Monocromatic into RGB image using Deep Learning

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INTRODUCTION

- Image colorization is the process of assigning colors to a grayscale image to make it more aesthetically appealing and perceptually meaningful.
- There are two main approaches for image colorization:
- One that requires user to assign colors to some regions and extends such information to the whole image.
- Another one that tries to learn the color of each pixel from a color image with similar content.
- We extract the information about color from an image and transfer it to another image.
- A CNN consists of multiple layers of small computational units that only process portions of the input image in a feed-forward fashion.

PROBLEM STATEMENT

- Colorization is fundamentally an ill posed problem mainly due to the loss of information across dimensions when a colour image goes to grayscale version.
- The main challenge arises as various colors can give rise to same grayscale values. Mathematically the problem is estimating 3 dimensions (RGB or YUV color space) from single dimension.
- In this project an attempt has been made to come with methods to colorize images without human assistance. The algorithm works by a training a model on a large corpus of images and then using the developed model to colorize grayscale images.
- Deep learning has been successfully applied to various classification, recognition and regression problems This project formulates colorization as a regression problem and neural networks are employed to solve regression. A large image database is used for training the model.

Literature Survey

- Previous work regarding colorization can be divided into two, scribble based colorization and example based colorization.
- In Scribble based colorization, user is required to provide some colorful scribbles and based on the scribble an algorithm predicts the colors of the image .
- In Example based colorization, the color information from a reference image is transferred to target grayscale image. The reference image can be either user supplied or web supplied example images.
- The method implemented in this project is an extension of the second method where in a large image dataset is provided to the algorithm and the model transfers colors by considering the observed patterns in the provided dataset.

Existing System

- The existing System was manual system.
- The need for Automation of the existing system arose because of many difficulties, irregularities and inaccuracy present in the current system.
- Earlier the black and white images where manually colored using photo editor , then the grey scale was adjusted to accurate colors.

Advantages and Disadvantages of Existing System

ADVANTAGES	DIS-ADVANTAGES
Can be made more precise	Time Consuming Process.
Reduced Error	Cannot do multiple at a time
Customization and flexibility	Causes more Stress.
Intuitive and user-friendly	Cost is too high per image

Proposed System

We layout and construct a convolutional neural model (CNN) that accepts a black-and-white picture as an input and generates a colorized model of the picture as its output.

- torch - Tensorflow(neural network based deep learning models)
- skimage – Image Manupulation
- numpy – Mathematical Functions
- matplotlib – Plot the Output
- argparse - Positional arguments
- PIL - Python Imaging Library (editing, creating and saving images.)

Applications

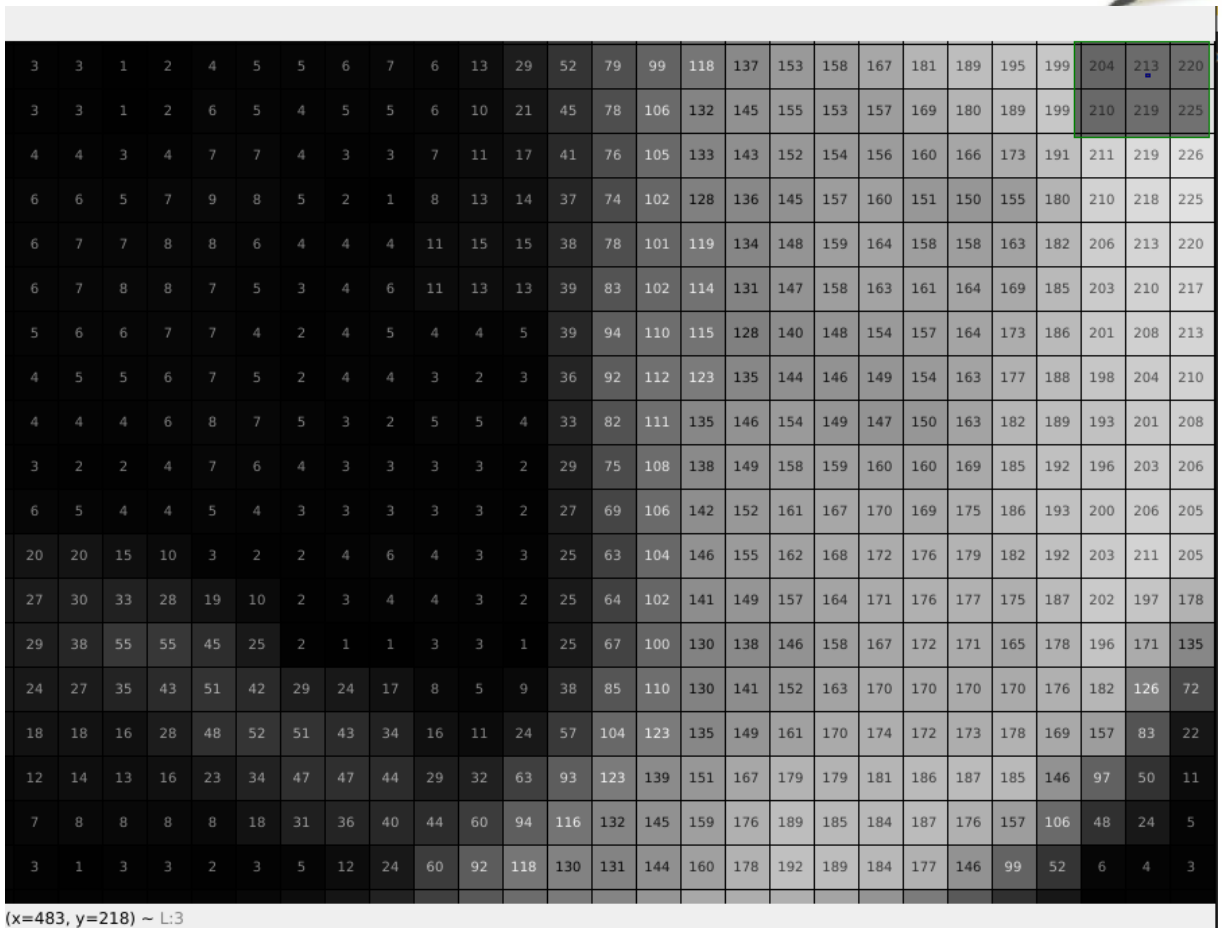
- Can be used to converd bulk quantity of black and white photos to coloured images.
- Major application for studios, cinematography industries.
- Further all the historic photos of wars,great personalities etc can be brought back as coloured images.
- Further more black and white videos(Cinema) also can be converted to coloured movies.

