
CENG 483

Introduction to Computer Vision

Fall 2022-2023

Take Home Exam 3

Image Colorization

Student ID:

Please fill in the sections below only with the requested information. If you have additional things to mention, you can use the last section. Please note that all of the results in this report should be given for the **validation set** by default, unless otherwise specified. Also, when you are expected to comment on the effect of a parameter, please make sure to **fix** other parameters. You may support your comments with visuals (i.e. loss plot).

1 Baseline Architecture (30 pts)

Based on your qualitative results (do not forget to give them),

- Discuss effect of the number of conv layers:
- Discuss effect of the number of kernels(except the last conv layer):
- Discuss effect of the learning rate by choosing three values: a very large one, a very small one and a value of your choice:

2 Further Experiments (20 pts)

Based on your qualitative results (do not forget to give them),

- Try adding a batch-norm layer (`torch.nn.BatchNorm2d`) into each convolutional layer. How does it affect the results, and, why? Keep it if it is beneficial.
- Try adding a tanh activation function after the very last convolutional layer. How does it affect the results, and, why? Keep it if it is beneficial.
- Try setting the number of channels parameter to 16. How does it affect the results, and, why? Keep it if it is beneficial.
- Try replacing conv layers with **separable conv** or **group conv** layers. How does it affect the results, and, why? Keep it if it is beneficial. **Note that** number of kernels in separable conv and group layers should be the same as previously selected architecture.

3 Your Best Configuration (20 pts)

Using the best model that you obtain, report the following:

- The automatically chosen number of epochs(what was your strategy?):
- The plot of the training mean-squared error loss over epochs:
- The plot of the validation 12-margin error over epochs (see the3 text for details):
- At least 5 qualitative results on the validation set, showing the prediction and the target colored image:
- Discuss the advantages and disadvantages of the model, based on your qualitative results, and, briefly discuss potential ways to improve the model:

4 Your Results on the Test Set(30 pts)

This part will be obtained by us using the estimations you will provide. Please tell us how should we run your code in case of a problem:

5 Additional Comments and References

(if there any)