



Réseaux de neurones artificiels

LE DEEP LEARNING

Les dates clés

1943

Neurone Formel

1950

Test de Turing

1957

Perceptron

2012

Concours ImageNet Large
Scale Visual Recognition
Challenge

2012

Google Brain

...

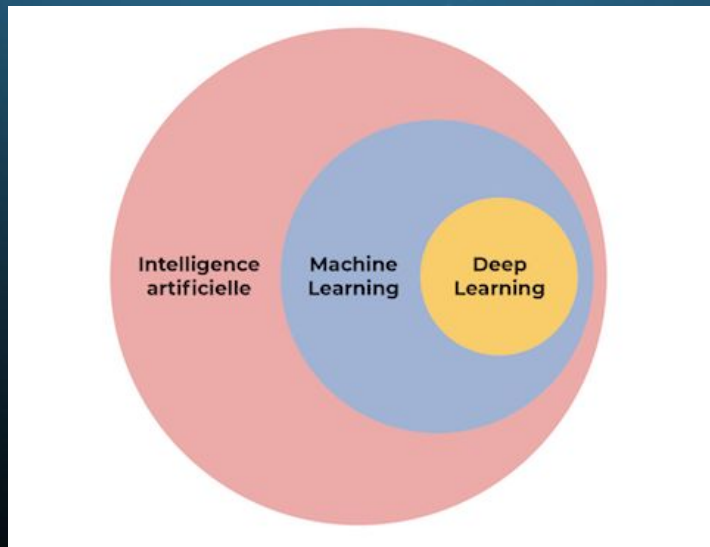


Le Deep Learning et les Réseaux de neurone artificiel

Apprentissage profond

**Ensemble de
méthodes
