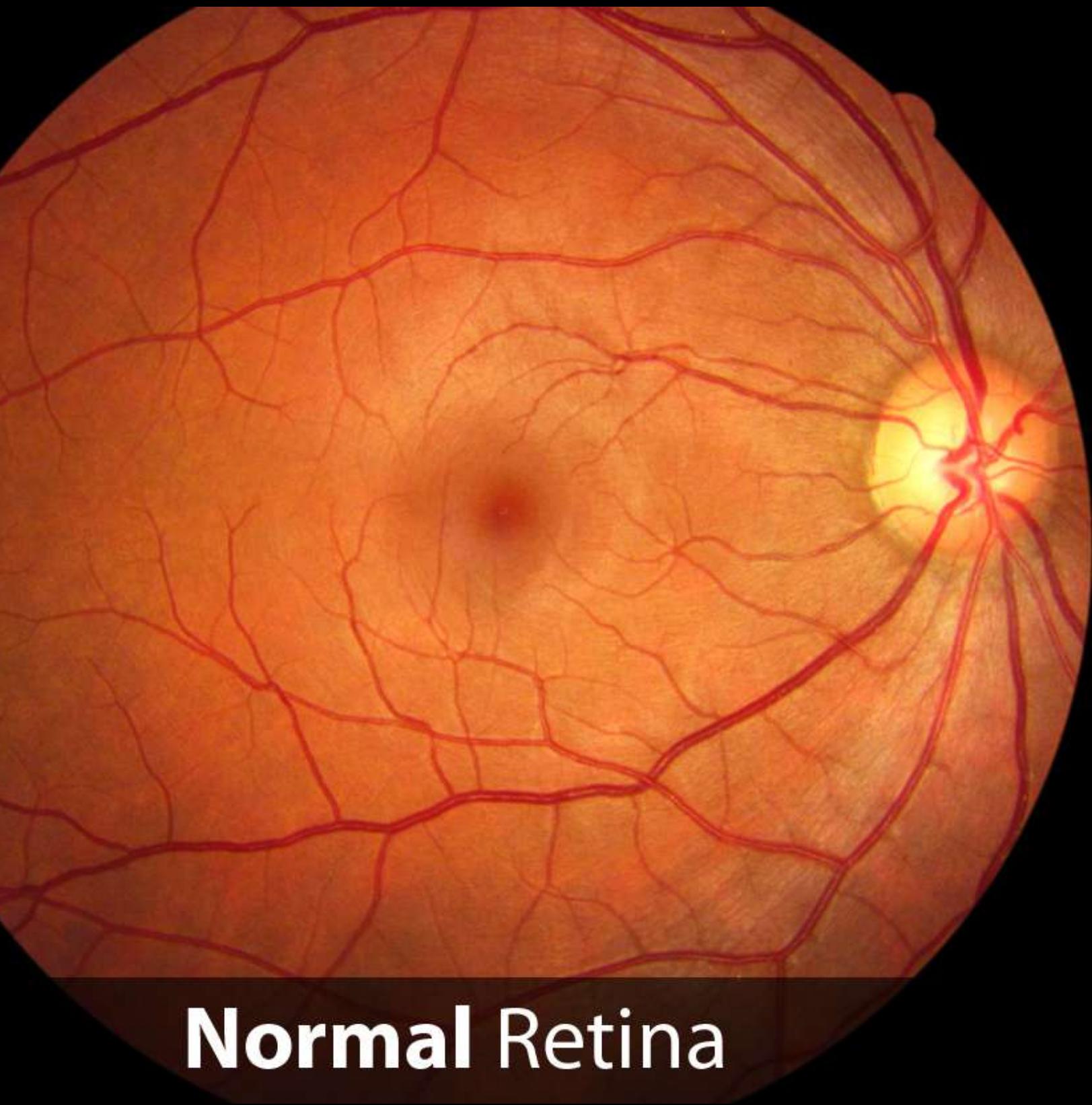
<http://deeplearning.net/demos/>

<http://www.cs.toronto.edu/~graves/handwriting.html>

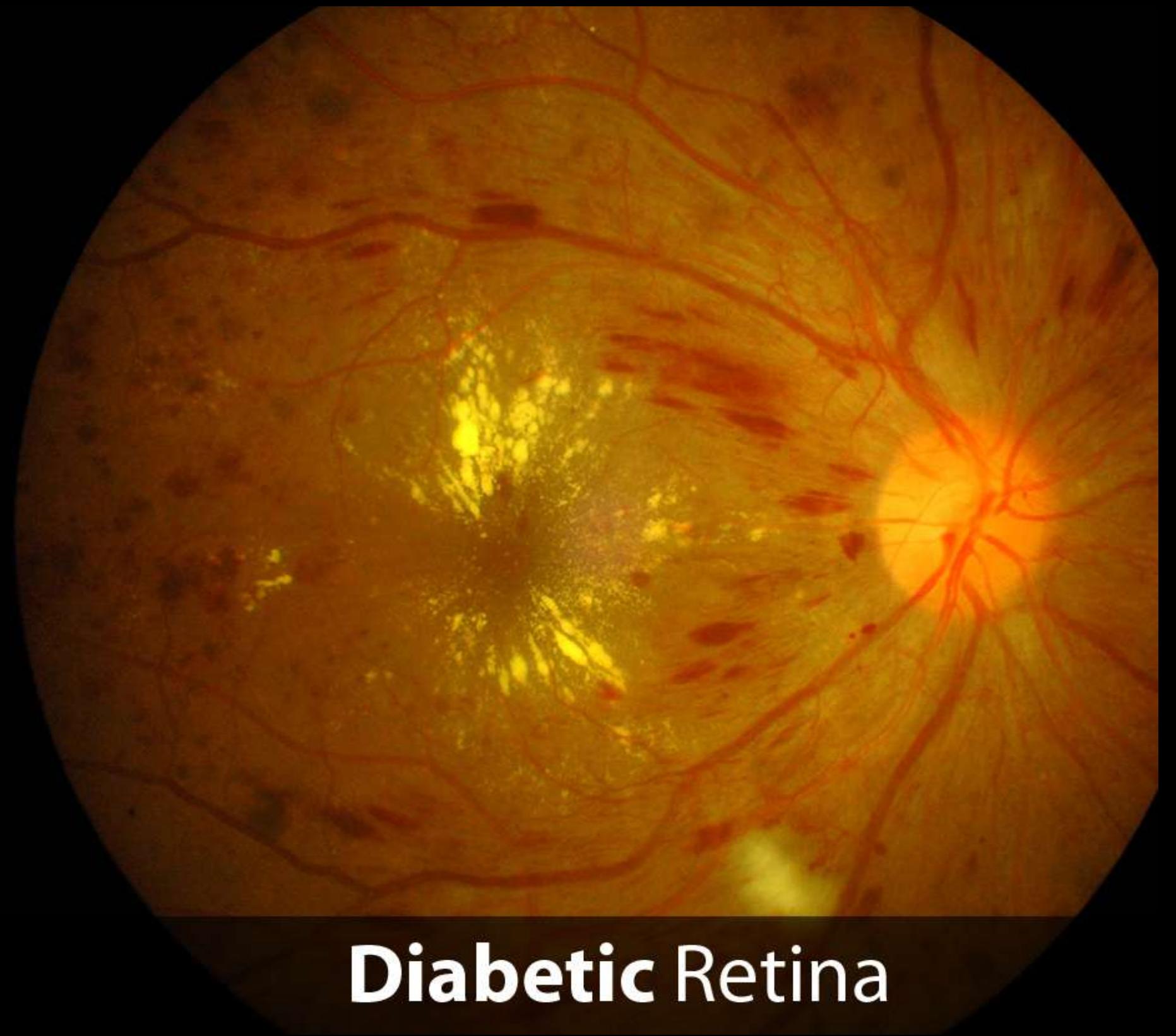
<http://demo.allennlp.org/>



À
QUOI
ÇA
SERT
?



Normal Retina



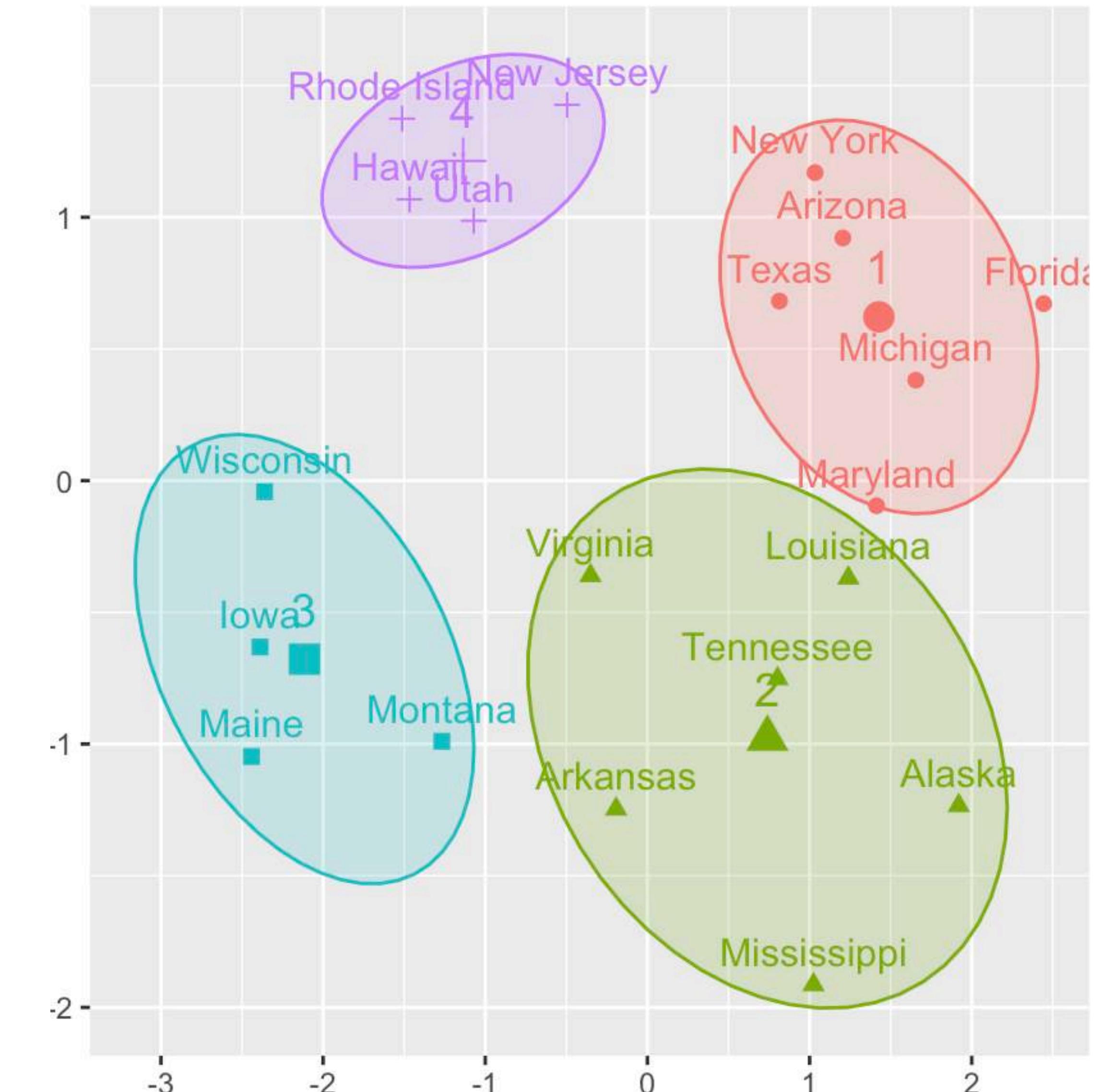
Diabetic Retina

ECOMMERCE



Filtrage Collaboratif : similarité et voisinage

MARKETING



Classification Clustering

Rankbrain SEO

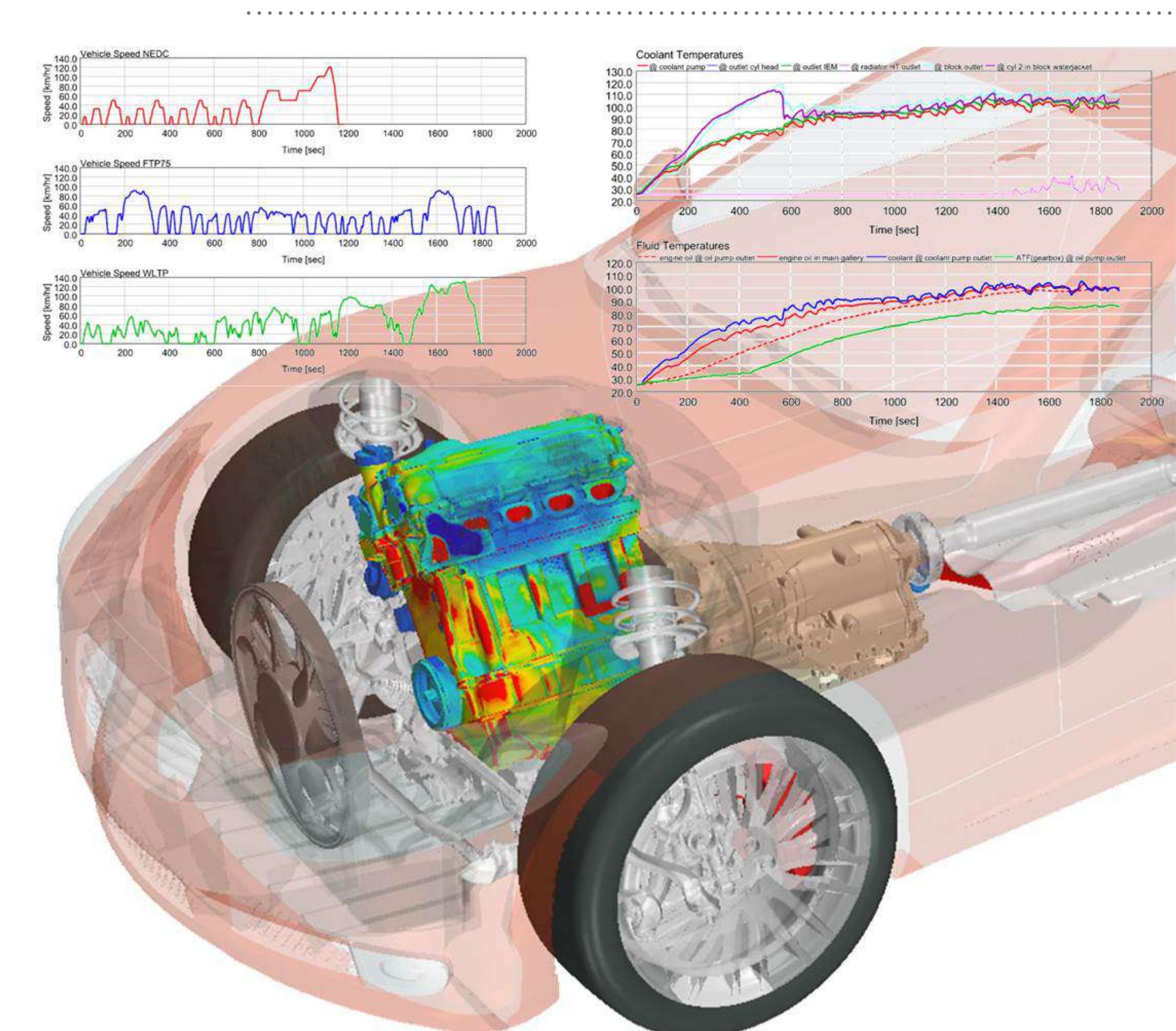
<http://blog.moov-up.fr/google-rankbrain-impact-seo/>



