

EECS 442 Final Project Proposal

Group Members

Our group contains 4 members: Junhui Li, Yisen Wang, Zhen Zhong, Ziyuan Huang

Project Description

In the final project of EECS 442, our group decided to follow the research *Colorful Image Colorization* [1], which is provided in the proposal guideline (its name is "Colorizing historical photographs" in the proposal guideline). This paper aims at creating an algorithm which can generate colorful images based on black and white images. Their goal is to generate colorful images that can make people confuse the generated pictures with the genuine pictures. With this technique, they can not only colorize historical photographs, but also colorize any black and white picture they want. They made a CNN which is trained on the whole 1.3M training images in ImageNet [2]. Another innovation in their project is that they developed a loss function tailored to the colorization problem.

Our jobs

Base on the paper we described before, we would like to conduct the following jobs one by one:

- Re-implement the algorithm in the paper, so that we can use the model to colorize back and white picture.
- Adjust the layers and parameters in the CNN model to see if we can make an improvement on the current model.
- Adjust the loss function to see if we can make an improvement on the current model.
- We may also conduct other revisions on the current model.

Our approaches

Though we do not have super computers, we have an adequate computer with 4 RTX-2070 Super GPUs. Therefore, we may not be able to train on the entire ImageNet dataset, but we could train on a sufficiently large dataset (like 200K pictures). After training the models (model from the paper and our revised model), we'd like to use the same method as the paper to test our model. We will release a survey on websites like SurveyMonkey to ask real people to decide which pictures are artificially generated, and which pictures are real. If a model is sufficiently good, the expected human-test accuracy should be 50%. The paper achieved an human-test accuracy of 32%, we'd like to see if we could improve it.

After that, we will use our model to colorize anything we want! No matter you want to reproduce a historical scene, or colorize an artificially generated picture, we can help you to do it. The model could also help people to stimulate their imagination, which is really exciting!

Reference

- [1] Richard Zhang, Phillip Isola, Alexei A. Efros. "Colorful Image Colorization". *University of California, Berkeley*.
- [2] ImageNet. <http://www.image-net.org/>.