d'apprentissage
automatique**

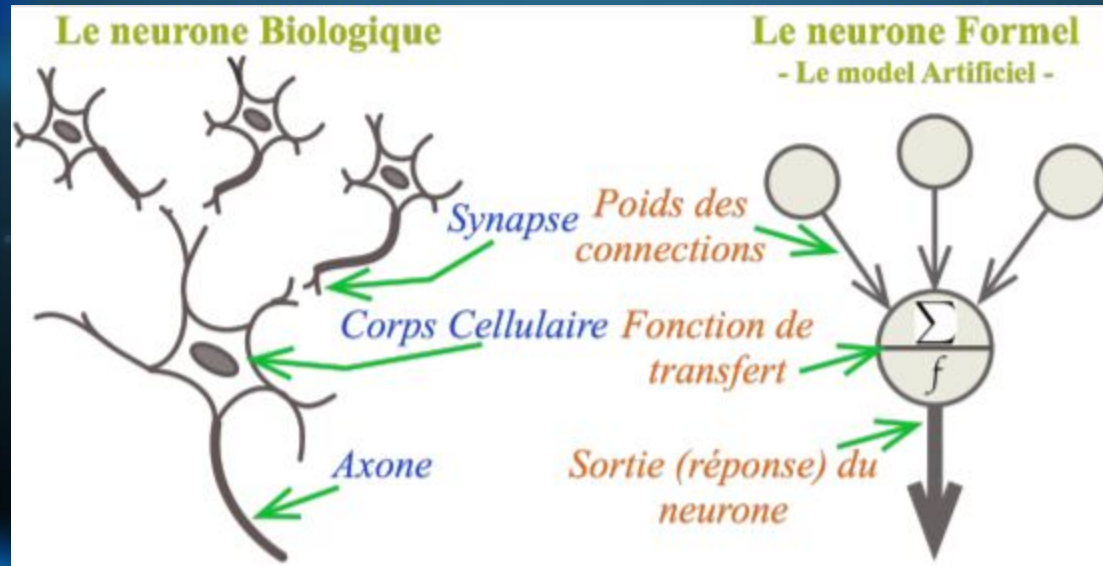
**Apprentissage
automatique**



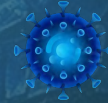
**Réseaux de
neurones artificiels**

**Beaucoup de
données**

Neurone biologique vs artificiel



Perceptron



Perceptron simple

Une couche de neurone

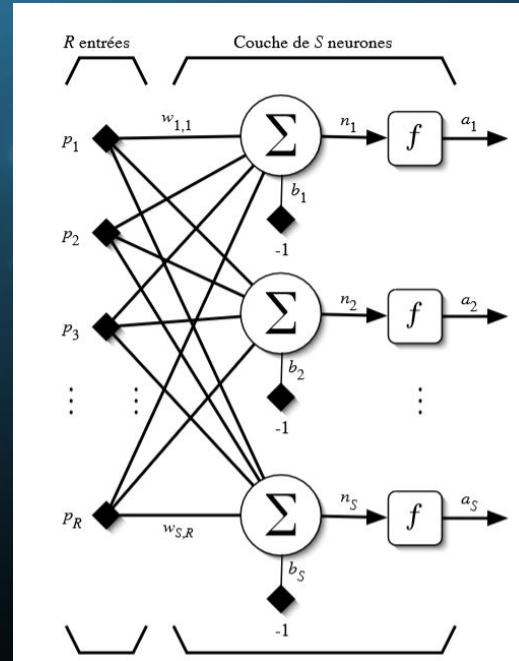
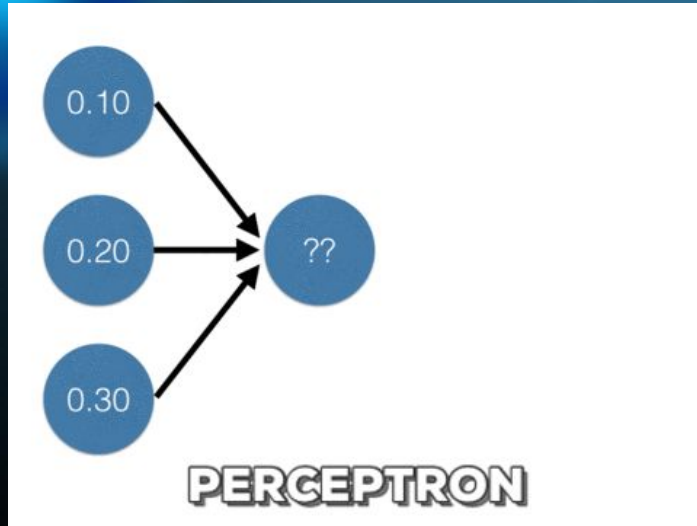


