

Monocromatic into **RGB** image using Deep Learning

Under guidance of Mr.Vasudev S Shapur

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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 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 were 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 Manipulation
- numpy – Mathematical Functions
- matplotlib – Plot the Output
- argparse - Positional arguments
- PIL - Python Imaging Library (editing, creating and saving images.)

Applications



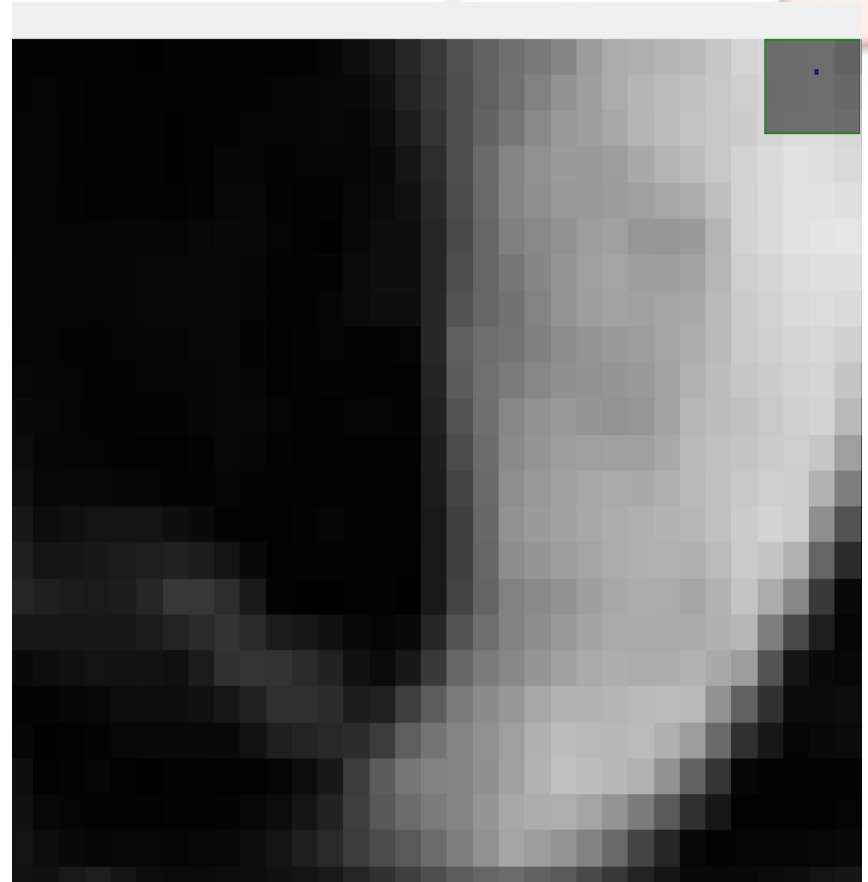
- Can be used to convert bulk quantity of black and white photos to coloured images.
- Major application for studios, cinematography industries.
- Further all the historic photos of wars, great personalities etc can be brought back as coloured images.
- Further more black and white videos(Cinema) also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

PROGRESS!



(x=94, y=2) ~ L:167

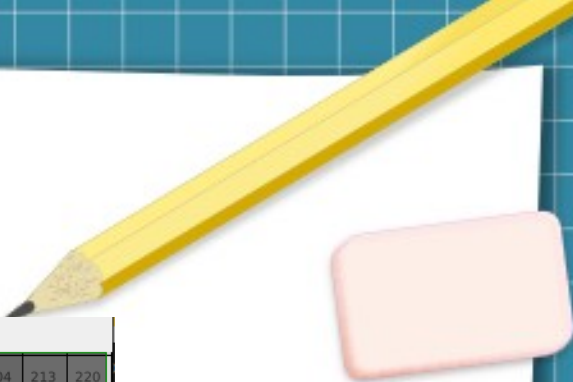
Grey Scale Image(Black and white)
of a Dog



