Programming with neural networks: Exercise sheet 7 SS 2020
University of Würzburg - Chair for Computer Science VI Prof. Dr. F. Doll, A. Hekalo, M. Krug

Exercise sheet: 7

Edited on June 18

Task 1: FCN

The following FCN structure is given in a paper:

All CNN layers have a stride of 1, a kernel size of 3x3 and
use the *same* padding, ie a padding of 1. The number of filters in the encoder is 20,
40, 60, 80, 100, and in the decoder 80, 60, 40, 5. All pooling layers are normal 2x2
Max pooling layer. The first deconv layer is equivalent to a normal conv
Layer as it has a 1x1 stride „Same "padding used. The next two
Deconv layers are used for upsampling (Stride 2x2) to restore the image
to bring it to its original size. The first three deconv layers have a kernel size
of 3, the last layer only of 1x1. The final output is sent to a softmax
to determine the probability distribution. This FCN should be used
one page in the background, text, image, headings and marginalia
to segment.

(a) Why does the last FCN layer have 5 channels?

(b) Does the network have skip connections? Does that make sense?

(c) Enter the pseudo-code for the network.

(d) Give the input and output dimensions for each layer of the network
both the number of trainable weights.

(e) Implement the network structure and train the network on the
given data.

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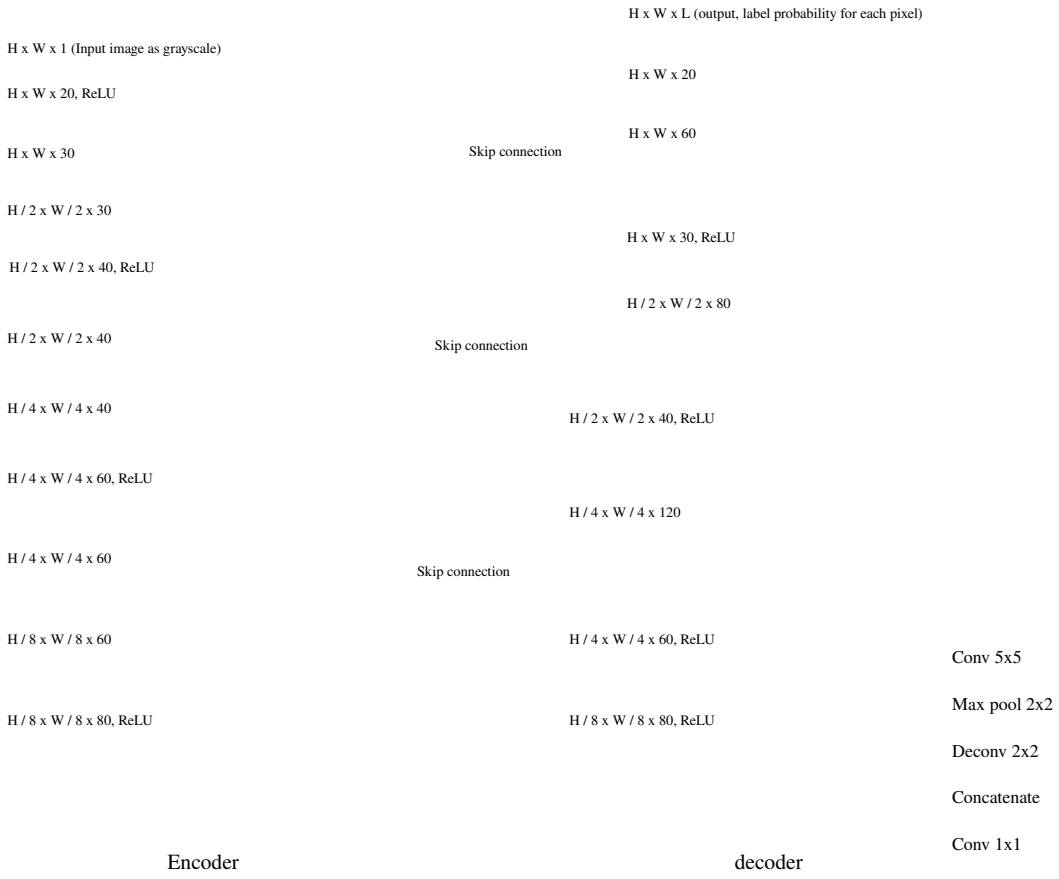
Task 2: FCN

The following FCN structure is given in another paper:



The final output (logits) is sent to a softmax in order to determine the probability to determine the distribution of labor. This FCN is intended to be used on a page Recognize staff lines.

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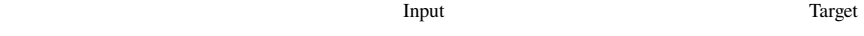
Staff line detection



(a) How many channels does the last layer have?

(b) Does the network have skip connections? Does that make sense?

(c) Enter the pseudo-code for the network.

(d) Give the input and output dimensions for each layer of the network both the number of trainable weights.

(e) Implement the network structure and train the network on the given data.