Perceptron multicouche

Plusieurs couches de neurones

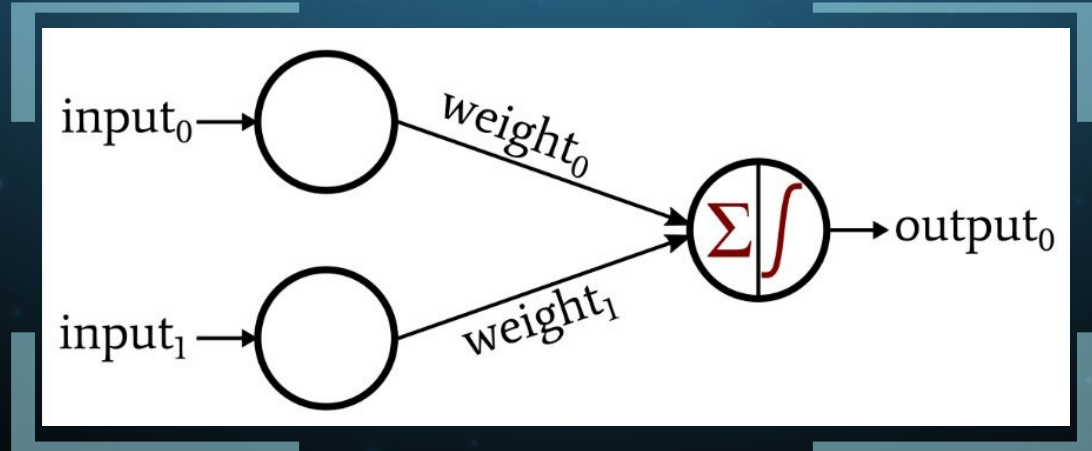


Calcul du perceptron

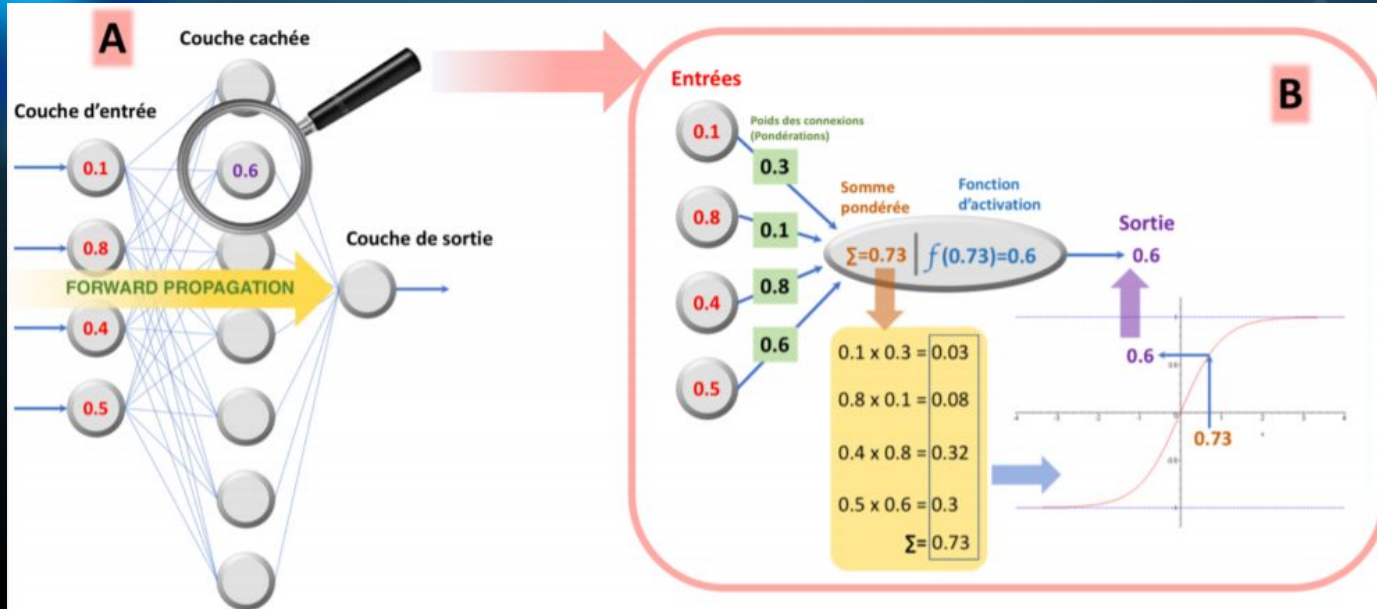


$$n = \mathbf{w}^T \mathbf{p} + b.$$

