Simon Paquette Project Proposal CSI 4106

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Topic: Colouring black and white images

Developing an AI model about colorization of black and white images seems an interesting project where it could be applied to our old photos to bring back the original color. Automated image colorization is a topic gaining a lot of notice recently in the exploration of computer vision and deep learning. The input of the model will be a grayscale image (in this project, it will be a landscape image) and the output will be the same image but with an RGB (or LAB) value for each pixel.

With this AI project, I will work with the following tools: Python, Numpy, OpenCV, Pandas, Scikit-Learn, TensorFlow and/or Keras. The key learnings from the development of this project will be to understand the LAB color space colourisation technique, converting images to different color space with the help of OpenCV and applying an AI model training on the dataset to colouring black and white images.

The dataset will consist of 7129 landscape images (150x150) in black and white and their corresponding colored images from <https://www.kaggle.com/theblackmamba31/landscape-image-colorization>. Here is a summary: “This dataset consists of street, buildings, mountains, glaciers, trees, etc. and their corresponding grayscale image in two different folders.  
The main objective of creating this dataset is to create autoencoder network that can colorize grayscale landscape images”. However, because the way we use the images and convert them to the LAB color space, it is easy to create our own grayscale images with the L channel. I could easily add a new dataset of images to extend the project with people, animals, or objects.

Some interesting reference that I will read during my project:

<https://richzhang.github.io/colorization/>

<https://emilwallner.medium.com/colorize-b-w-photos-with-a-100-line-neural-network-53d9b4449f8d>

<https://algotech.netlify.app/blog/image-colorization/>

<https://towardsdatascience.com/colorizing-black-white-images-with-u-net-and-conditional-gan-a-tutorial-81b2df111cd8>

<https://www.lri.fr/~gcharpia/colorization_chapter.pdf>

<https://www.kaggle.com/basu369victor/image-colorization-basic-implementation-with-cnn>

<https://pyimagesearch.com/2019/02/25/black-and-white-image-colorization-with-opencv-and-deep-learning/>

<https://cv-tricks.com/opencv/deep-learning-image-colorization/>

<https://learnopencv.com/convolutional-neural-network-based-image-colorization-using-opencv/>

<https://techvidvan.com/tutorials/deep-learning-project-colorize-black-white-images-with-python/>

<https://medium.datadriveninvestor.com/coloring-black-white-images-using-deep-learning-984e6f4ddf14>