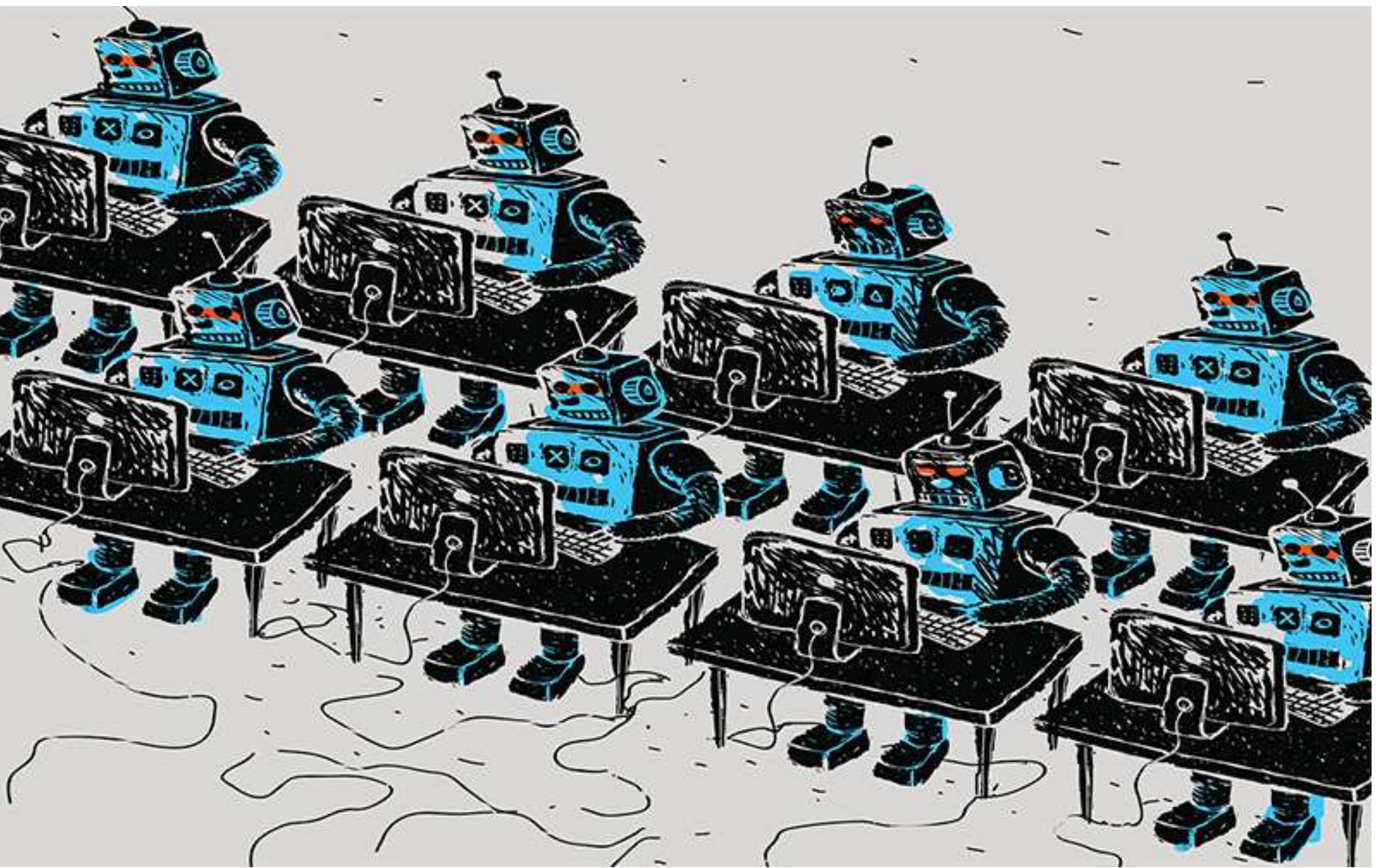
SÉCURITÉ | SUPERVISION



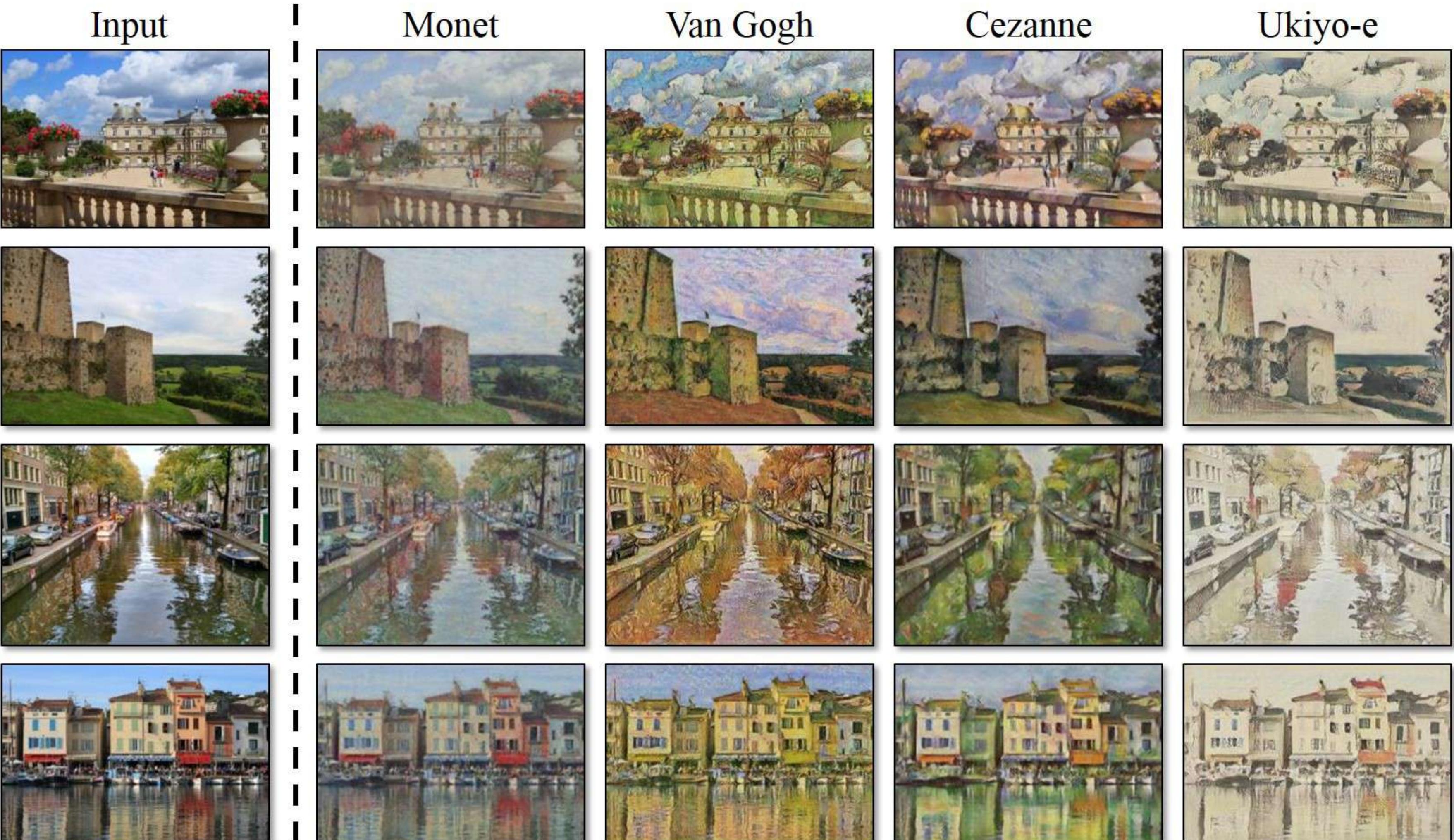
INDUSTRIE



GESTION D'ENTREPRISE



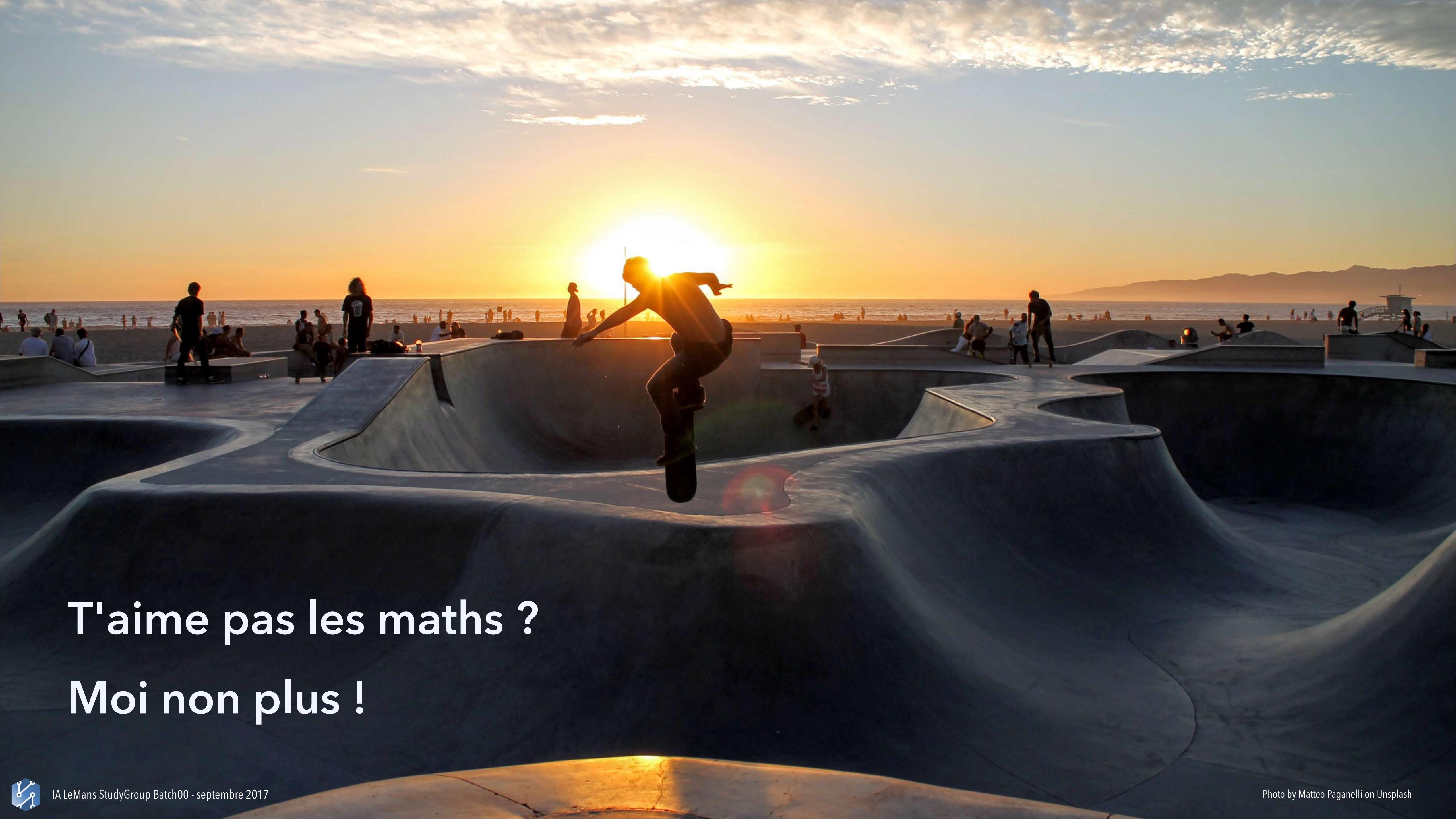
ART



<https://github.com/junyanz/CycleGAN>



IA LeMans StudyGroup Batch00 - septembre 2017



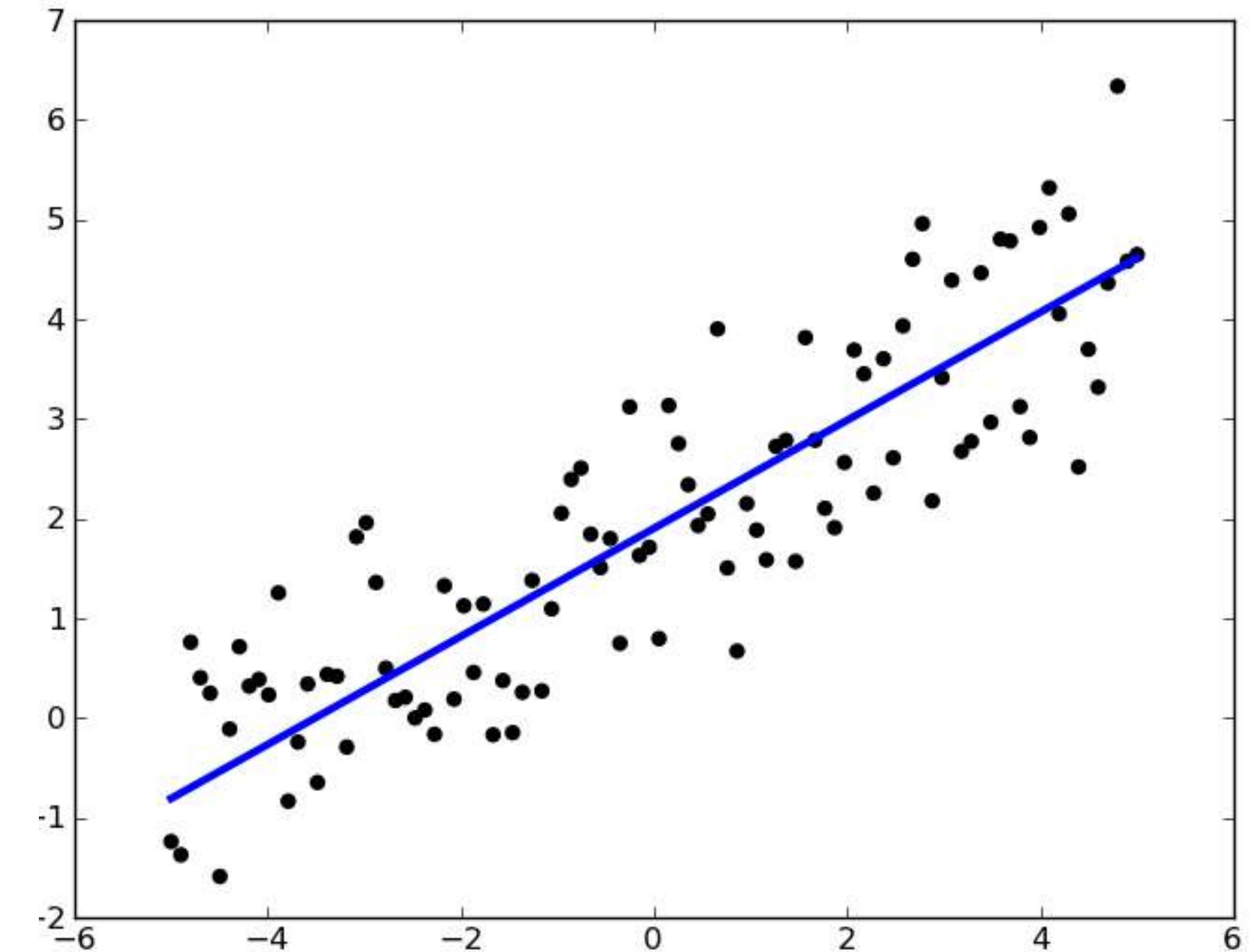
T'aime pas les maths ?
Moi non plus !