PROGRESS!

Grey Scale Image(Black and white) of a Dog

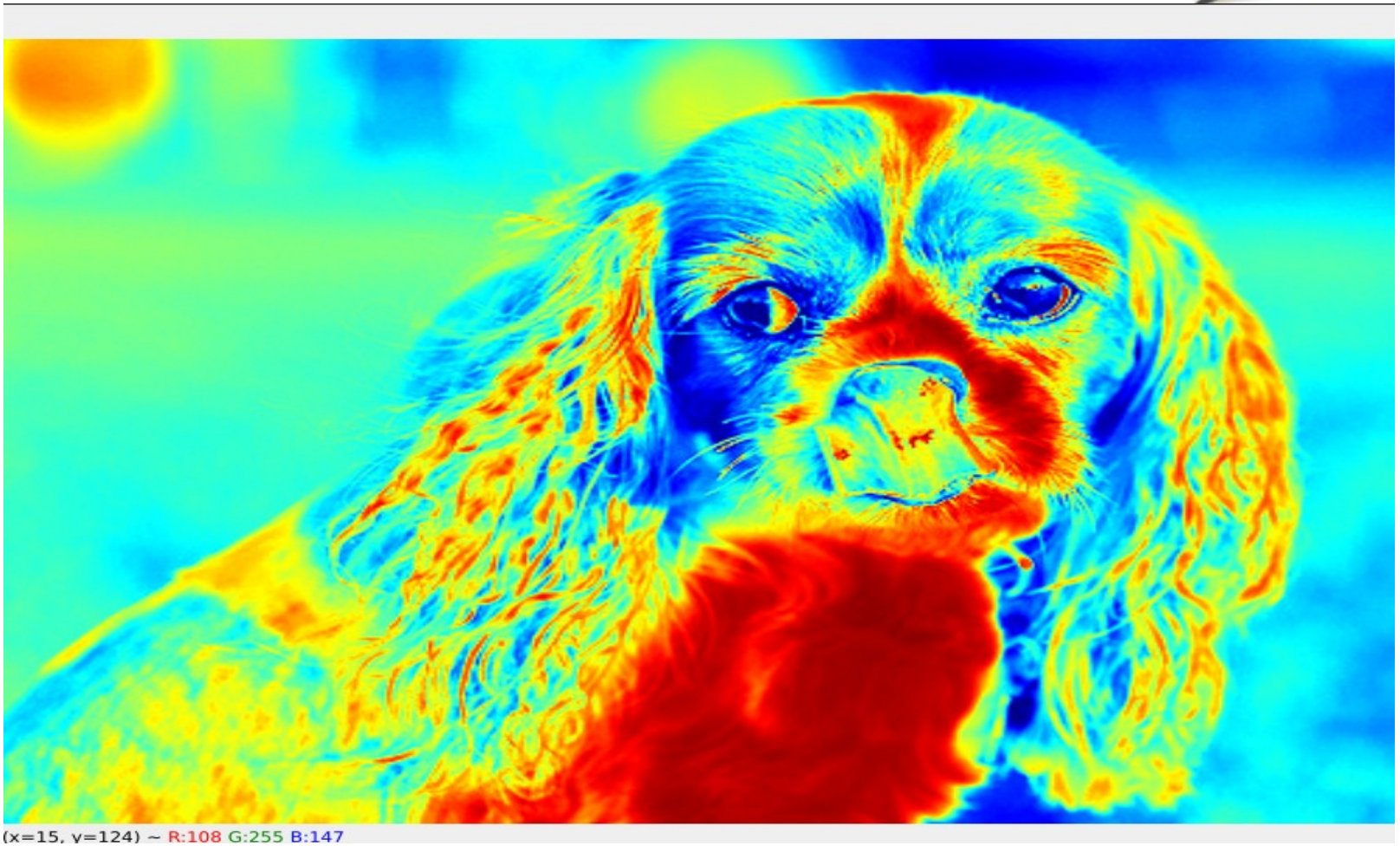
EYE of the dog Zoomed upto visible pixel