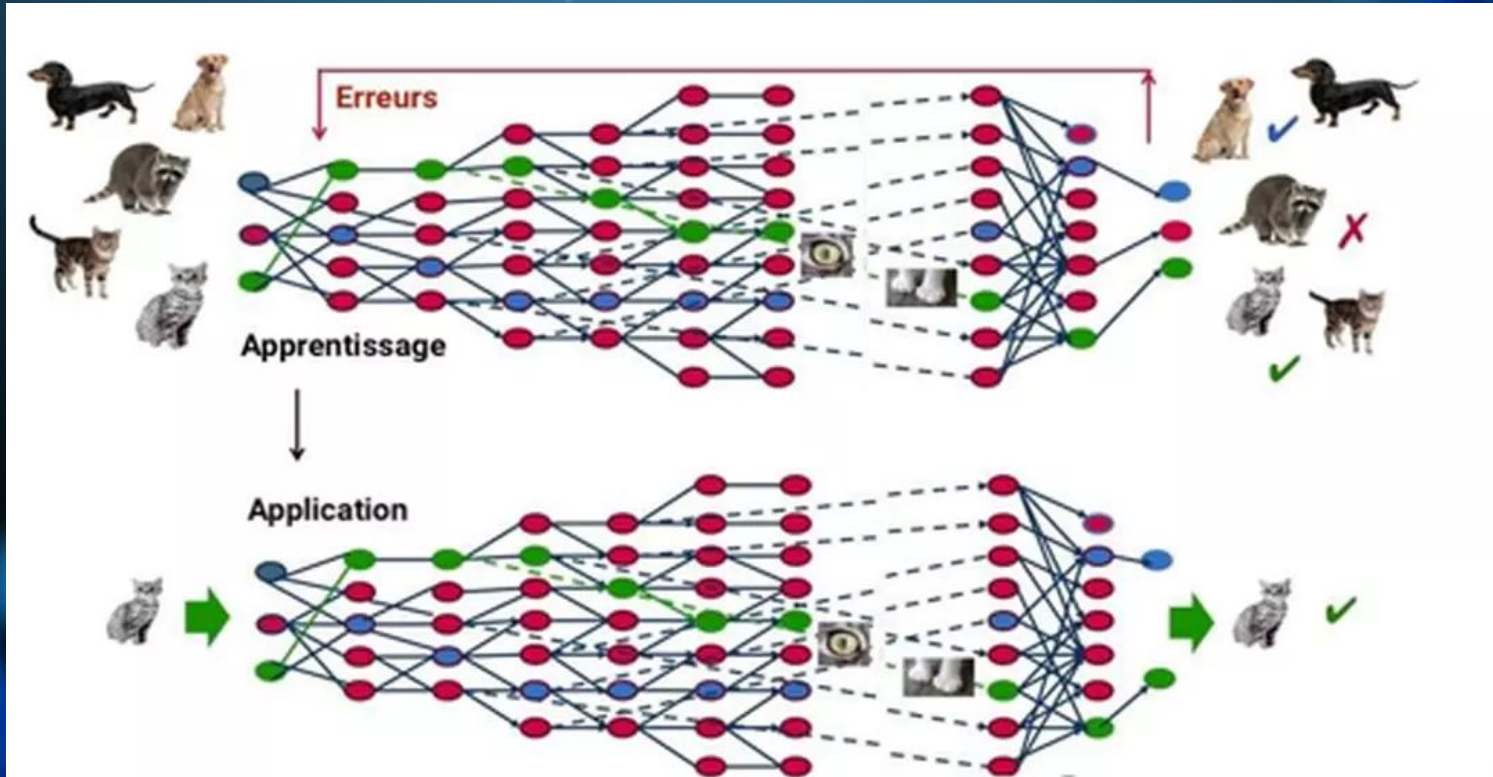
Perceptron simple



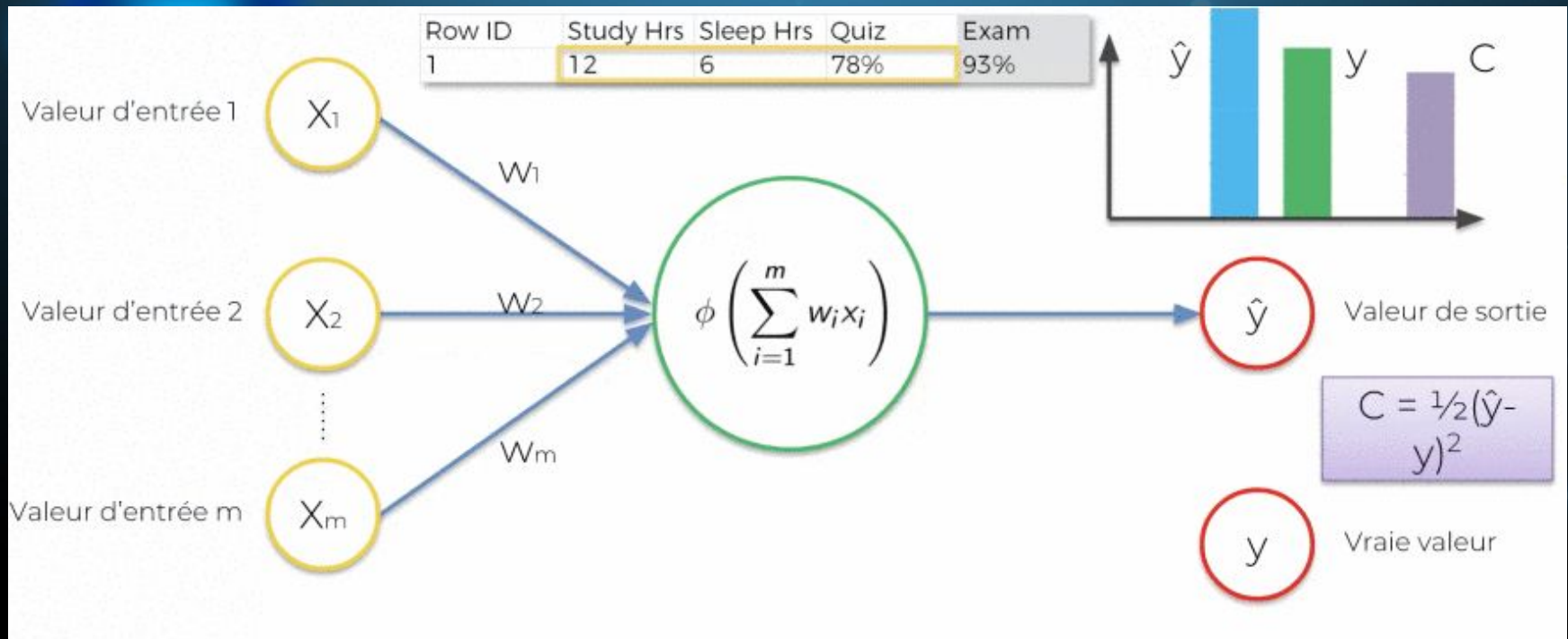
Perceptron multi-couche



Exemple de réseau de neurone

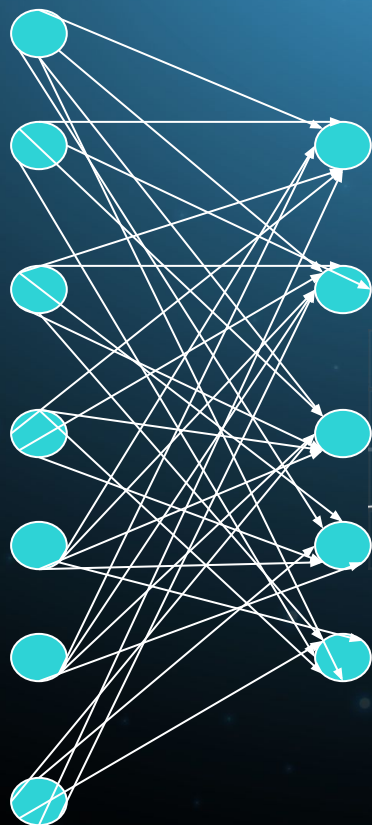


Algorithme de rétro-propagation du gradient

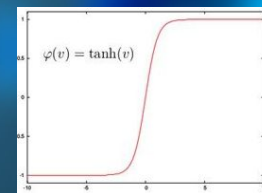
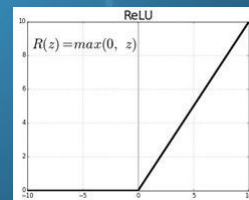
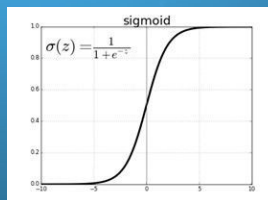
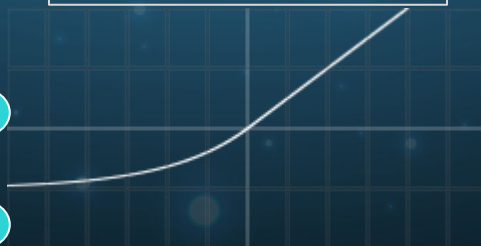