HISTOIRE DE DISTANCES



Objectifs :

Trouver la droite qui passe le « plus près » de tous les points d'un jeu de données



http://scikit-learn.sourceforge.net/0.7/auto_examples/linear_model/plot_sgd_ols.html

RÉGRESSION LINÉAIRE



Hypothèse :

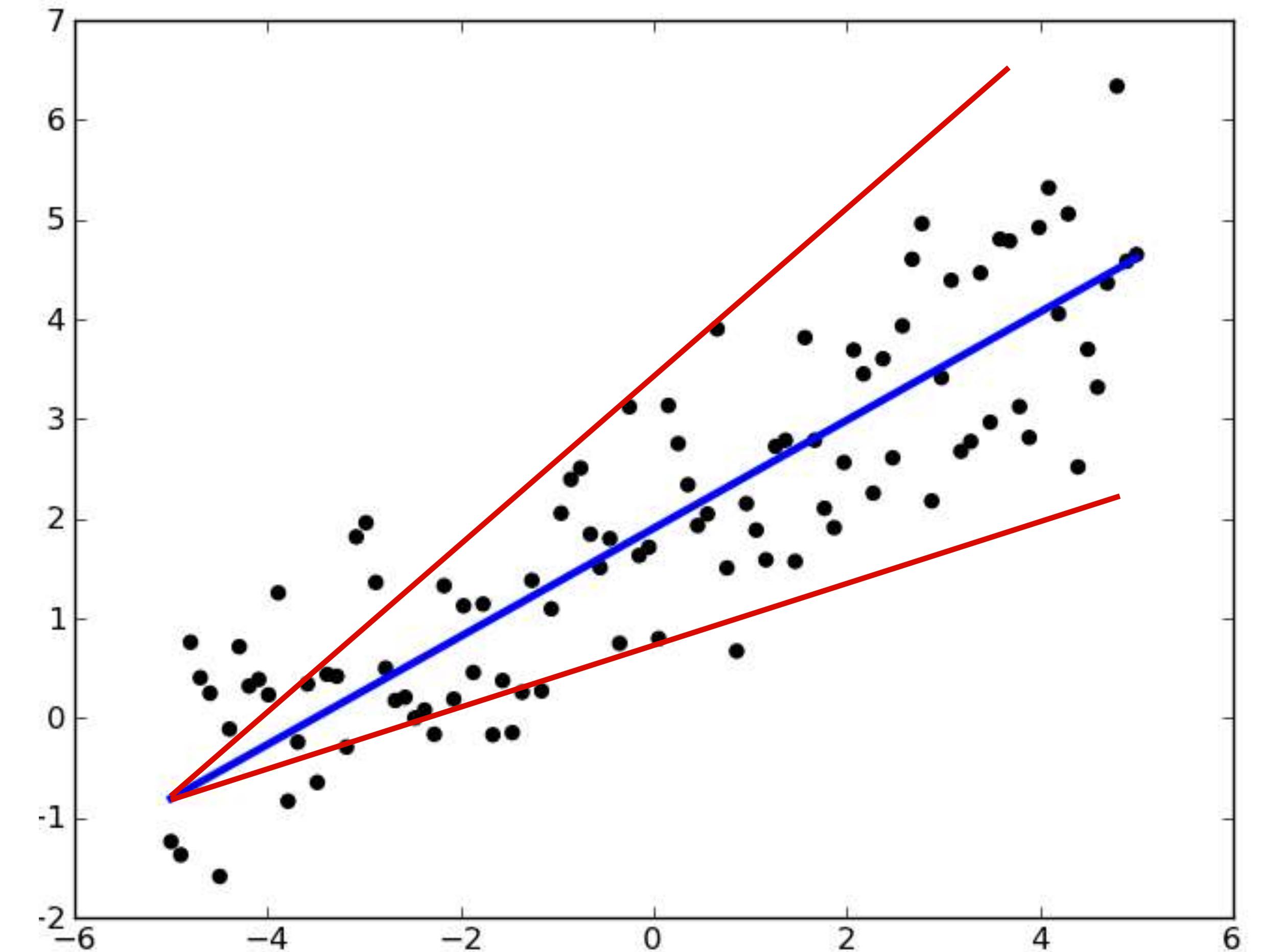
$$h_{\theta}(x) = \theta_0 + \theta_1 x$$

Cost Function :

$$J(\theta) = \frac{1}{2m} \sum (h_{\theta}(x^{(i)}) - y^{(i)})^2$$

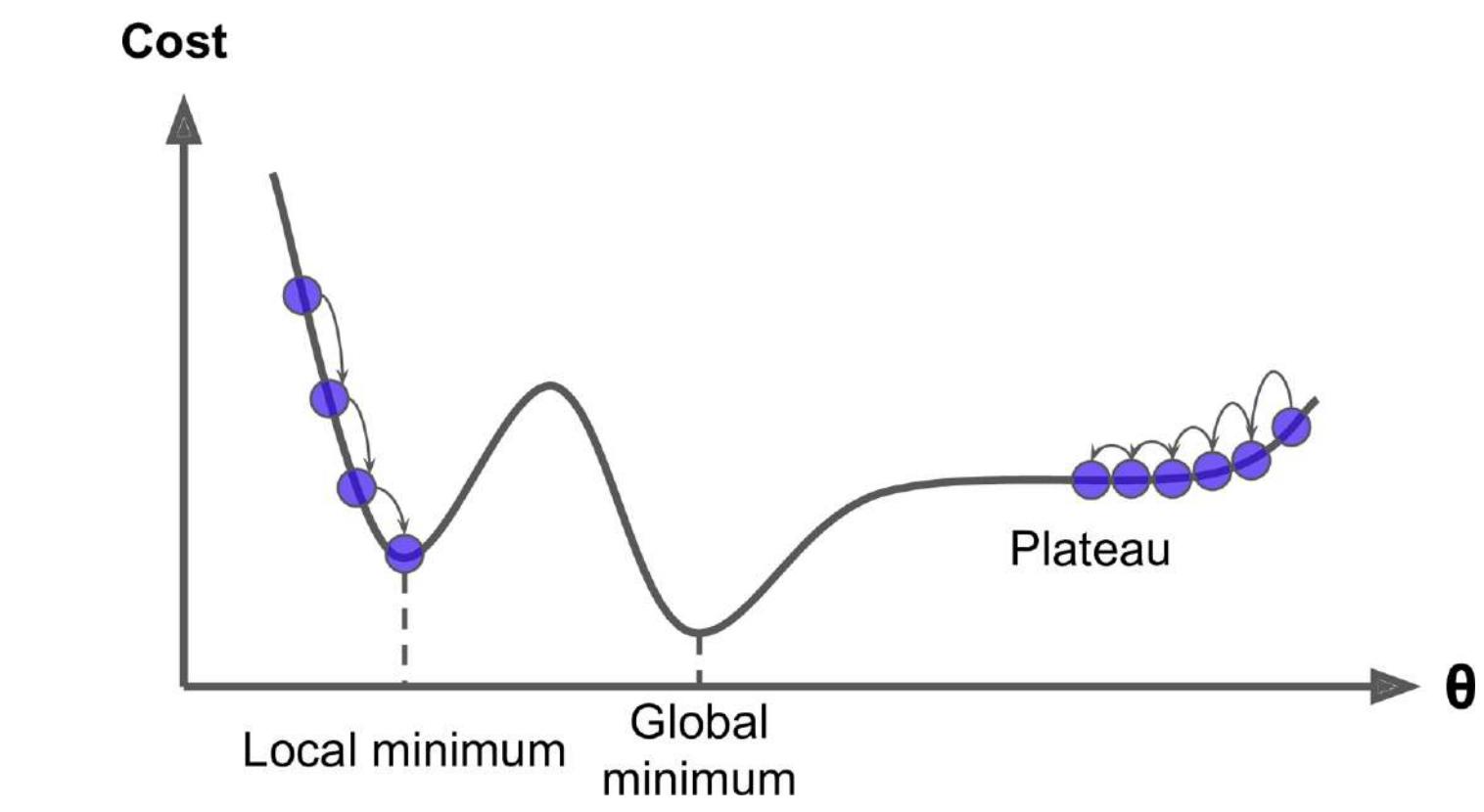
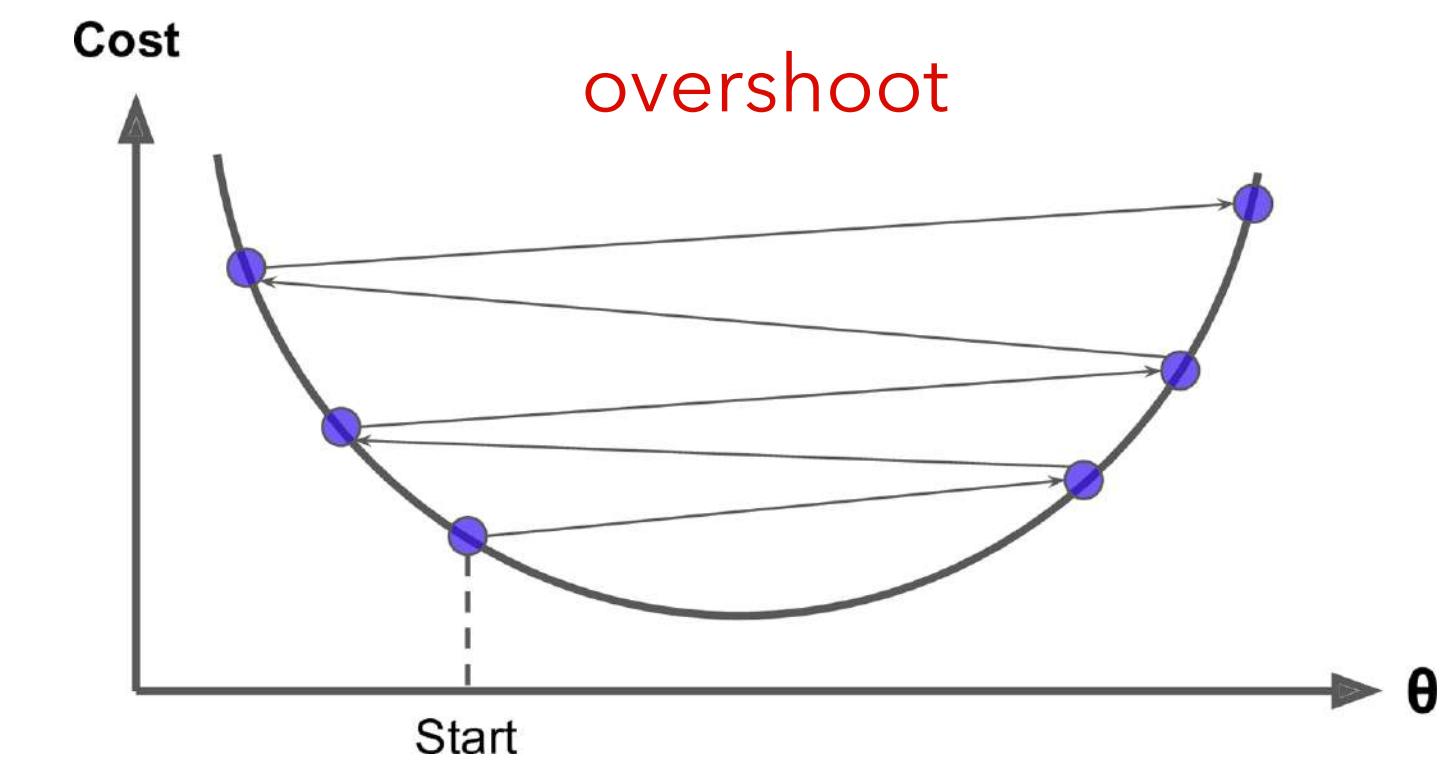
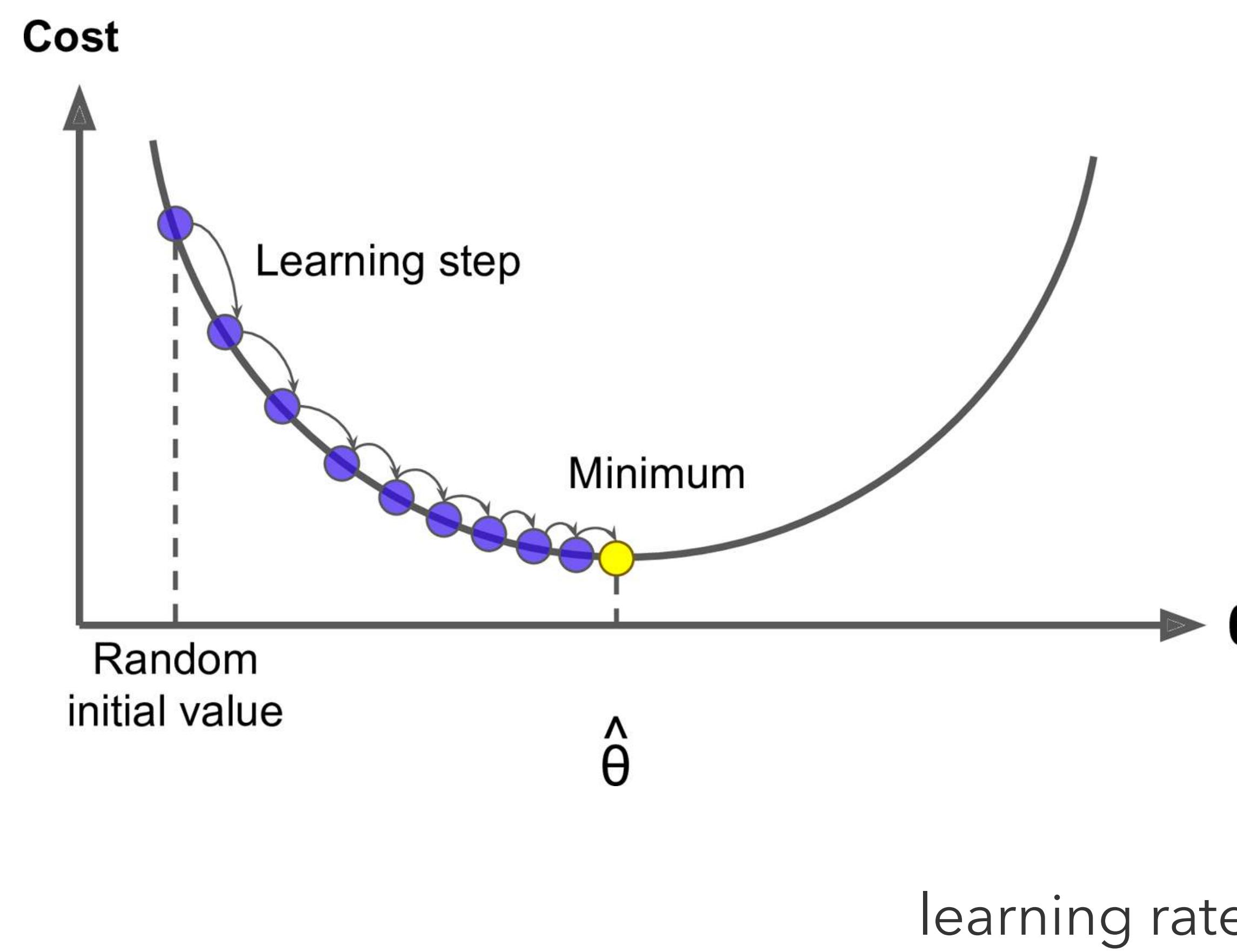
Objectifs :

Déterminer les valeurs des paramètres pour minimiser la valeur de la Cost Function