(x=499, y=226) ~ L:135

EYE of the dog Zoomed upto visible pixel

PROGRESS

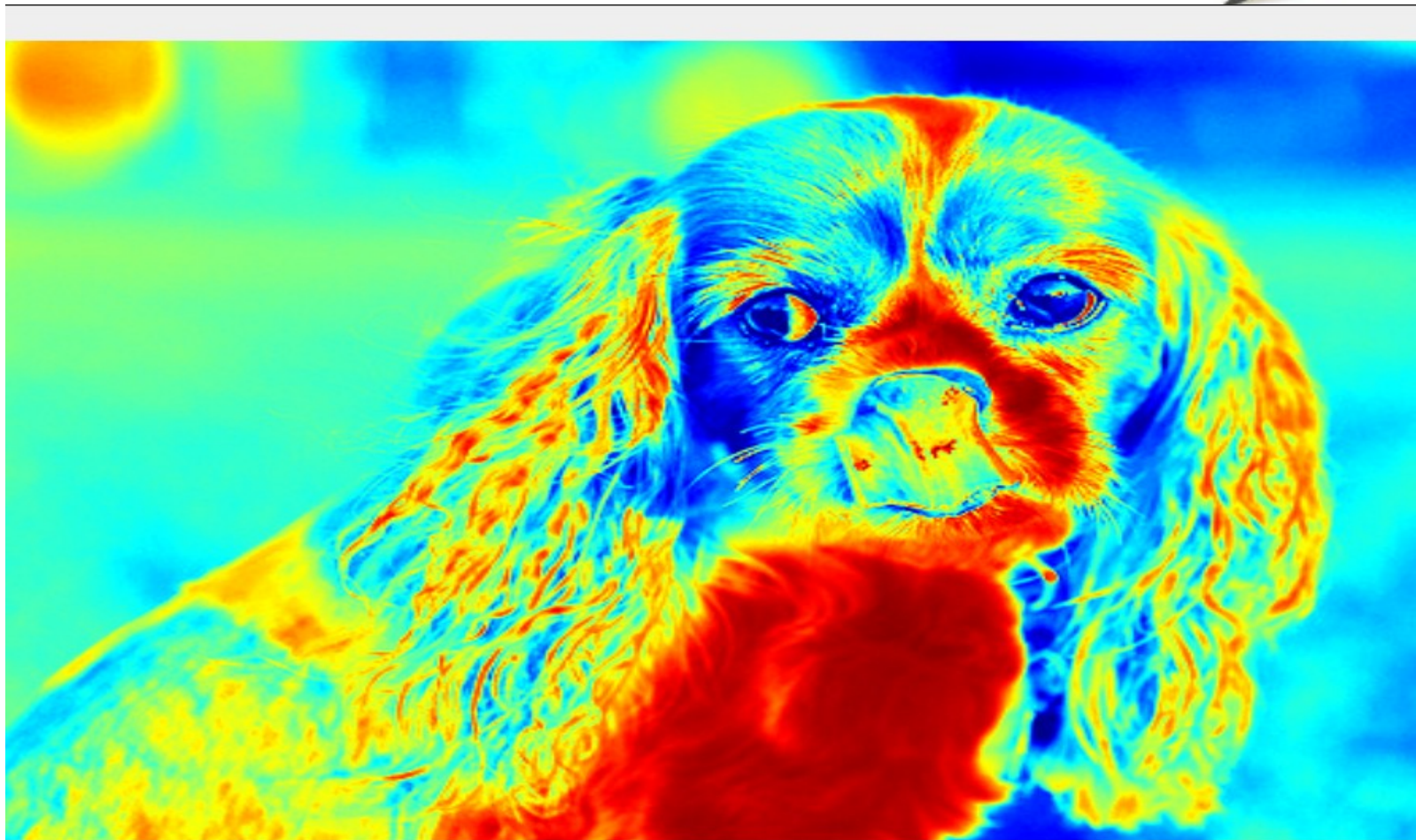


3	3	1	2	4	5	5	6	7	6	13	29	52	79	99	118	137	153	158	167	181	189	195	199	204	213	220
3	3	1	2	6	5	4	5	5	6	10	21	45	78	106	132	145	155	153	157	169	180	189	199	210	219	225
4	4	3	4	7	7	4	3	3	7	11	17	41	76	105	133	143	152	154	156	160	166	173	191	211	219	226
6	6	5	7	9	8	5	2	1	8	13	14	37	74	102	128	136	145	157	160	151	150	155	180	210	218	225
6	7	7	8	8	6	4	4	4	11	15	15	38	78	101	119	134	148	159	164	158	158	163	182	206	213	220
6	7	8	8	7	5	3	4	6	11	13	13	39	83	102	114	131	147	158	163	161	164	169	185	203	210	217
5	6	6	7	7	4	2	4	5	4	4	5	39	94	110	115	128	140	148	154	157	164	173	186	201	208	213
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20	20	15	10	3	2	2	4	6	4	3	3	25	63	104	146	155	162	168	172	176	179	182	192	203	211	205
27	30	33	28	19	10	2	3	4	4	3	2	25	64	102	141	149	157	164	171	176	177	175	187	202	197	178
29	38	55	55	45	25	2	1	1	3	3	1	25	67	100	130	138	146	158	167	172	171	165	178	196	171	135
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18	18	16	28	48	52	51	43	34	16	11	24	57	104	123	135	149	161	170	174	172	173	178	169	157	83	22
12	14	13	16	23	34	47	47	44	29	32	63	93	123	139	151	167	179	179	181	186	187	185	146	97	50	11
7	8	8	8	8	18	31	36	40	44	60	94	116	132	145	159	176	189	185	184	187	176	157	106	48	24	5
3	1	3	3	2	3	5	12	24	60	92	118	130	131	144	160	178	192	189	184	177	146	99	52	6	4	3