Utilisation d'un perceptron pour faire une Régression



Fonction d'activation



```
from sklearn.neural_network import MLPRegressor
```

Fonctions de coût

Régression

- Mean Squared Error

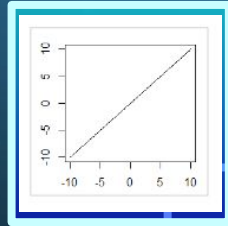
Classification

- Binaire : Binary cross entropy
- Multi : Categorical cross entropy

Fonctions d'activation

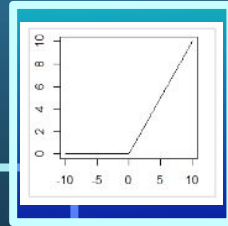
Linéaire

Pour la régression,
pas de
transformation



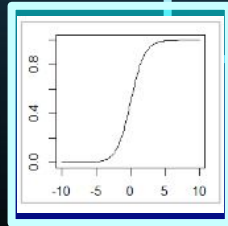
ReLu

Filtre les valeurs
négatives



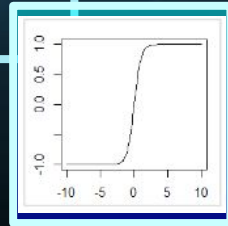
Sigmoïde

Ramène les valeurs entre
[0, 1]. Utilisé pour le
classement. Y codé {0,1}



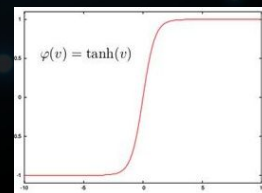
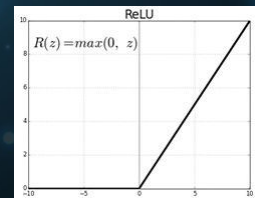
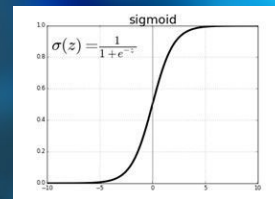
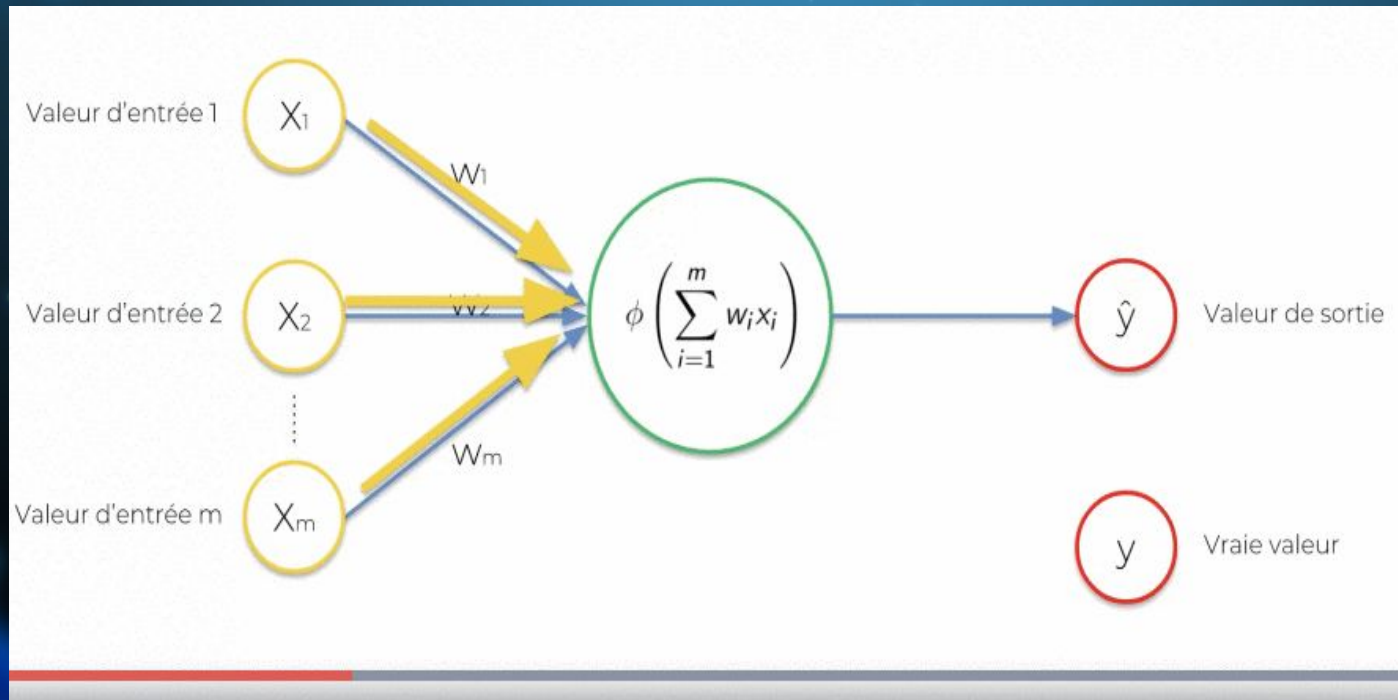
Tangente hyperbolique

