Exercise 3
Machine Learning in Graphics & Vision

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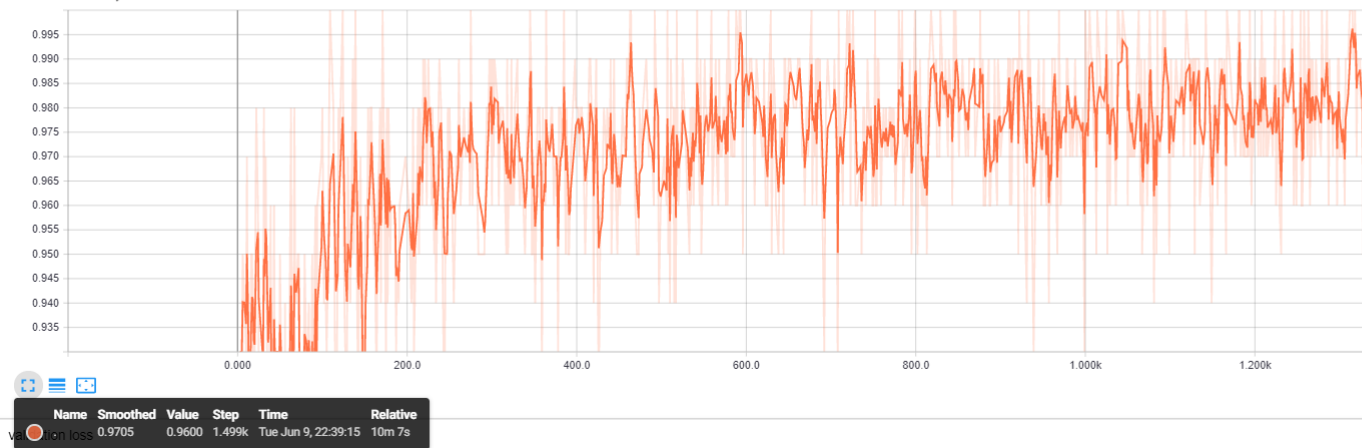Damir Ravlija   5503184   damir.ravlija@student.uni-tuebingen.de

1   Task 1

(a) Our implementation does achieve 97.05% accuracy after 15 epochs.

According to http://rodrigob.github.io/are_we_there_yet/build/classification_datasets_results.html#4d4e495354 the paper "Regularization of Neural Networks using DropConnect" in 2013 achieved a result of 0.21% errorrate, hence an accuracy value of 99.79%.

(b) from torchsummary import summary
summary(model, (1,28,28))

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Layer (type)          Output Shape        Param #
========================================================
Conv2d-1              [-1, 32, 28, 28]    320
ReLU-2                [-1, 32, 28, 28]    0
Conv2d-3              [-1, 32, 28, 28]    9,248
ReLU-4                [-1, 32, 28, 28]    0
Conv2d-5              [-1, 32, 28, 28]    9,248
Linear-6              [-1, 256]           6,422,784
ReLU-7                [-1, 256]           0
Linear-8              [-1, 10]            2,570
========================================================
Total params: 6,444,170
Trainable params: 6,444,170
Non-trainable params: 0
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```

Input size (MB): 0.00
Forward/backward pass size (MB): 0.96
Params size (MB): 24.58
Estimated Total Size (MB): 25.55

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Output of convolutional layers can be calculated with this formula:

$$[(W - K + 2P)/S] + 1$$

where W is the width(or height if the input is squared), K is the kernelsize, P is the amount of padding and S the stride.

(c) After 15 epochs training on the default network with FashionMNIST dataset,
the validation(test) accuracy is about 89%.
Console output:
epoch done: 14 accuracy train 0.9082844034830729 accuracy test 0.891600112915039

After tweaking (hyper)parameters of the network:

(d)