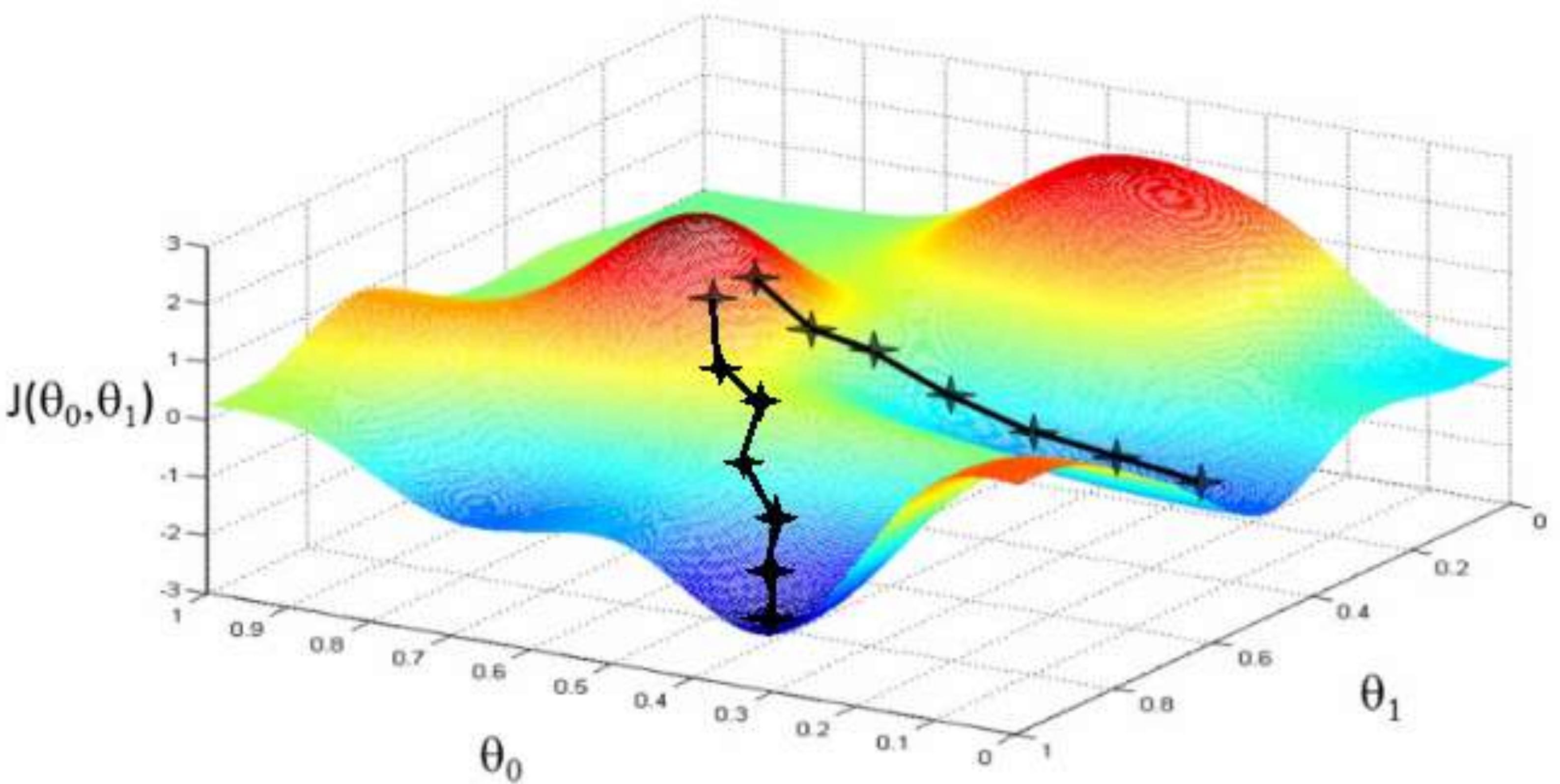


MÉTHODE ITÉRATIVE DU GRADIENT





MÉTHODE ITÉRATIVE DU GRADIENT

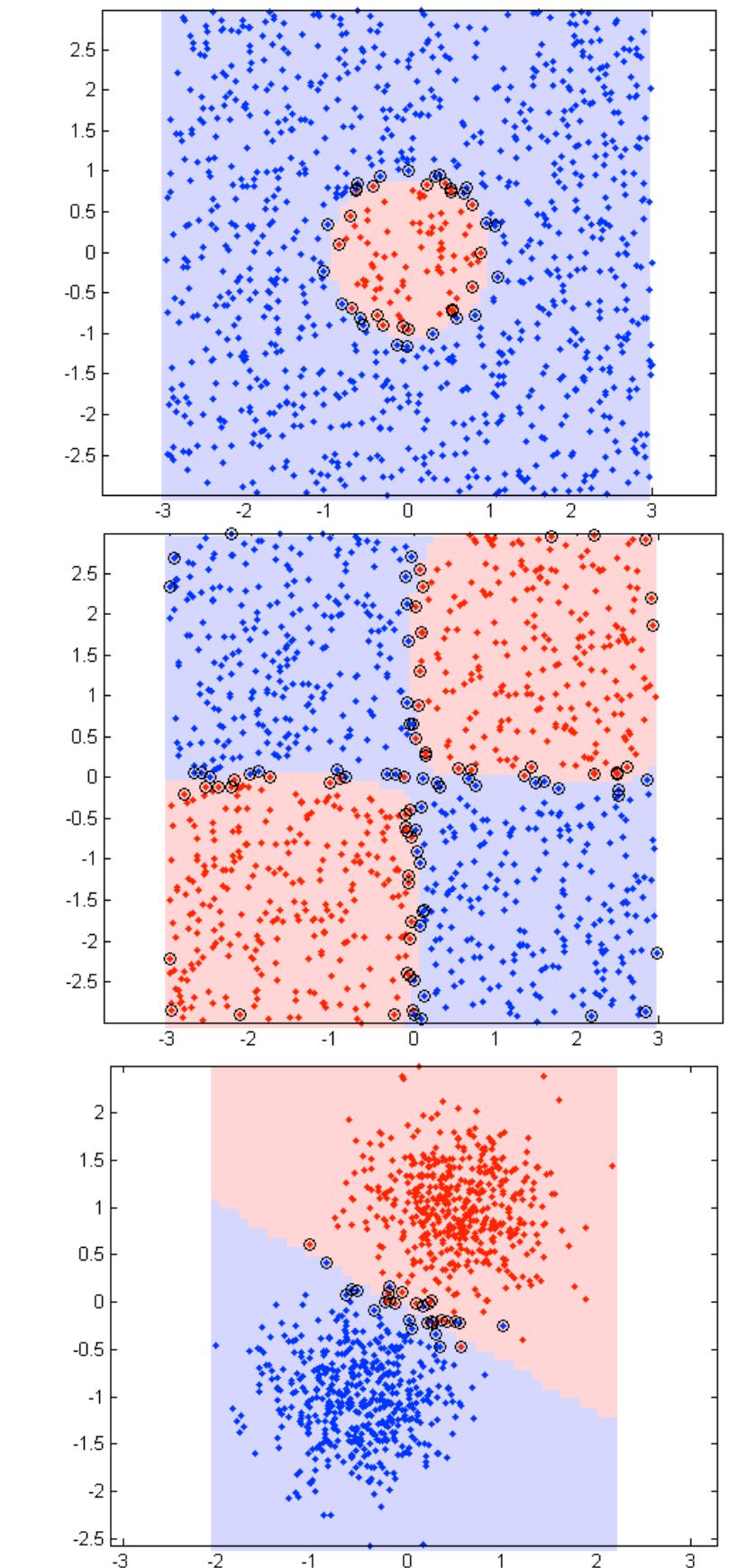
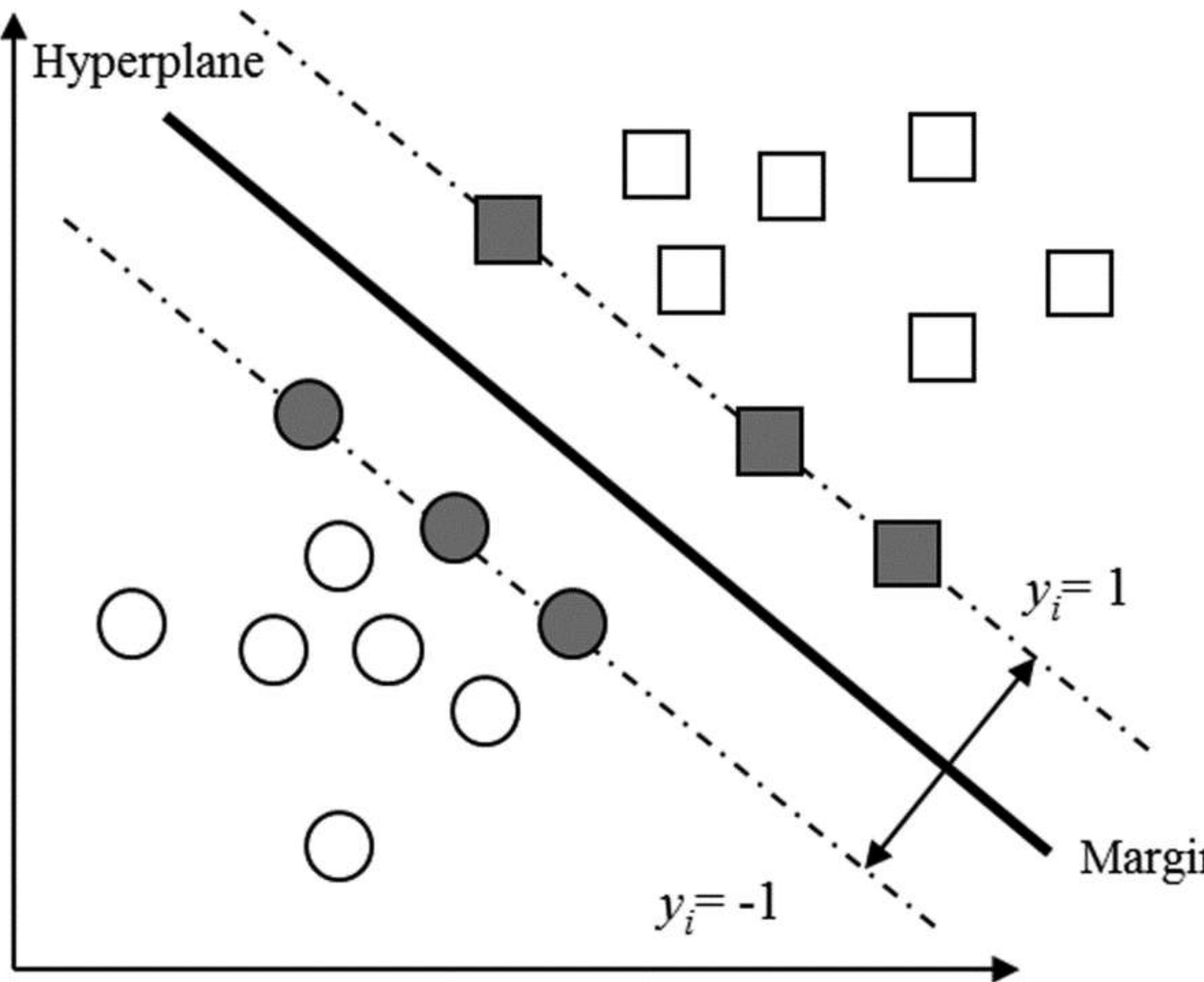


algorithmes d'optimisation | SGD | ADAGRAD | ADAM

<https://www.analyticsvidhya.com/blog/2017/03/introduction-to-gradient-descent-algorithm-along-its-variants/>