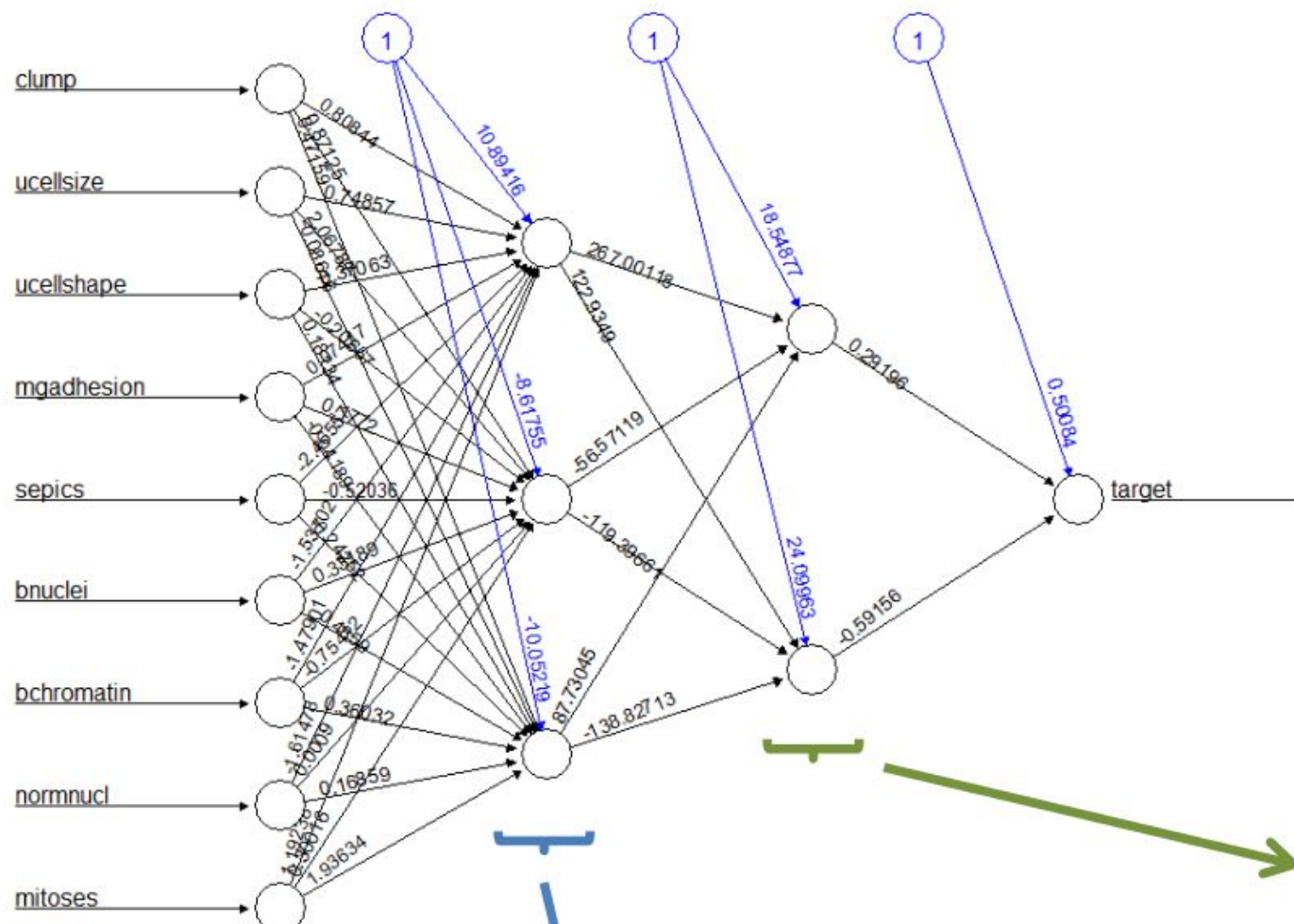
Ramène les valeurs entre [-1,
1]. Alternative à sigmoïde pour
le classement. Y codé {-1,+1}





