Exercise set 3: Deep learning 2

Bonus submission deadline: 07.04.2021 23:59

The exercises marked with **BONUS** should be returned in Moodle by the submission deadline. Successfully solving it will give you bonus points to boost your final grade. During the exercise session, the solution of the exercises will be discussed.

Exercise 1: Parameters of CNN (BONUS)

A convolutional neural network takes as input a $64 \times 64 \times 3$ image and classifies it as "cat" or "not cat". The network has the following layers

1. **Convolutional layer 1:** kernels size 5×5, number of filters: 32, padding: "same" (output image has same width and height of input)
2. **MaxPooling layer 1:** Kernel size: 4×4, stride: 4.
3. **Convolutional layer 2:** kernels size 5×5, number of filters: 32, padding: "same" (output image has same width and height of input)
4. **MaxPooling layer 2:** Kernel size: 4×4, stride: 4.
5. **Flatten layer**
6. **Dense layer 1:** 100 neurons
7. **Dense layer 2:** 1 neuron

Answer the following questions:

- For each layer, compute the output size and the number of learnable parameters. Motivate your answer!
- For each convolutional layer, compute the number of scalar multiplications. Motivate your answer!

It is preferred that you return your answer to moodle as a pdf. Hand-written solutions (scanned or photograph) are also accepted, **but please make sure your solution is readable!**

Bag-of-words classification

Nothing to do here! The TA will go through the `ex2.m` script and explain step by step the code.

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