A Review on Changing Image from Grayscale to Color

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***Abstract*— we introduce a general technique for making colorless images into colored one. To achieve this we are introducing a technique for predicting color of a particular image adaptively. This technique helps in adding chromatic values to a colorless image and sophisticated measure for color transfer. Rather than choosing the entire color from the source to the target image we transfer RGB colors from a palette to color gray scale components, by matching difference information between the images. Particular emphasis is placed on using color information to improve the assessment of colorless images to transfer only chromatic information and retain the original luminance values of the target image using image splitting. This simple technique can be successfully applied to a variety of gray scale images and videos, provided that texture and luminance are sufficiently distinct.**

Keywords: Color, Gray scale image, Image difference, Image processing, quality.

I. INTRODUCTION

Colors are extremely subjective and personal. They have a prominent feature by which we try to identify images better and improve the visual appearance of image. Colorization is a computer assisted process of adding color to a monochrome (grayscale) image or movie. One wish to add colors to grayscale image for many reasons: colors increase the visual appeal of an image such as an old black and white photo; they make an old movie nicer, and help to make a scientific illustration more attractive.

In addition, the information content of some scientific images can be perceptually enhanced with color by exploiting variations in chromaticity as well as luminance. Since different colors may have the same luminance value but vary in hue or saturation, the problem of colorizing grayscale images has no inherently "correct" solution. Due to these ambiguities, a direct prediction of color usually plays a large role in the colorization process. Where the mapping of luminance values to color values is automatic, the choice of the color map is commonly determined by a reference image.

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Here we address the color-related aspects of image splitting. We focus on full-reference measures, which will convert colorless image into color image. Ideally, they reflect the actual visual mechanisms responsible for image color conversion. These mechanisms, however, are poorly understood, which applies especially to gray scale images.

A grayscale is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. Images of this sort, also known as black-and-white, are composed exclusively of shades of gray, varying from black at the weakest intensity to white at the strongest. Grayscale images are distinct from one-bit bi-tonal black-and-white images, which in the context of computer imaging are images with only the two colors, black, and white. Grayscale images have many shades of gray in between. Grayscale images are also called monochromatic, denoting the presence of only one (mono) color (chrome).

Color images are often built of several stacked color channels, each of them representing value levels of the given channel. For example, RGB images are composed of three independent channels for red, green and blue primary color component. While standard methods accomplish this task by assigning pixel colors via a global color palette, our technique empowers the user to first select a suitable color image and then transfer the color of this image to the gray level image at hand.

The early published methods to perform the image colorizing rely on heuristic techniques for choosing RGB colors from a global palette and applying them to regions of the target gray-scaled image.

Fig: A typical Grayscale Image

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II. LITERATURE REVIEW

Studies on this subject shows not too much progress comparing with image processing, as in Mahmud uses Pseudo Coloring technique to color medical images and completely restricted, which the same topic can be found at and See also[1] [2] [3].

In another report Haldankar and colleagues have provided the benefit of a color image as a sample image, create a mapping of color image to black and white image and then they use the appropriate mapping to color gray levels of black and white image, the results of this technique have Further improvement than has[4].

In another technique that Cheng and colleagues have expressed the operation of image histogram and definition of an overlap to select different intensity of light in different levels of color image, is basic idea, although this technique is not entitled of good quality in images details and in some situations of image color contrast is developed but is still acceptable and desirable in images with not a lot of details, in Xiang and colleagues for coloring industrial images are acting, of course that the images are divided into smaller pieces thus the obtained results[5] [6].

In another technique that Rujuta R Mahambare, introduce a general technique for "colorizing" grayscale images by transferring color from the colored reference image to the black and white grayscale image. This technique helps in minimizing the amount of human labor required for this task. They transfer the entire color "mood" of the source to the target image by matching luminance and texture information between their image[7].

Technique suggested by Ingmar Lissner, Jens Preiss emphasis on placed on using color information to improve the assessment of gamut-mapped images. Our best image-difference measure shows significantly higher prediction accuracy on a gamut-mapping dataset than all other evaluated measures.

The objective is to have a converter, which will be useful for number of applications with a basic function of converting from one color space to another and the inverse on same architecture. This paper presents an efficient parallel implementation for two color space converters [8] [9] [10].

G.Sapiro, present an approach for adding color to a monochrome image or movie, based on considering the geometry and structure of the monochrome luminance input, given by its gradient information, as representing the geometry and structure of the whole colored version[11] .

D. Sỳkorå, J. Buriånek, and J. Žåra, present a novel *color-by example* technique which combines image segmentation, patch-based sampling and probabilistic reasoning .This method is able to automatic colorization when new color information is applied on the already designed black and –white cartoon. In this case, the background is usually a static image and only the dynamic foreground needs to be colored frame by frame. They also assume that objects in the foreground layer consist of several well visible outlines which will emphasize the shape of homogeneous regions. They state the problem as: having two segmented frames. First frame serves as a color example where each region has one color index assigned from the user-defined palette. The second frame contains unlabelled target regions. The colorization task, then, is to assign color indices to target regions similarly to as they are assigned in the example frame [12].