(x=483, y=218) ~ L:3

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

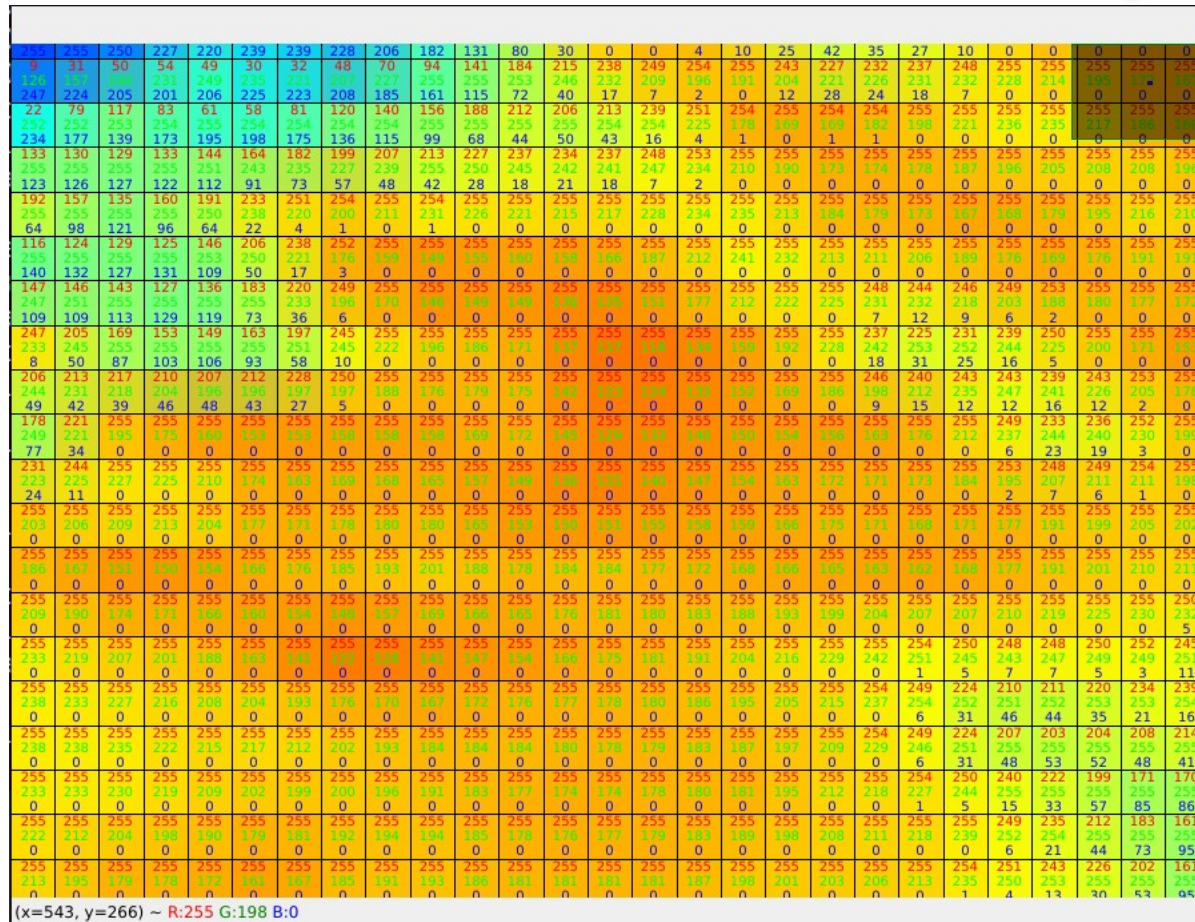
PROGRESS



(x=15, v=124) ~ R:108 G:255 B:147

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

