

Exercise 2

Download and unzip [exercise 2.tar.gz](https://www.cs231n.github.io/assets/exercise2/exercise2.tar.gz) into your Deep Learning folder in your virtual machine.

Q1: Modular Neural Network v2

This part of the exercise is an extension of Q2: Modular Neural Network in [Exercise 1](#). This time we will implement dropout, convolution and pooling layers.

Start by copying `cs231n/layers.py` from Exercise 1 into the corresponding folder in Exercise 2.

Note: With regard to the convolutional layer: focus on understanding it rather than speed. If your implementation requires 10 nested for-loops it is quite alright, as long as you understand what happens. The course providers have provided some fast C-implementations of the convolutional layers, which we will be using later on.

Q2: Data Argumentation

We have not covered Data Argumentation in class, but the idea is very simple: we wish to make the network more robust towards variations in the data by artificially introducing these variations. Fx. if we have an image of a cat and we want to be able to detect it even if it is slightly off center or slightly rotated. Likewise, we also don't care if the cat is facing left or right. It's still a cat. The idea is to perform data argumentation, where we slightly modify and reuse the image multiple times during training. This can be done by making random crops of the original image, flipping it, rotating it, change contrast and brightness and adding noise. Although widely used in Deep Learning, data argumentation can be applied in other fields as well.

This exercise will focus on implementing 4 different types of data argumentation to reduce overfitting. The exercise will also make use of the dropout layer you implemented in Q1 to reduce overfitting.