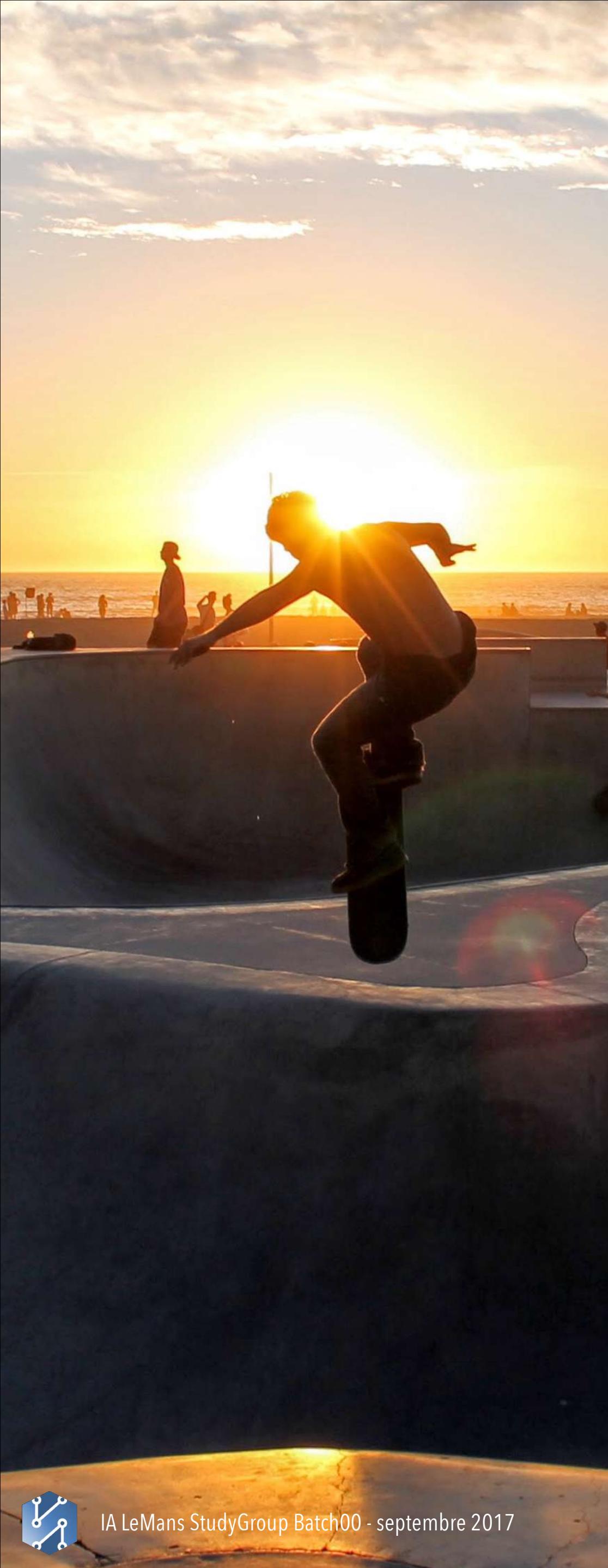
CLASSIFICATION / SUPPORT VECTOR MACHINE



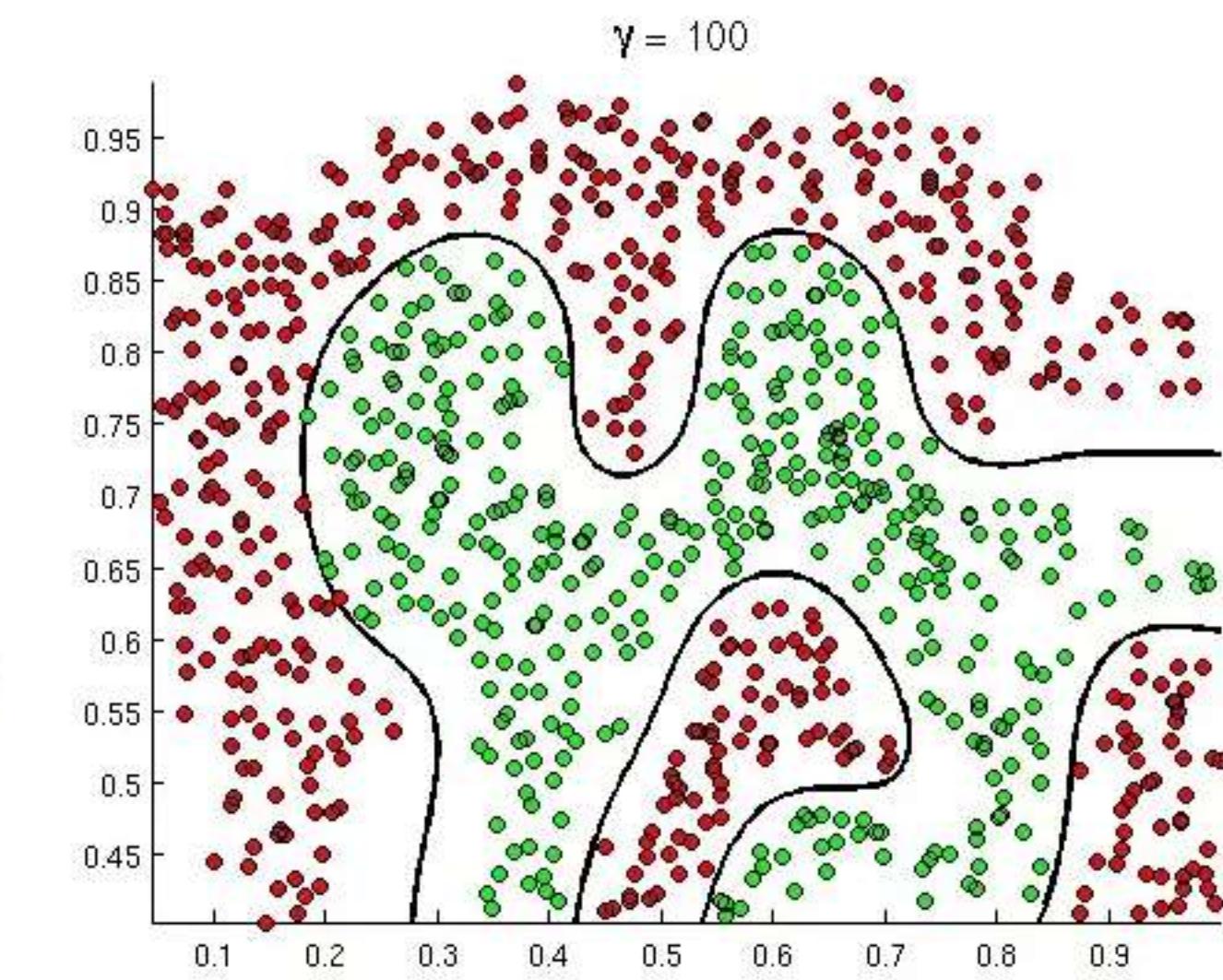
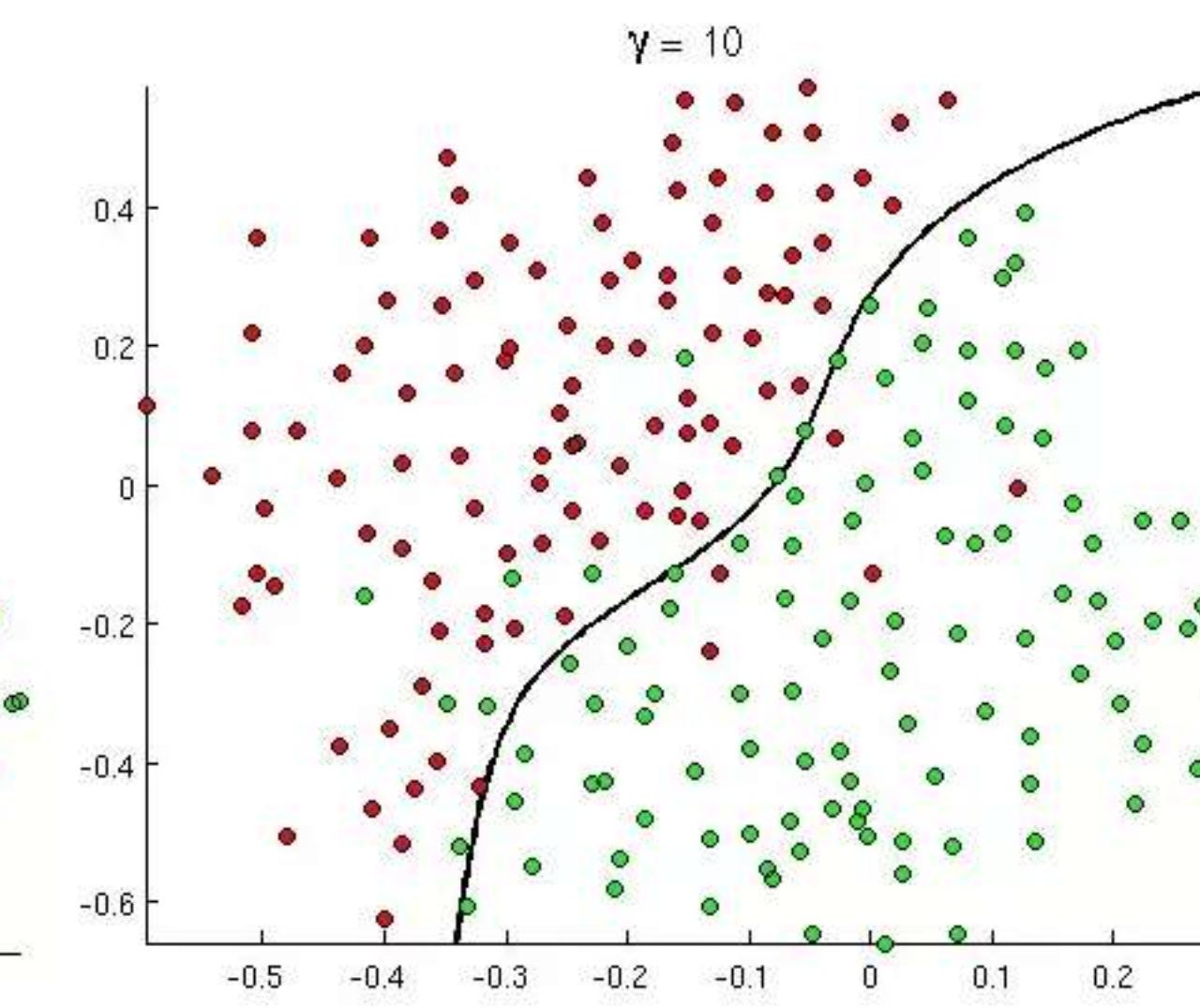
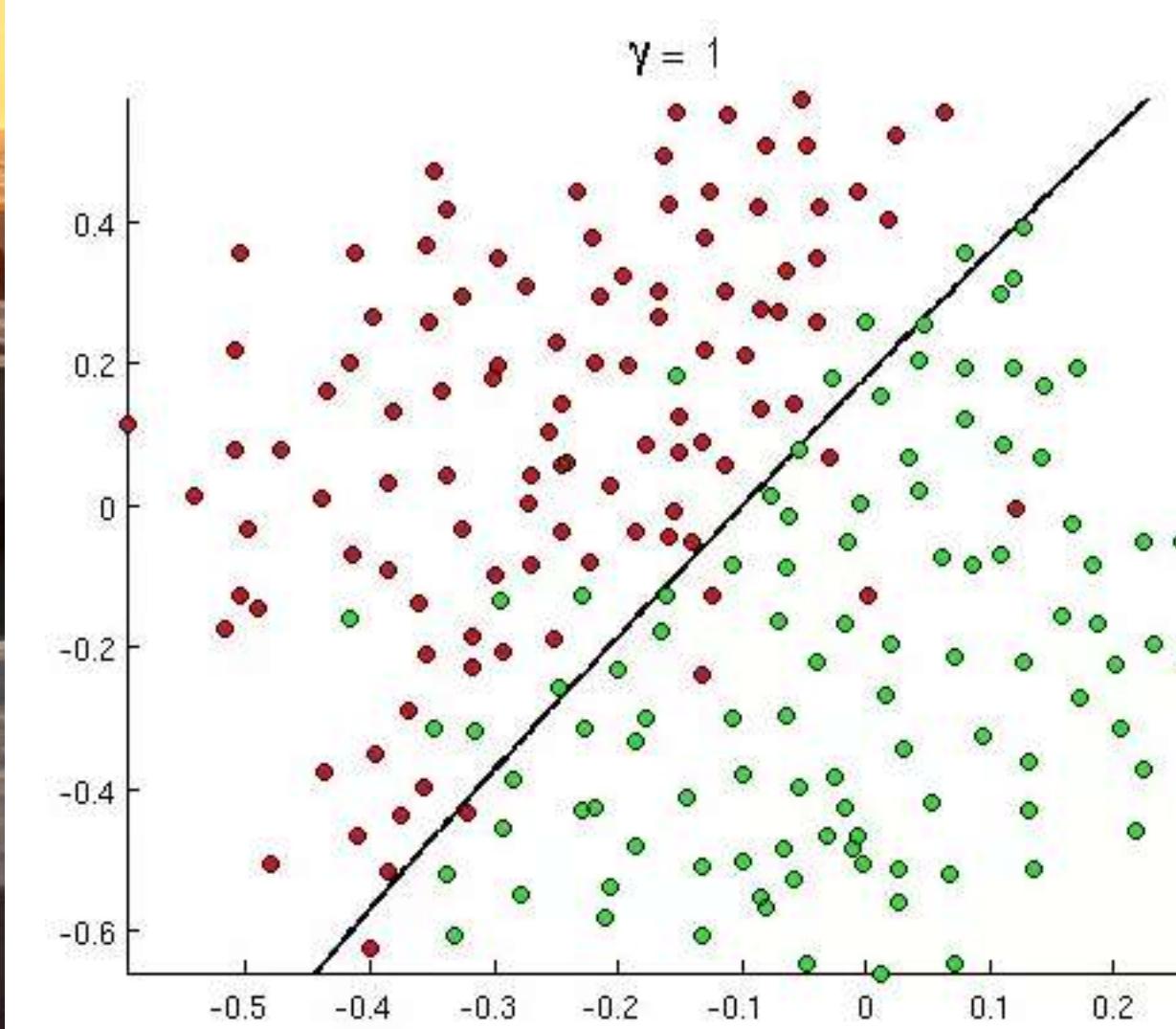
méthode de classification binaire par apprentissage supervisé

<http://www.alivelearn.net/?p=912>

<http://manufacturingscience.asmedigitalcollection.asme.org/article.aspx?articleid=1894974>



RÉGRESSION LINÉAIRE | RÉGRESSION LOGISTIQUE | SVM



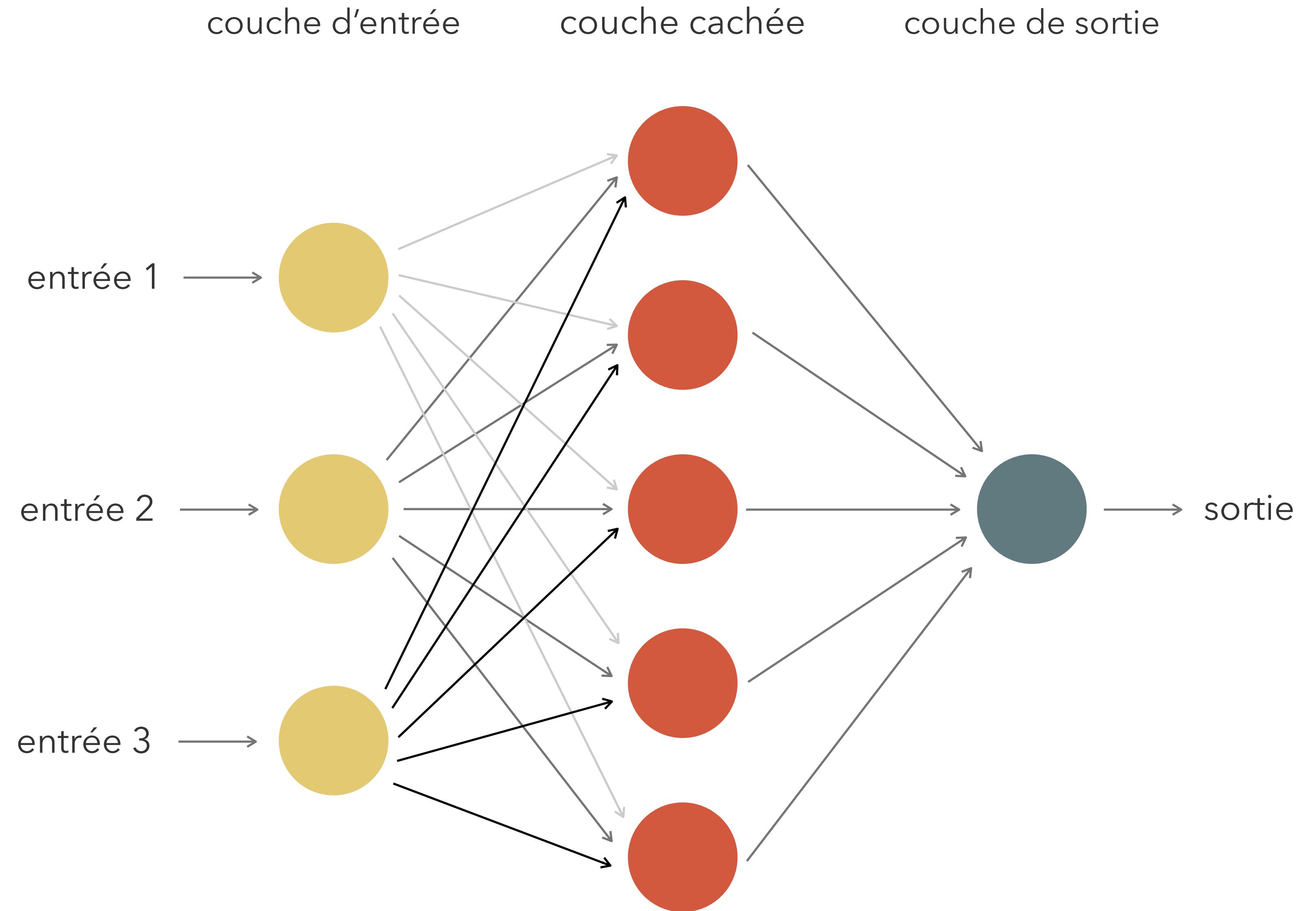
<https://www.quora.com/What-are-the-advantages-of-support-vector-machines-SVM-compared-with-linear-regression-or-logistic-regression>



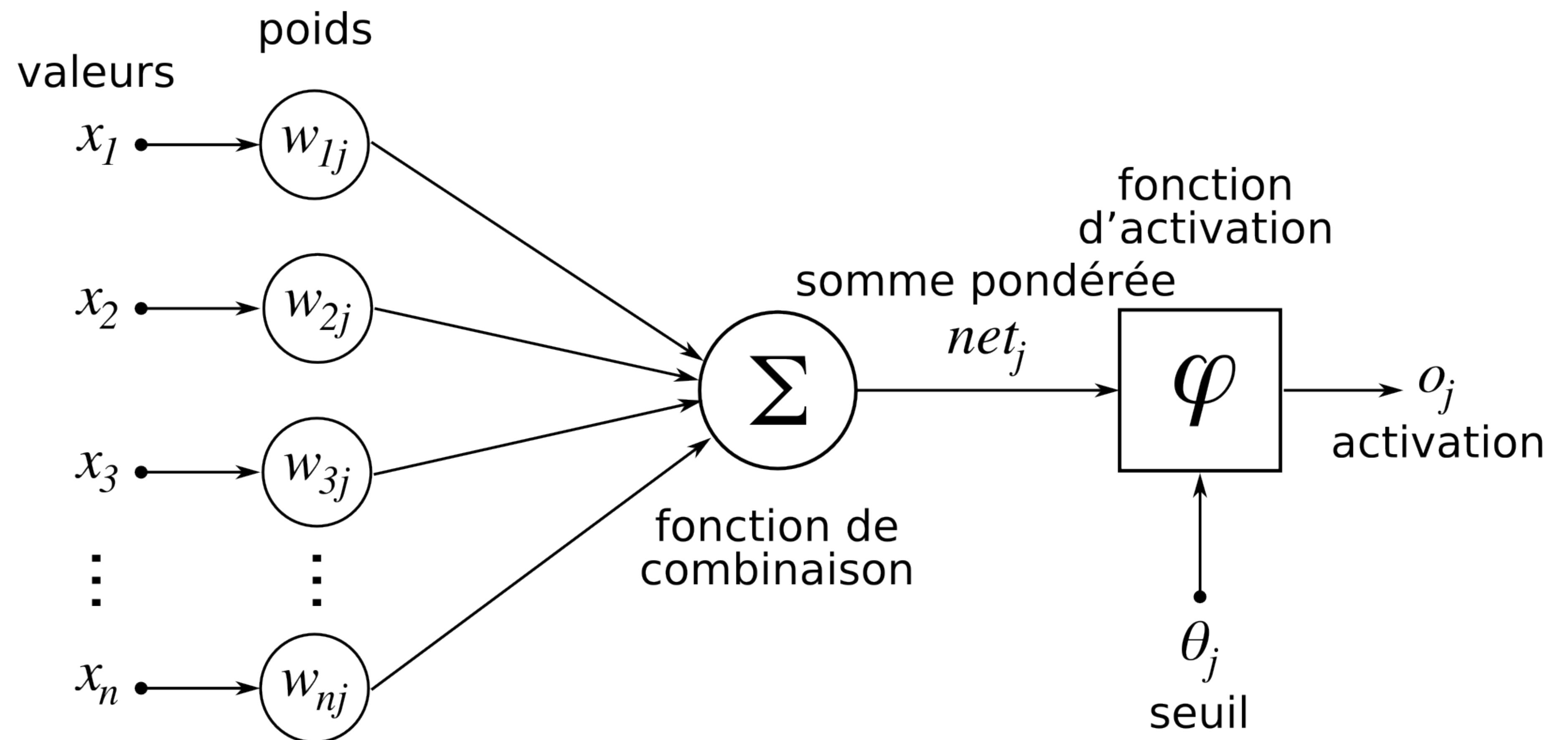
Et les réseaux de neurones alors ?