III. ANALYSIS OF PROBLEM

According to referred methods, predicting and then direct application of color on the colorless image is one of the main problems which reduced the overall effectiveness of the entire work. This drawback makes the overall system rigid less so that, the prediction about the color of image should not match every time.

A major difficulty with colorization lies in the fact that it is an expensive and time-consuming process. Changing gray scale image to color image is very complicated. Adding direct color to a gray scale image is not possible .One of the myths about the concept of changing a colorless image into a color image is that taking a color image and removing its color applying directly to the gray scale image. To change the color of colorless image we need to modify the existing methods. For applying color to a gray scale image, segmentation is used first but due to improperness in its separation resultant image quality may loss.

The changes in source image and resultant image are not completely verified depending upon its image difference mapping. Difference was calculated by considering few parameters and reference image in the previous case and then that reference image are converted into the color. The mapping methods used in current scenario are not satisfactory.

IV.PROPOSE WORK

Adding color to a gray scale image directly is not possible. Admittedly, the process of colorizing a grayscale image certainly seems not straight forward enough, in that it probably involves various methods to apply color onto the colorless image. This technique is entirely different; it is an adaptive system, which emphasis on a gray scale image and converting them into color image using image splitting.

Image splitting will add more effective addition of color. This gives us enhancement of the luminance and clarity of image. For the first preliminary work we consider a particular selection of a colorless image then to add color into it is not that easy, first we have to work on the selection of splitter segment of image in colorless image and need to set a reference for it. For example, if there is a image of plant then the color of leaves of it should be either green or similar shade to it. This application of color need to be adaptive and for that first we need to select references and the by deploying certain methodologies regarding to object detection program can achieve its adoptions.

Automatic selection of color in a particular grayscale image makes system more impactful and obtained resultant image enhanced the scale of colorization. Purpose of this Paper is to produce with the new approach to work on the way to get the solution of problem in hand. Adding color to a colorless image gives more benefactors for analysis of any kind of image in any application. For example, color can be added to a range of scientific images for illustrative and educational purposes will enhance the impact on the receiver. It is the tendency of human eye which are attracted to color more and it is scientifically proved that grasping information by actual color pictures of a certain topic are more impactful than by any textual material or in oral communication.

Main objective of this propose work is to change colorless image into color image without having any loss in actual image. The main huddle in this task its adaptiveness because in previous work they have selected reference image completely either by considering the mood of image or by giving more reference choices in datasets which will cause some drawbacks when we observe the outcomes of it. So, the selection of color must be suitable for a particular kind which will justify the projection of colors.

For converting a gray scale image into color image we refer following steps:

- Image Selection
  In this step we select the source grayscale image and depending upon the image quality we will filter it using some technique to remove noise in image.

- Image Splitting
  After image selection we need to split grayscale image. Image splitting is needed for selecting proper area to be converted in appropriate color. Splitting can be done in different ways like horizontal splitting, vertical splitting, etc.

- Pattern Recognition
  For applying color to any fragment of image first we need to recognize pattern of that part. For example, if we take a human image the first section may be face then relative color should be applied to that portion. But to apply any color first we need to find out that what part of image it is? And then accordingly color can be selected.

- Changing color of gray scale image
  After deciding color the different segmented parts of image are converted to color by the selected reference image and this procedure should be adaptive, it means program must decide which color shall be given to which part of image.

- Joining splitted color image
  Now the newly obtain image i.e color image will be in different segments so we need to join all parts properly to get complete colorful image.

- Applying image difference method
  Analysis of work can be suggested to be done by image difference method in which we are.

trying to find out what actual difference is happened resultant image and the source image.

In previous adapted methods the difference mapping is done partially. Here we proposed that the method used in predicting maps will be uniform and having effective mapping techniques between the gray scale image and obtained color image. In this proposed system we will map the entire source and destination images for better results. Mapping differences in source image and resultant image will gives a more suitability to our objective and will help us to verify the approach.

V. Application

Colorization helps in scientific illustration by exploiting variations in chromaticity as well as luminance, for example, a simple approach for pseudo coloring grayscale images of luggage acquired by X-ray equipment at an airport. The method uses separate transformations for each color channel which results in coloring objects with the density of explosives in bright orange and other objects with a blue tone.

Further, color can be added to a range of scientific images for illustrative and educational purposes. In medicine, image modalities which only acquire grayscale images such Magnetic Resonance Imaging (MRI), X-ray and Computerized Tomography (CT) images can be enhanced with color for presentations and demonstrations.

Moreover, more "mundane" applications can benefit from colorization techniques. For instance, consider a scenario where two people that chat regularly through the Internet decide to enhance their virtual meetings with live video. If colorization software, inexpensive and fully automatic one, was available to them, they might buy less expensive monochromatic webcams instead of color ones, use limited bandwidth by transmitting monochromatic video, but still be able to view fully colored video streams.

VI. Conclusion

According to analysis done over present system, the propose system is appearing more adaptiveness in changing a colorless image into color image. Image enhancement can be seen in resultant image. Perceive methods are seen to be improved. Resultant image will be rich in color, texture and feature.

Fig: Propose Resultant Image

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