PROGRESS



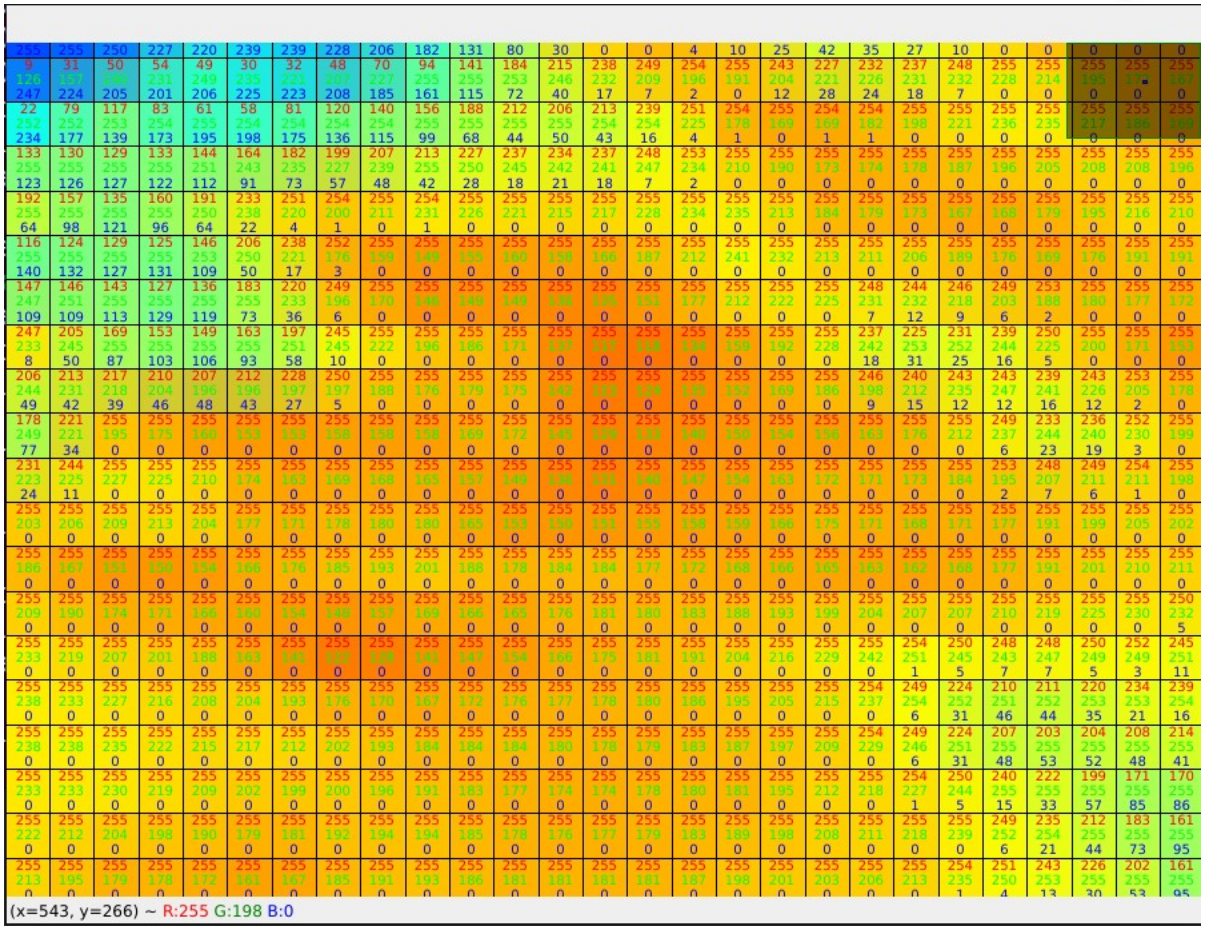
Grey Scale Matrix of the Eye of Dog (each pixel of eye,with it grey scale value)

PROGRESS



Pseudo Color of Dog

PROGRESS



The Color Matrix of Eye of the Dog with RGB values in each

References

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THANK YOU