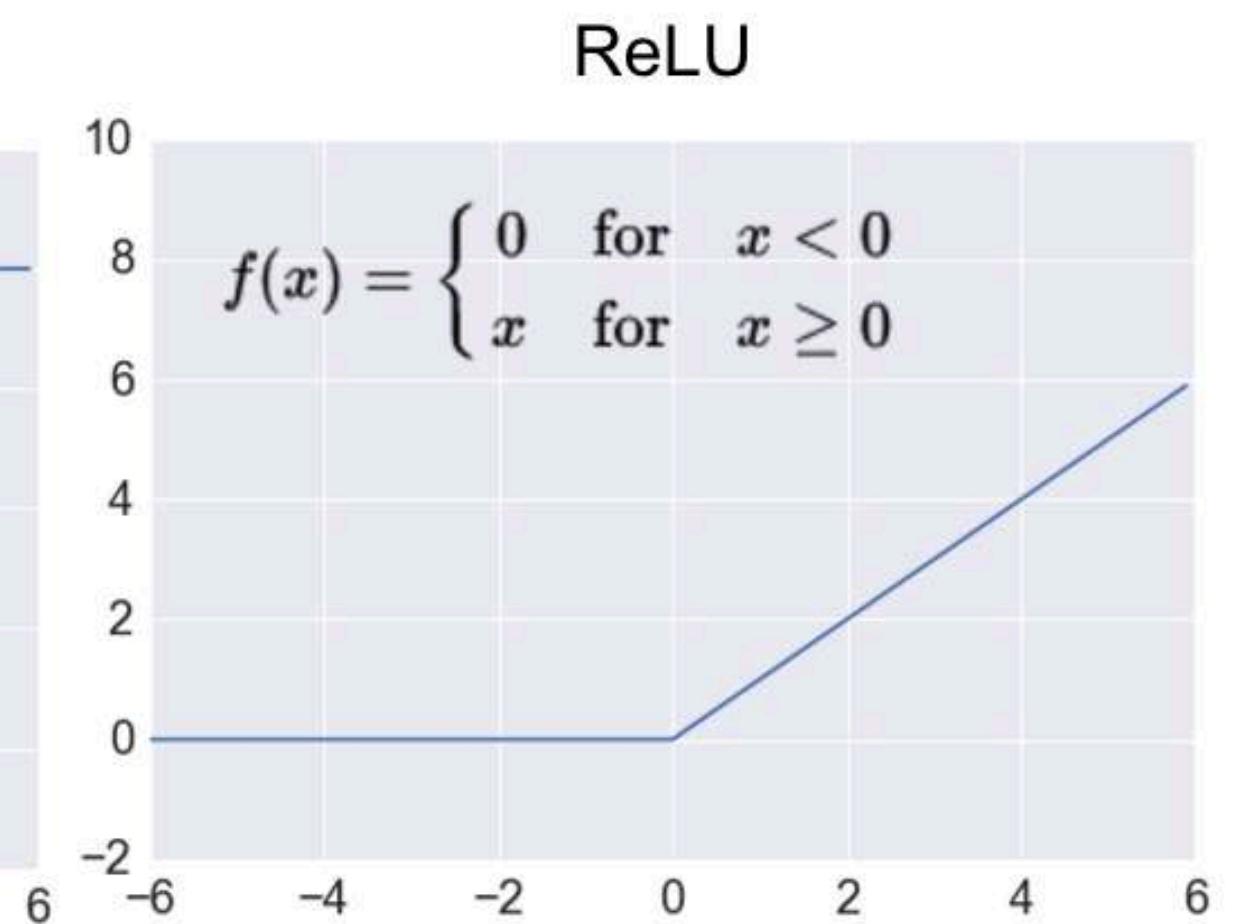
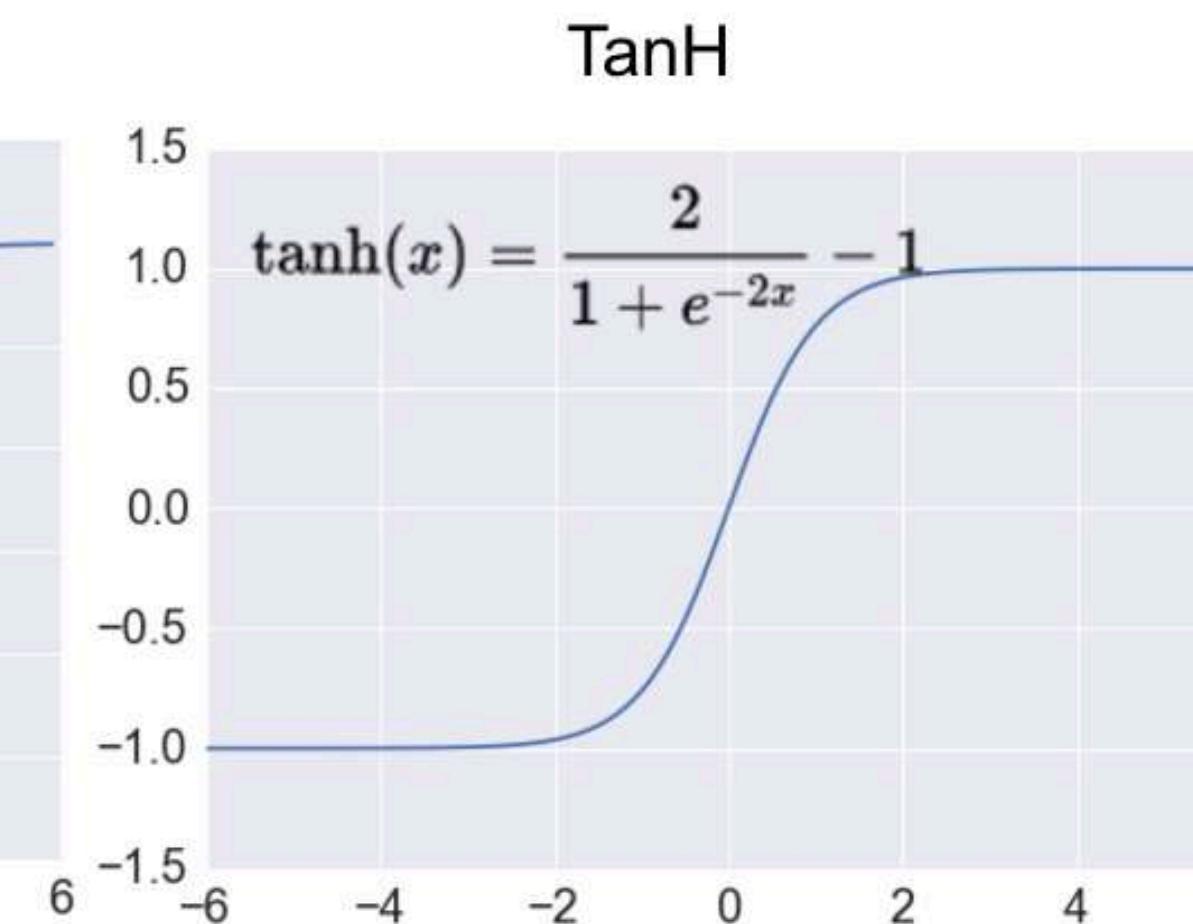
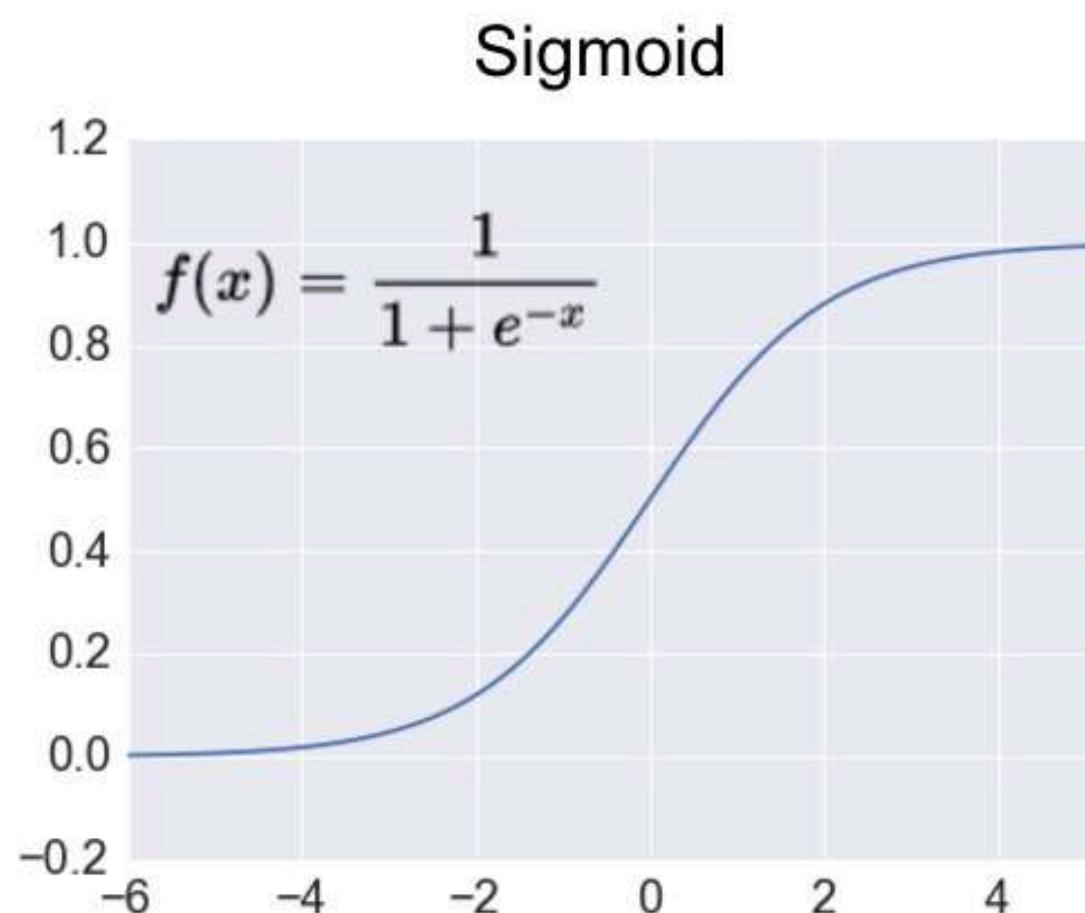
NEURAL NETS



NEURAL NETS



FONCTIONS D'ACTIVATION



<http://adilmoujahid.com/posts/2016/06/introduction-deep-learning-python-cafe/>

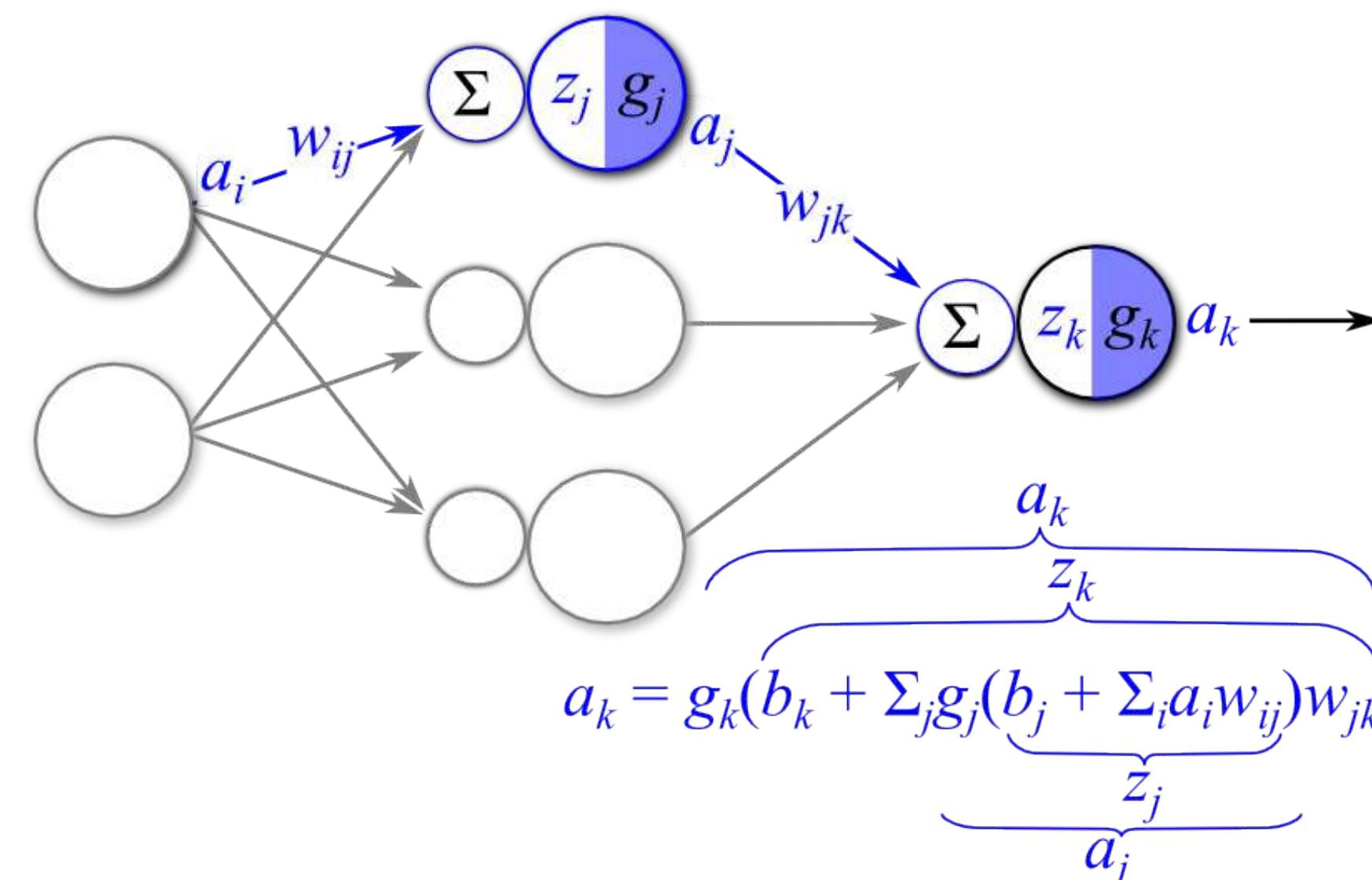


<http://dataaspirant.com/2017/03/07/difference-between-softmax-function-and-sigmoid-function/>

