Vision & Cognitive Services Project Proposal (2021)

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Image Colorization Problem

Colorization is the process of adding plausible color information to monochrome photographs or videos. It is a highly undetermined problem, requiring mapping a real-valued luminance image to a three-dimensional color-valued one, that has not a unique solution.

Dataset

Many papers addressing the image colorization challenge use a dataset generated with images taken from Flickr.

For my project, I will download three datasets

- 25k *generic* images from *Flickr* as used by *Zhang et al. (2016)* in Colorful Image Colorization
- 4.3k *landscape* images (also downloaded from *Flickr*). It is a publicly available Kaggle dataset
- possibly a **custom** dataset downloaded from google images with a *python script* (with a *webscraper* or some *API's* like simple_image_download) belonging to some, arbitrary, specific topic

Method

First I will resize all the images to a fixed, predetermined size. Later I will do some pre-processing of the resized images (*e.g. normalizing, extracting grayscale and colors,...*). Finally I will build my custom deep learning model based on an **autoencoder** architecture. In order to evaluate my model I will run comparisons to previous implementations:

- *Colorful Image Colorization* by *Zhang et al. (2016)*
- *Real-Time User-Guided Image Colorization with Learned Deep Priors* by *Zhang et al. (2017)*

I will not train these two models from scratch but I will use the pre-trained versions available here.

Contribution

I want to create my custom algorithm from scratch and test different model architectures starting from a base *autoencoder*. I would love to build a specialized model for a specific class of images (*e.g. landscapes, cities, mountains...*) of my choice.