

# Deep Learning Practical Session 4

François Fleuret

<https://fleuret.org/dlc/>

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## Introduction

The objective of this session is to implement a convolutional network and test the influence of the architecture on the performance.

You can get information about the practical sessions and the provided helper functions on the course's website.

<https://fleuret.org/dlc/>

You can start this session with the example from the course:

[https://fleuret.org/dlc/src/dlc\\_practical\\_4\\_embryo.py](https://fleuret.org/dlc/src/dlc_practical_4_embryo.py)

## 1 Training function

Re-organize the code to define and use a function

```
train_model(model, train_input, train_target, mini_batch_size)
```

**Hint:** My version is 605 characters long

## 2 Test error

Write and test a function

```
compute_nb_errors(model, input, target, mini_batch_size)
```

To compute the number of prediction mistakes using a “winner-take-all” rule, that is the class with the largest output is the predicted one.

Run the training and test ten times, record the test error rates.

With 100 epochs for training, the test error should be around 8% with the small sets, and around 0.7% with the full ones.

**Hint:** My version is 424 characters long

### **3 Influence of the number of hidden units**

In the default network, the number of hidden units is 200.

Modify the class constructor to take a parameter for that value, and run the training and compute the test error for 10, 50, 200, 500, and 1,000 hidden units.

### **4 Three convolutional layers**

Write a new class `Net2` with three convolutional layers. Pick the structure you want.