

# Introduction to Neural Networks and CNN

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# Summary

Neural Networks

Convolutional Neural Networks (CNN)

Pooling Layers

Architecture VGG16

If you want to dig deep



# Neural Networks

## Formal definition

- "...a computing system made up of a number of simple, highly interconnected processing elements, which process information by their dynamic state response to external inputs."



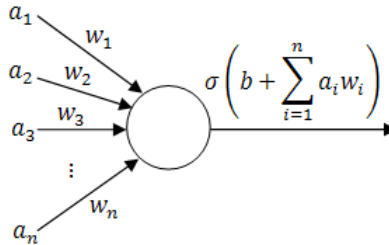
# Neural Networks

## Practical definition

-Or you can also think of Artificial Neural Network as computational model that is inspired by the way biological neural networks in the human brain process information.



# Quick Model explanation



Simple Perceptron

Figure: Modèle Perceptron



# Quick Model explanation

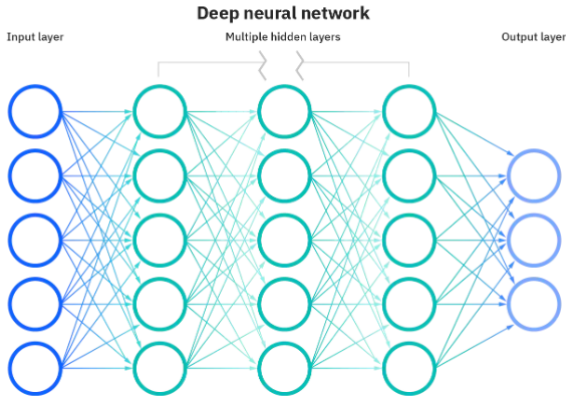


Figure: Modèle plus compliqué



# Convolutional Neural Networks (CNN)

## Definition

- A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects / objects in the image and be able to differentiate one from the other.



# Explanation

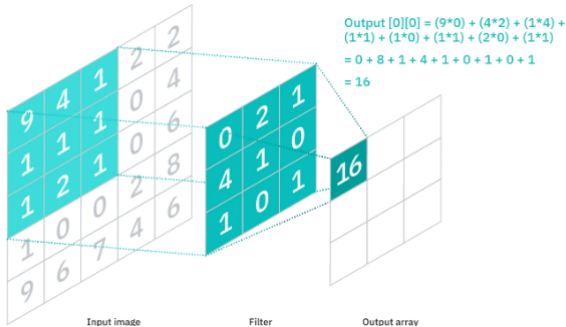


Figure: Work on image





# Pooling Layers

## Definition

- The pooling operation involves sliding a two-dimensional filter over each channel of feature map and summarising the features lying within the region covered by the filter.



# Explanation

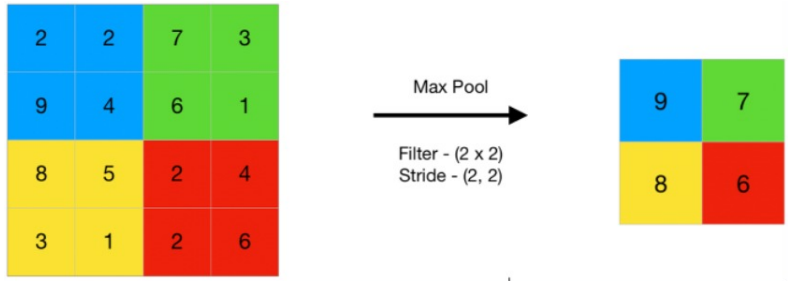


Figure: Work on image



# Architecture VGG16

## Definition and history

-VGG16 is a convolutional neural network model proposed by K. Simonyan and A. Zisserman from the University of Oxford in the paper “Very Deep Convolutional Networks for Large-Scale Image Recognition”. The model achieves 92.7% top-5 test accuracy in ImageNet, which is a dataset of over 14 million images belonging to 1000 classes.



# The Architecture

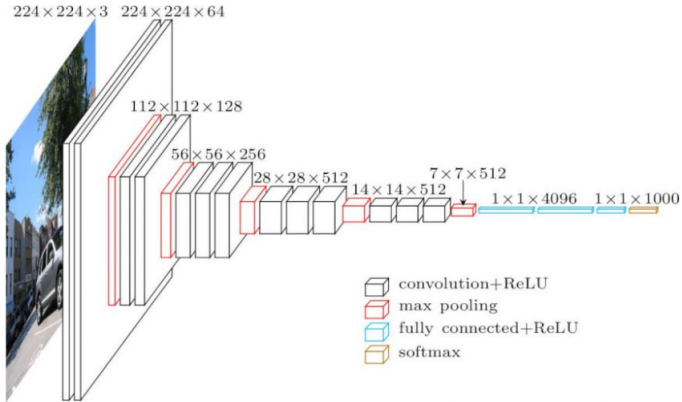


Figure: The Architecture



# YOLO

## Definition

-YOLO is an algorithm that uses neural networks to provide real-time object detection. This algorithm is popular because of its speed and accuracy. It has been used in various applications to detect traffic signals, people, parking meters, and animals.

