



Deep Learning Summer Course - Exercise 5

Summer 2022

Tuesday 16-8-2022

To do these exercises, you will use Python with 3 and the following packages:

- [NumPy](#). This is often a good package to use, in order to create various data transformation / generate data.
- [TensorFlow](#). The used backend used for Keras
- [Keras](#). Good front-end package for easier integration of neural networks

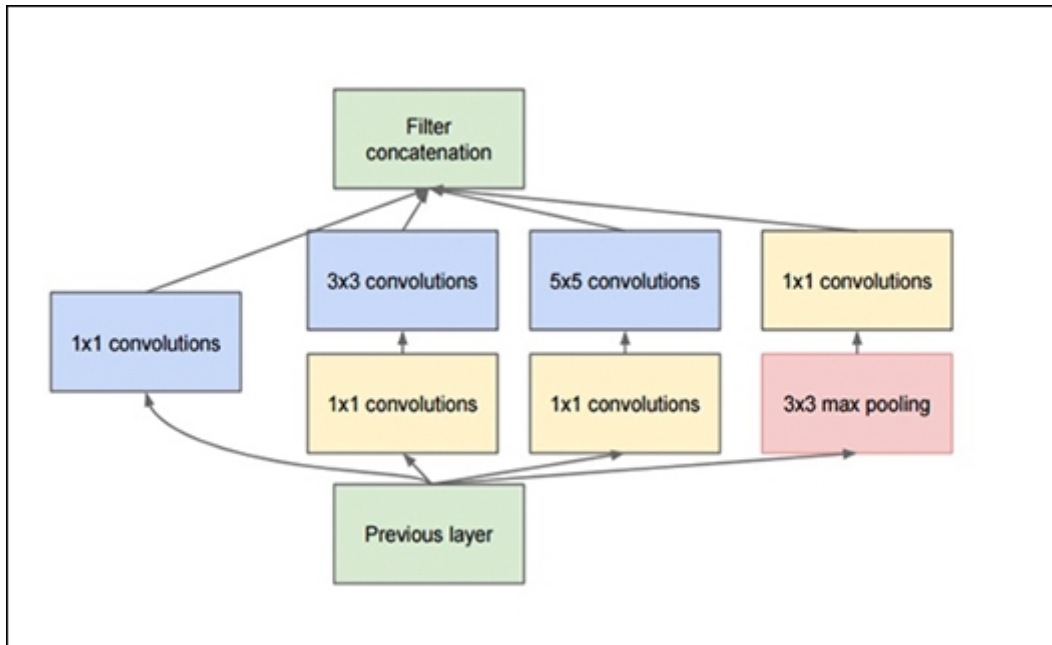
You are not strictly forced to use these packages, but it is highly recommended. Feel free to use other packages you think are necessary.

We will go through your results of this exercise on Wednesday 17-8-2022, so you are expected to have completed them.

Question or comments: [Tobias Greisager Rehfeldt](#)

1. Using the functional API in Keras, build a feed-forward neural network with one input and one output, that forks in the middle using [Concatenate layer](#) (example shown below). The forked layers should be convolutional layers on the MNIST datasets.

Example Architecture (Google Inception V3):



2. On the [IMDb review dataset](#), make a [recurrent neural network](#) using the Functional API. The choice of recurrent layers is up to you, but try multiple and see which gives the best result. A major part of this exercise is thinking about how to encode the data, as you need to:
 - (1) Retain the sequential nature of the review
 - (2) Remove any linear relationships between the input data numbers
 - (3) Retain a consistent data size for a neural network input

Reading/Hints: [1](#), [2](#), [3](#), [4](#), [5](#)

To load the data, run the following code:

```
import tensorflow as tf
max_len = 500
batch_size = 128
NUM_WORDS = 10000
(train_data, train_labels), (test_data, test_labels) =
tf.keras.datasets.imdb.load_data(num_words=NUM_WORDS)
```