DL Project Proposal

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TITLE

Coloring B/W Images

SHORT SUMMARY

This project utilizes deep learning techniques to automate coloring black-and-white images. The proposed approach involves training a Convolutional Neural Network on paired black and white and color images. The ultimate goal is to develop an accurate and realistic model that can predict the colors of an unseen black-and-white image. By doing so, not only can historical photographs be brought to life, but applications such as photo editing, and object recognition can be achieved.

OBJECTIVES

The goal is to design a Convolution Neural Network model to,

1. Learn the complex relationships between grayscale intensity and corresponding colors.
2. Colorize the B/W images accurately and realistically.

METHODOLOGY

We will be using a CNN model to understand the relation between the grayscale pixels in the image to the color in the RGB scale. Each pixel has a value corresponding to its brightness. The value span from 0-255, from black-white.
We are planning to use the CNN model to identify this relation between the pixels with the respective color. We will be mostly using Autoencoder to encode grayscale images and decode them into colorized outputs. Also will be utilizing PyTorch, and TensorFlow.

EVALUATION

We expect an accurately and realistically colored image of the black-and-white input image as the output qualitatively.
Quantitatively we can measure the output image with mean squared error (MSE) and Structural Similar Index(SSIM). Adding to this, we have the Perceptual Similarity Index(PSI) which measures perceptual similarity between 2 images.

DATASET

We have found the possible datasets in the following sources:
MS-COCO, Imagenet, Open Images dataset, CIFAR-10, CelebA

REFERENCES

- Article about coloring B/W images on Medium
- Detailed explaination on L*a*b approach of coloring on TowardsDataScience blog
- Black and White Image Colorization with Deep Learning on Medium by Anne Guilbert