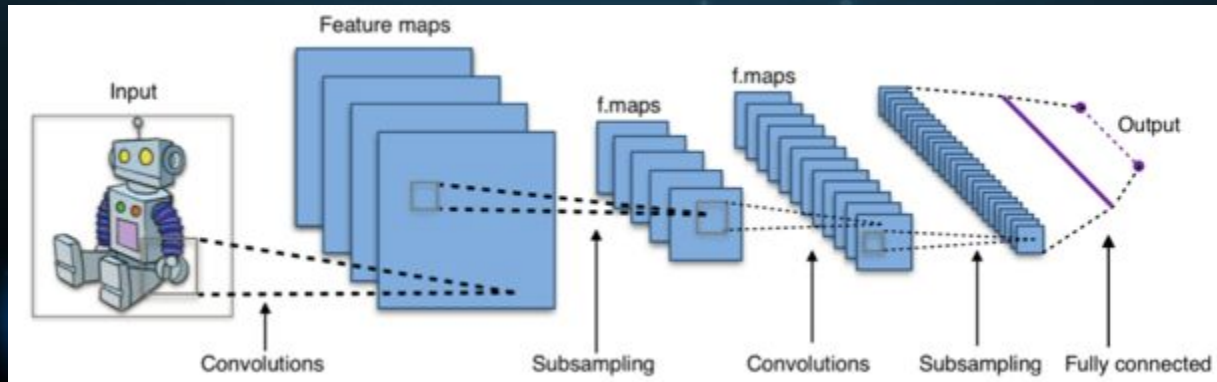
Utilisation d'un perceptron pour faire une Classification





Evolution

Réseaux de Neurones Convolutifs



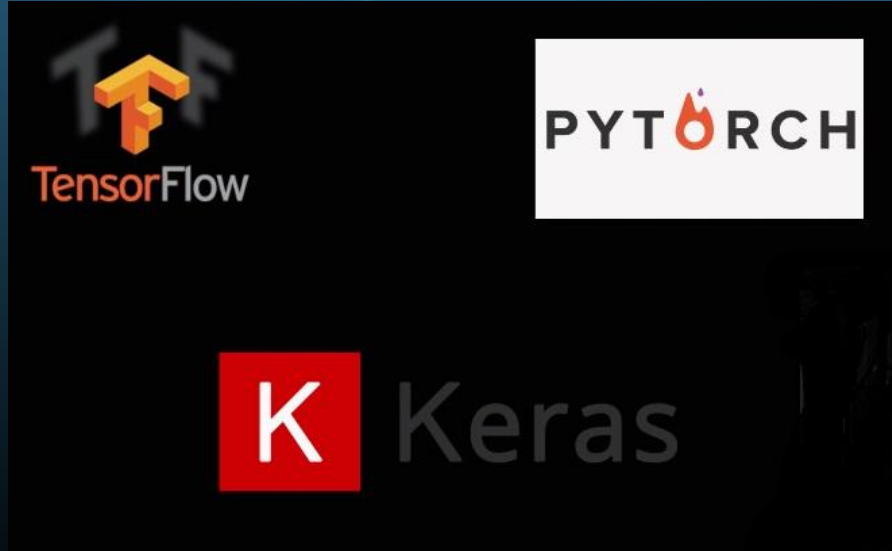
Dans le Futur !!!!

AMÉLIORER LA PLASTICITÉ NEURONALE

DIVERSIFIER FORMES DE NEURONES

SUSCITER LA CURIOSITE

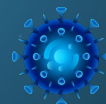
Bibliothèques Python





Conclusion

Notre équipe de chercheurs



Denis



Sarah



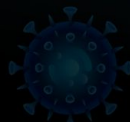
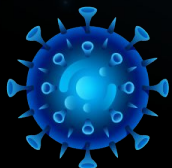
Vincent



Charlène



Loïc



The background is a dark blue gradient with out-of-focus light blue bokeh spots. A light blue frame, consisting of four L-shaped corner brackets, surrounds the central text.

Merci!

Do you have any questions?