

# Practical work 08 – Deep Convolutional Architectures

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## Objectives

The objective of this PW is to review classical deep architectures and understand the recent strategies to compose such architectures.

## Submission

- **Deadline** : W09 (in 1 week), before the start of the lecture.
- **Format** : Zip with report and/or iPython notebook.

## Exercise 1 Deeper Models

Let's play with a deeper CNN model on CIFAR10 using a structure inspired by VGGNet : `[[Conv2D → relu → BN]*3 → MaxPool2D → Dropout]*4 → Flatten → Dense → Dropout → Out`. In this structure, BN means Batch Normalisation. You can try different options but a configuration with blocks of 64 filters of size 3 with same padding and stride 1, max pooling of size 2 and stride 2, dropouts of 0.2 and a dense layer of 256 neurons should bring your performance around 80-85% on CIFAR10.

You probably now need to use a GPU to train and play with different settings. Report your observations.

## Exercise 2 Analysis of a Deep Architecture

In 2016, the **Inception-v4** architecture have been declared as outperforming ResNet and GoogleNet architecture on the ImageNet competition (see lecture slides).

- Download the paper presenting the architecture at <https://arxiv.org/abs/1602.07261>.
- Read the paper up to the point you have a general understanding of their strategy<sup>1</sup>.

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1. No need to understand all the details!

- c) Re-explain in few phrases what you understood from the architecture doing comparison with the architectures presented in the class.

### **Exercise 3   Optional : Review Questions**

- a) Explain the notion of hierarchical features with CNNs.
- b) Explain the main differences for the deep architectures seen in class : AlexNet, VGGNet, GoogLeNet, ResNet. What were their intuitions when putting together such architectures ?