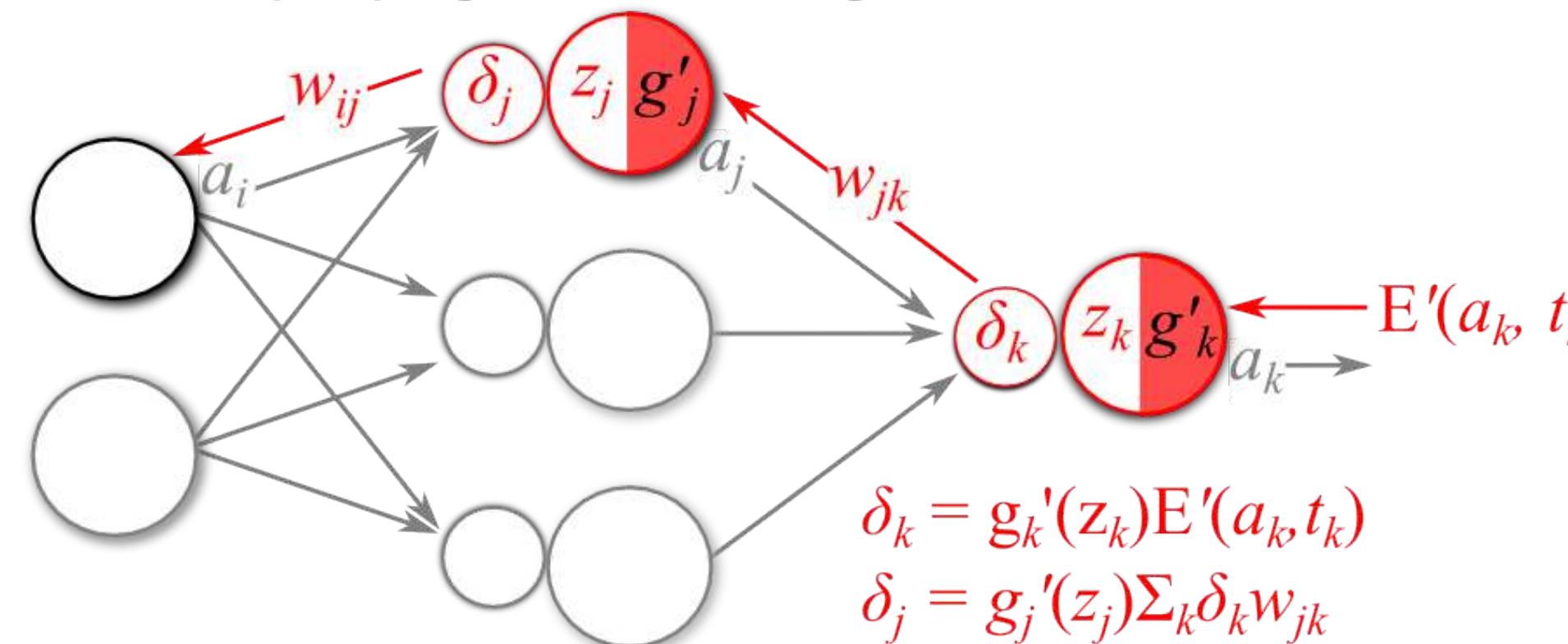


FORWARD / BACKWARD PROPAGATION

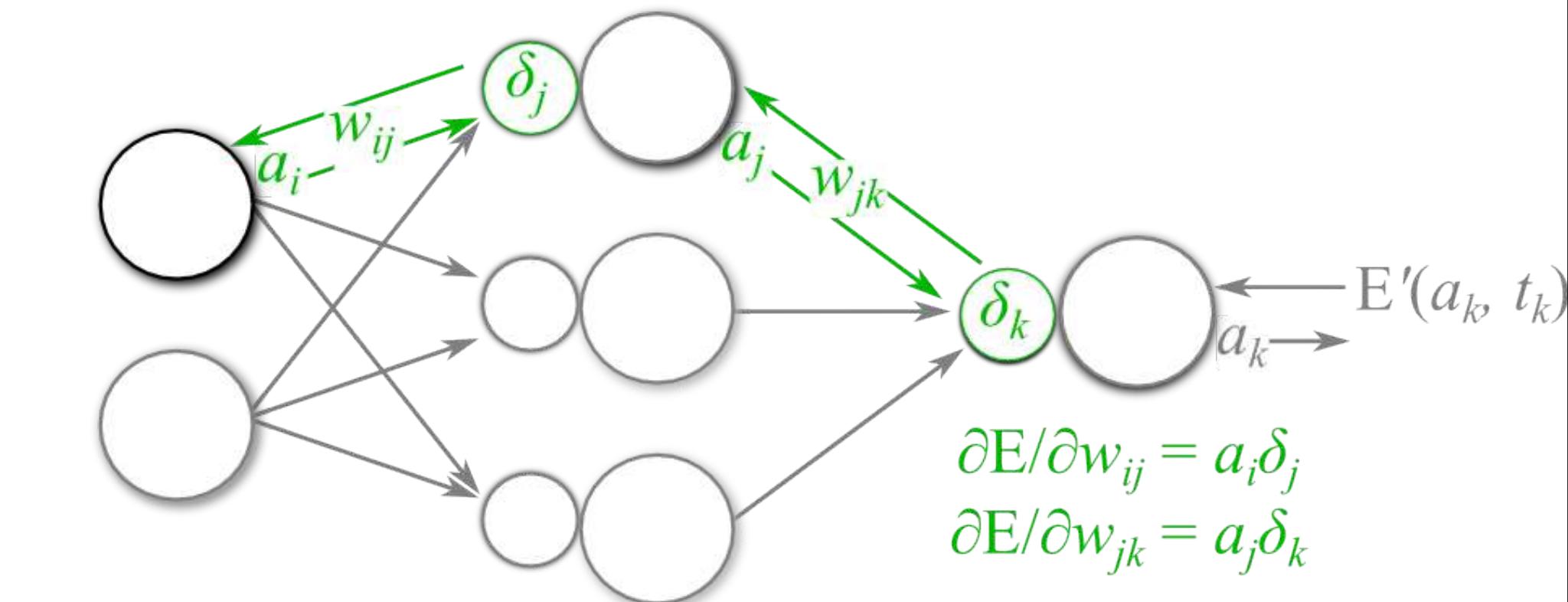
I. Forward-propagate Input Signal



II. Back-propagate Error Signals



III. Calculate Parameter Gradients



IV. Update Parameters

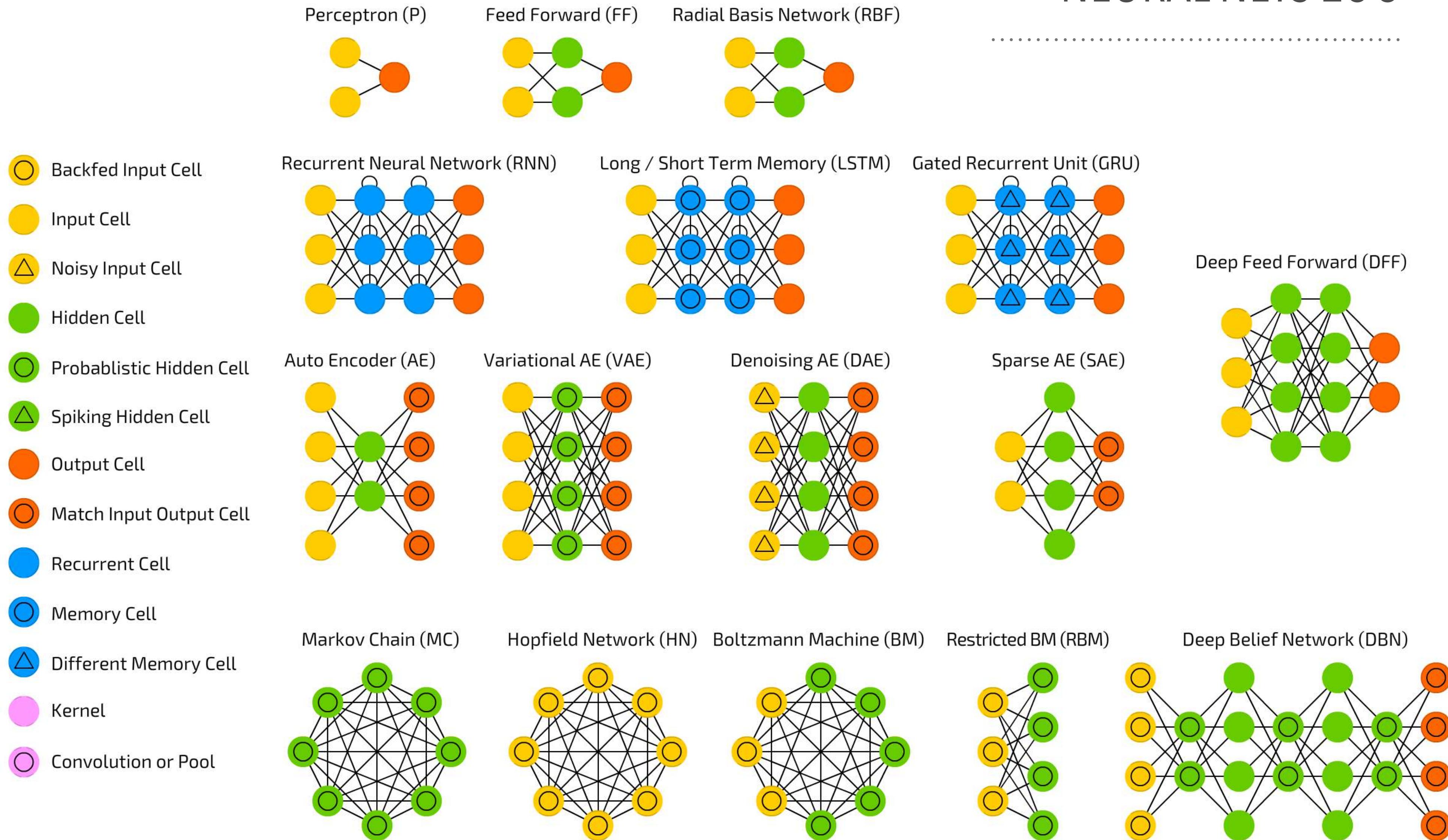
$$w_{ij} = w_{ij} - \eta(\frac{\partial E}{\partial w_{ij}})$$

$$w_{jk} = w_{jk} - \eta(\frac{\partial E}{\partial w_{jk}})$$

for learning rate η

<https://theclevermachine.wordpress.com/2014/09/11/a-gentle-introduction-to-artificial-neural-networks/>

