

A SURVEY ON GREY IMAGE COLORIZATION USING DEEP LEARNING

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Abstract - Grey image colouring or ‘colorization’ means to give colours to grey images. It has become a new research area as it can be utilized to increase the visual appeal of the images such as old black and white images or scientific illustrations. The project deals with converting the grey images to colourful images using deep learning algorithms. “Pysimplegui” package will be used to serve the purpose. The images will first be classified using classification algorithms and then colorized using colorization algorithm and then the 2 outputs of the algorithms will be fused to produce the final output. For this, we built a model using deep learning that can predict colours in a grey scale image. The model is trained using training dataset and therefore the trained model is further tested using test data images..

Key Words: optics, photonics, light, lasers, templates, journals

1. INTRODUCTION

The Grey Image Colorization problem is based on the real-life scenario of converting the black and white (grey) images to colored images. The proposed system aims to generate acceptable results for colored versions of grey scale images

The idea behind self-supervised learning is to take abundant and readily available data, unlabeled data and use it to understand itself. In other words self-supervised learning allows machines to look at a part of a knowledge example so as to work out the remaining part. If we can train a machine to understand and predict the most likely result or different possible results of the play from previous play data alone, without needing labels.

Basically, self-supervised learning learns from unlabeled data to fill within the blanks, or missing pieces, all without being limited to predicting only a narrow set of task specific labels.

2. MODELLING AND ANALYSIS

• CNN Architecture for Colorization

Each block has two or three convolutional layers followed by a Rectified linear measure (ReLU) and terminating during a Batch Normalization layer. Unlike the VGG net, there are not

any pooling or fully connected layers. The input image is rescaled to 224×224. Let us represent this rescaled grey scale input image by X . When it passes through the neural network shown above, it gets transformed to by the neural network. Mathematically, this transformation by the network are often written as

The dimensions of is $H \times W \times Q$, where $H = 56$ and $W = 56$ are the height and width of the output of the last convolution layer. For each of the $H \times W$ pixels, contains a vector of $Q = 313$ values where each value represents the probability of the pixel belonging to that class. Our goal is to seek out one pair of ab channel values for every probability distribution

• Modeling Process

We will be using 3 channels:

- The a channel encodes green-red.
- The L channel encodes lightness intensity only
- And the b channel encodes blue-yellow.

The entire (simplified) process can be summarized as:

- Convert the Lab image back to RGB.
- **Requirements**
 - Jupyter Notebook
 - Python
 - Operating System – Windows 10 or macOS or Linux.
- **Hardware Requirements**
 - 8 GB RAM
 - 40 GB disk space would be preferred
 - 64 bit Operating System
- **Evaluation Metrics**

For evaluation, we will conduct a survey of approx. 20 – 30 people using Google Forms. In the survey we will include a sample of the images we colorized and corresponding to each of them will be the actual colorized image. We will record the response of each person on every image.

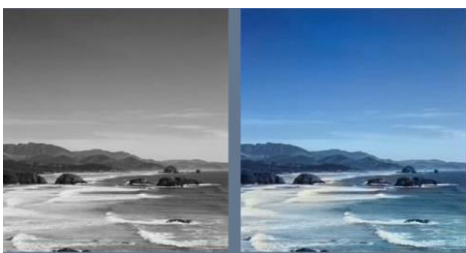


FIG 2.1 Operational Flowchart

3. CONCLUSIONS

We colorized the images and conducted a survey of 30 people where we asked them to choose whichever they thought was the real image. As per the submissions received on average approximately 70% of the people chose our colorized images and were successfully fooled.

Sample Image –



Grey Image

Colored Image

FIG 3.1 Sample Colorized Image

In this paper, we presented a reliable method for colorizing gray scale images that uses a CNN to extract color information from an image and transfer it to another image. We generated plausible looking coloured images. Our result indicates the presented method can be used as a creativity tool to assist human artists in the near future.

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