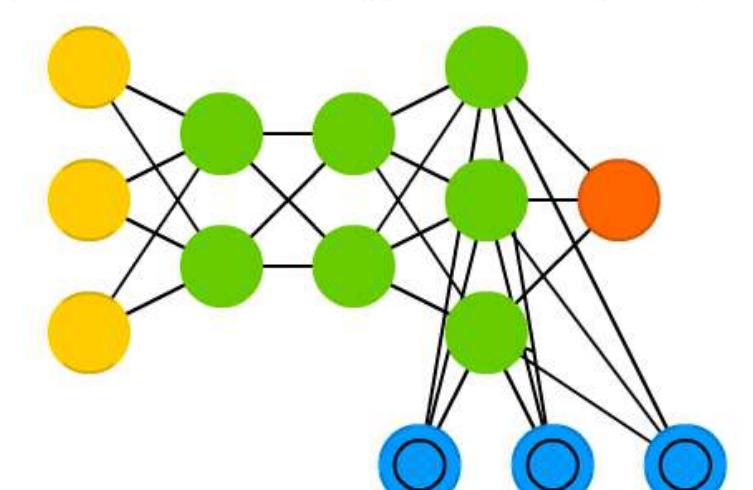
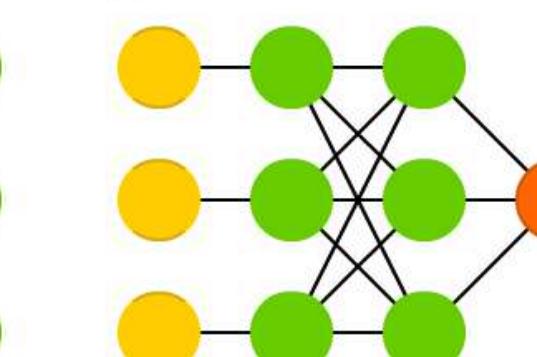
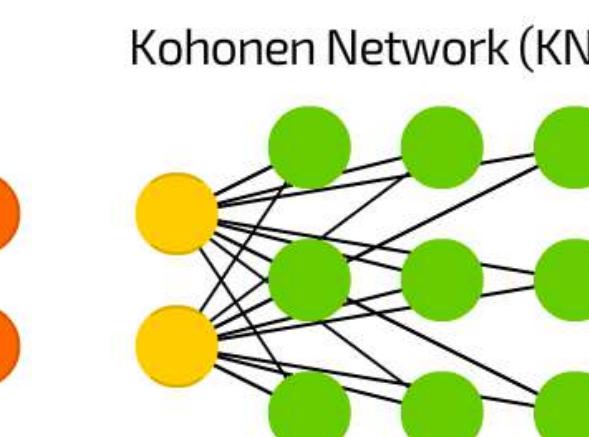
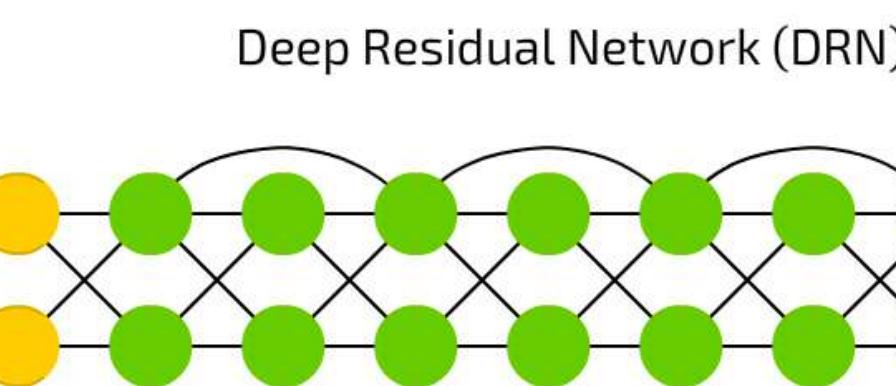
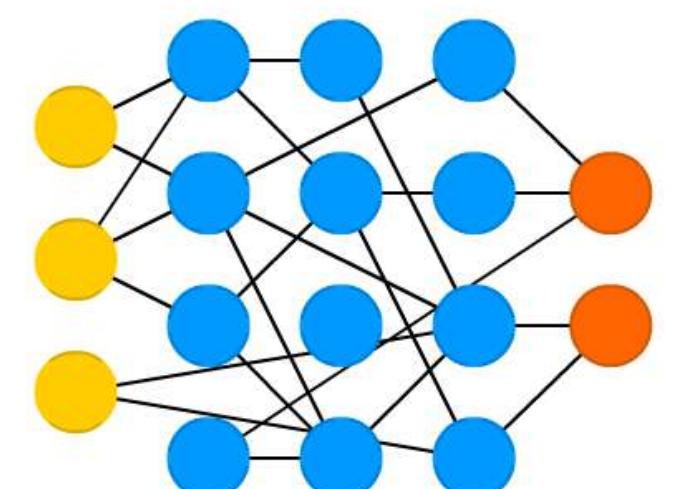
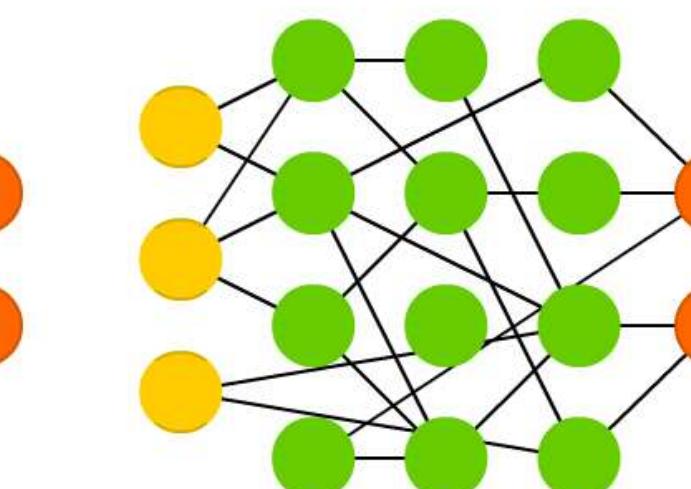
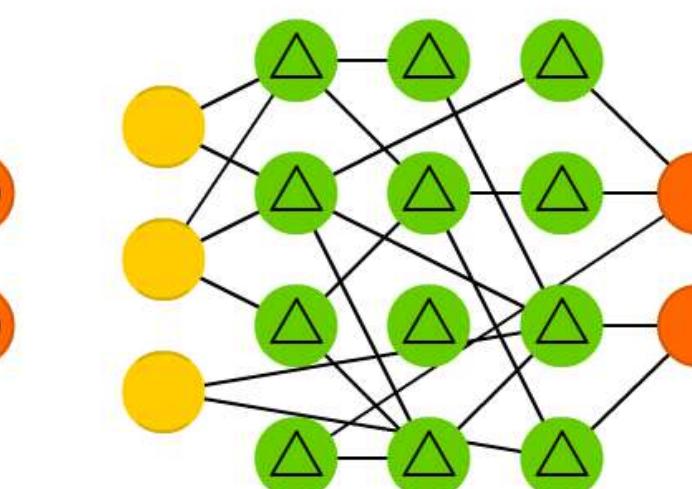
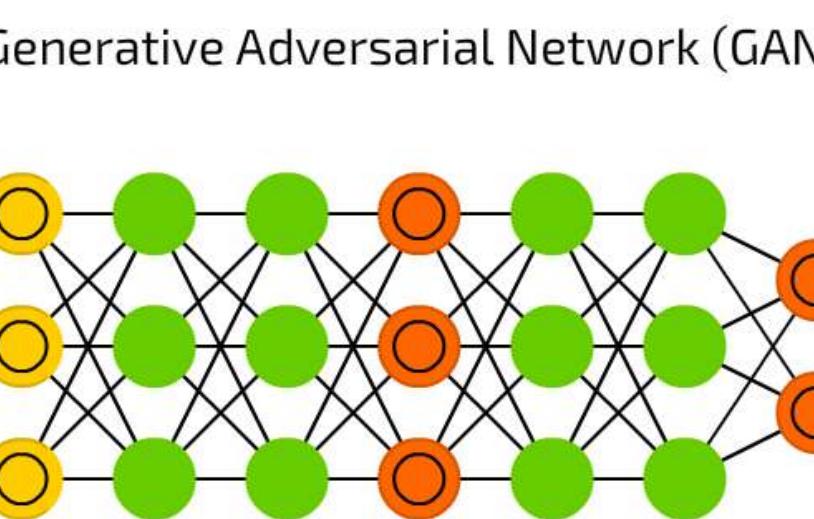
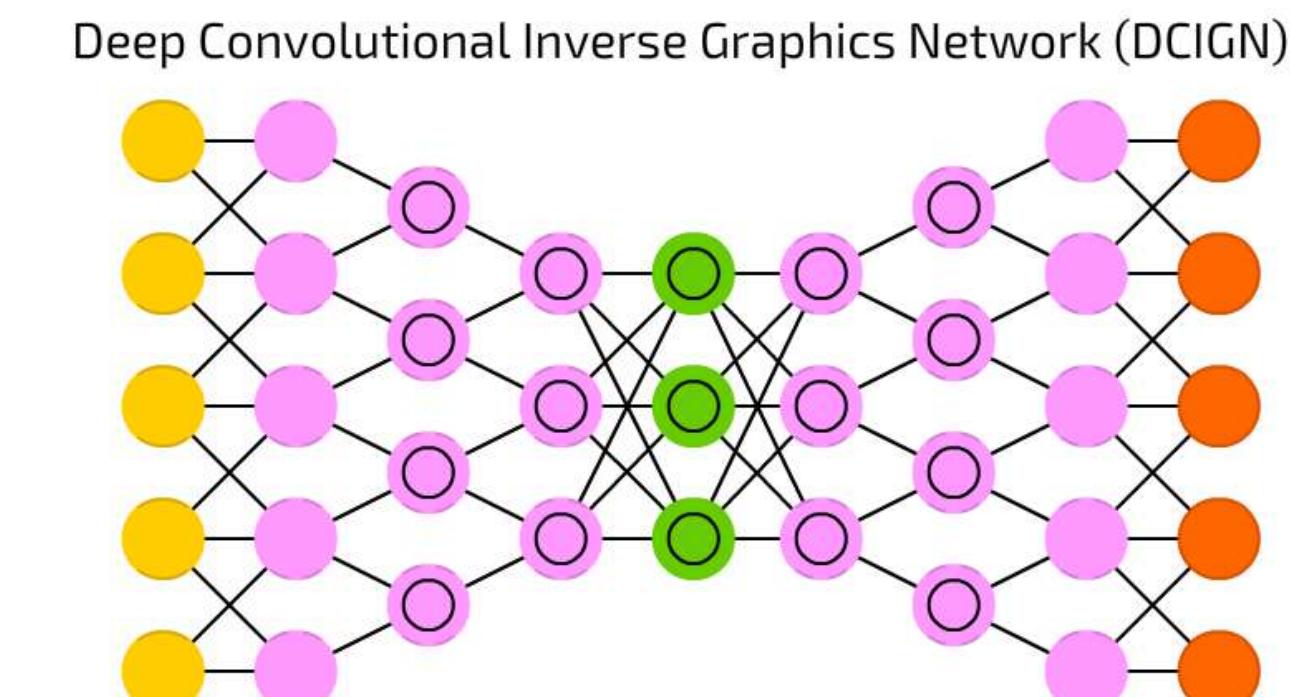
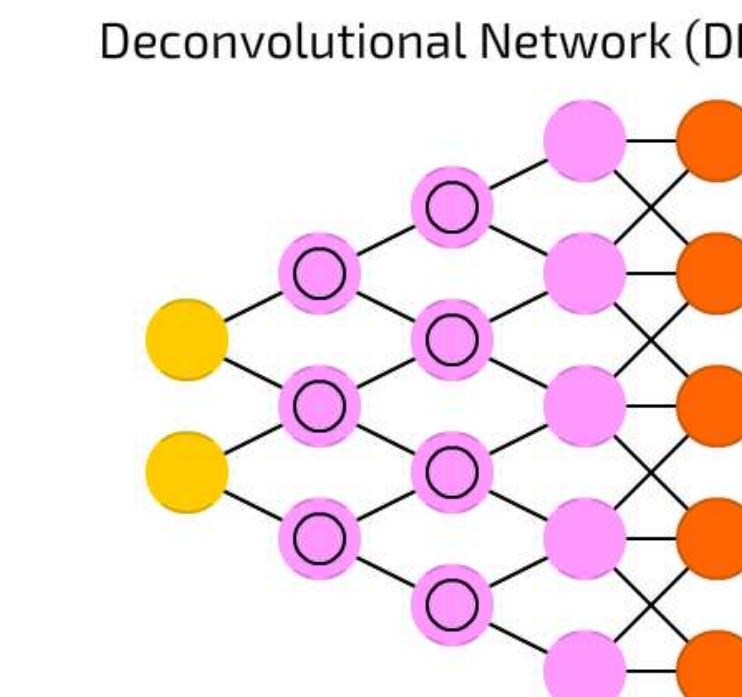
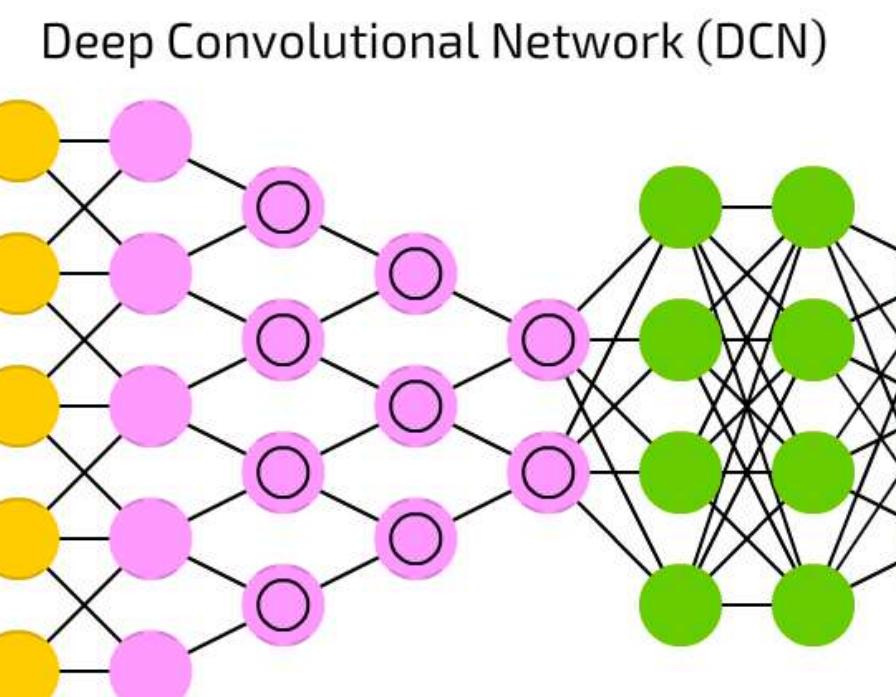
NEURAL NETS ZOO



NEURAL NETS ZOO



- Backfed Input Cell
- Input Cell
- △ Noisy Input Cell
- Hidden Cell
- Probabilistic Hidden Cell
- △ Spiking Hidden Cell
- Output Cell
- Match Input Output Cell
- Recurrent Cell
- Memory Cell
- △ Different Memory Cell
- Kernel
- Convolution or Pool



MATRICES ET VECTEURS



$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} ax + by \\ cx + dy \end{bmatrix}$$

$$\begin{bmatrix} 3 & 2 \\ 4 & 5 \end{bmatrix} \bullet \begin{bmatrix} 4 & 6 & 7 \\ 2 & 3 & 8 \end{bmatrix} = \begin{bmatrix} 16 & 24 & 37 \\ 26 & 39 & 68 \end{bmatrix}$$

$$\begin{bmatrix} a & b & c \\ d & e & f \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ 1 \end{bmatrix} = \begin{bmatrix} ax + by + c \\ dx + ey + f \\ 1 \end{bmatrix}$$

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} ax + by + cz \\ dx + ey + fz \\ gx + hy + iz \end{bmatrix}$$

$$\begin{bmatrix} a & b & c & d \\ e & f & g & h \\ i & j & k & l \\ 0 & 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix} = \begin{bmatrix} ax + by + cz + d \\ ex + fy + gz + h \\ ix + jy + kz + l \\ 1 \end{bmatrix}$$

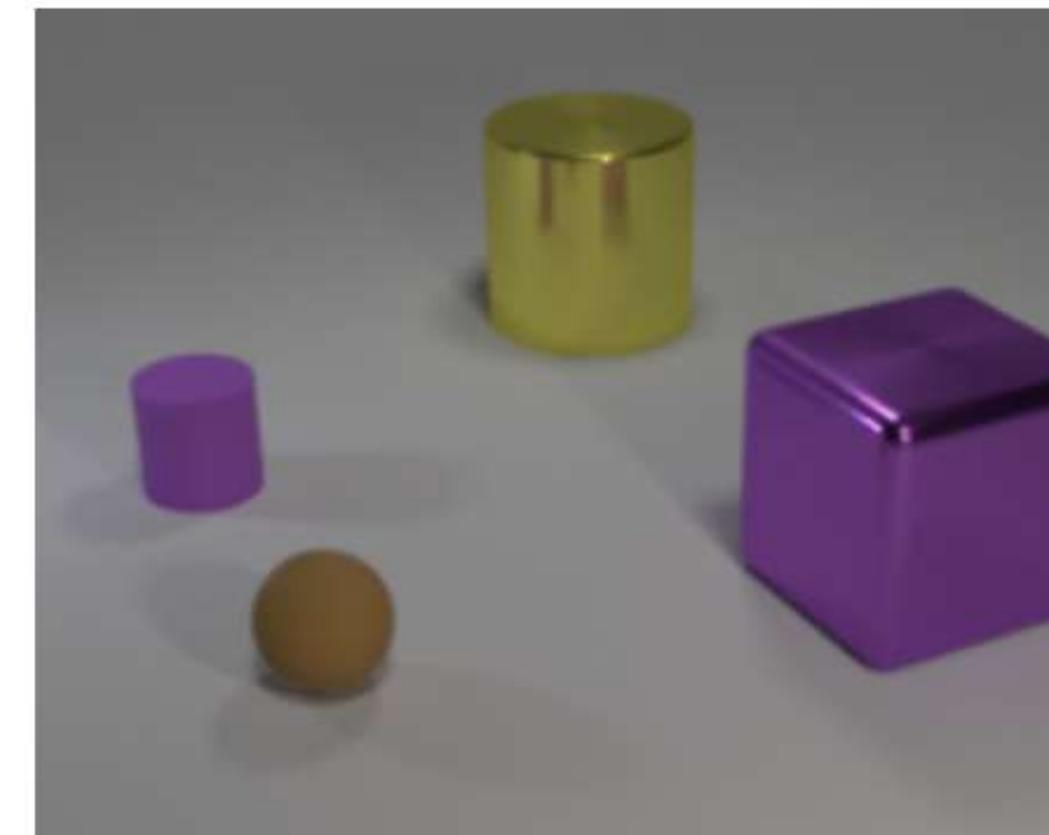
dimensions !



SO
HYPE

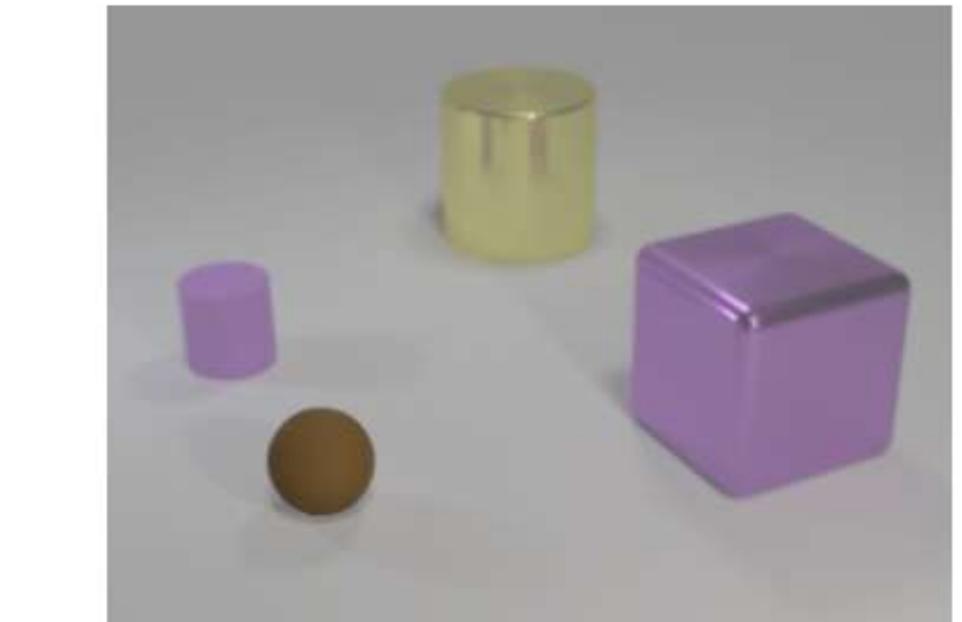


Original Image:



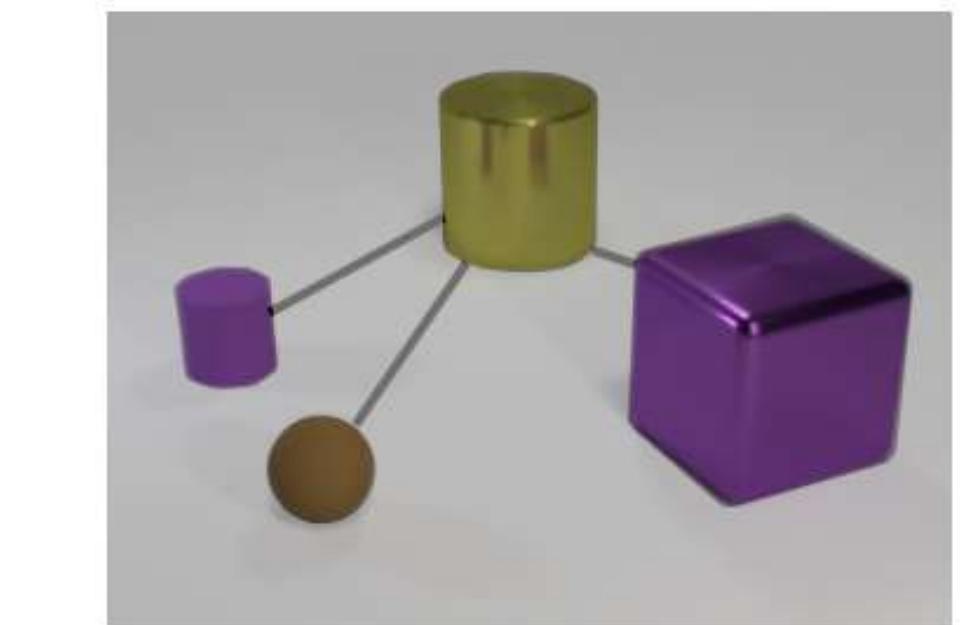
Non-relational question:

What is the size of the brown sphere?



Relational question:

Are there any rubber things that have the same size as the yellow metallic cylinder?



neural network reasoning

<https://hackernoon.com/deepmind-relational-networks-demystified-b593e408b643>

<https://deepmind.com/blog/neural-approach-relational-reasoning/>



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