Video Colorization

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***Abstract*—**as the rapid progress in computer technology for multimedia system has led to a rapid increase in the use of digital images. In this world of digital video, Video Colorization has become one of the most challenging tasks for multimedia Technologists. The present method of video colorization requires high processing costs and will induce temporal artifacts in a video space. Thus here we introduced 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. Rather than choosing the entire color from the source to the target image we transfer RGB colors from an palette to color gray scale components, by matching difference information between the images. This technique helps in adding chromatic values to a colorless image and sophisticated measure for color transfer. We will be developing an application of Video Colorization, which is based on a simple premise: pixels with similar pixel intensity should have same color. In this approach, the user scribes the colors and the indicated color is automatically propagated in both space and time by the use of algorithm. Thus as a result we get a high quality colorized video obtained from user input.

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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.

Here we address the color-related aspects of image splitting. 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 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, RGBimages 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.

A. Literature Review

Colorization Using Parallel Optimization in Feature Space [1]. Bin Sheng, Member, IEEE, Hanqiu Sun, Member, IEEE, Marcus Magnor, Member, IEEE, and Ping LiVideo states that they present a new scheme for video colorization using Pixel level matching by comparing one pixel of target with every pixel of source and then replace the minimum difference location of source with target current pixel which is found using saturation point.It is able to handle most of the rotated and disjoint texture regions and achieves comparable quality.It is also to detect texture region more accurately and it leads to fewer errors in region matching. It is able to remove artifacts and improve colorization performance. The experimental results demonstrate that their proposed approach is efficient in producing high-quality colorized videos.

Luminance-Chrominance Model for Image Colorization[2]. Fabien Pierre, Jean-Franc¸oisAujol, Aur´elieBugeau, Nicolas Papadakis, Vinh-Thong Ta states that they provides a new method to colorize gray-scale images. Two classes of approach exist. The first class includes manual methods that needs the user to manually add colors on the image to colorize. The second class includes exemplar-based approaches where a color image, with a similar semantic content, is provided as input to the method. These two types of priors have their own advantages and drawbacks. It provides a single framework that unifies advantages of both approaches. Finally, experiments and comparisons with state-of-the-art methods illustrate the efficiency of their method.

Epitomic image colorization[3]. Yingzhen Yang1, Xinqi Chu1, TianTsong Ng2, Alex Yong-Sang,Chia2, Jianchao Yang3, Hailin Jin3, Thomas S states that process of adding color to grayscale images Increasing the visual appeal of images Information illustration in scientific images.Manual colorization is time consuming and tedious. They focus on automatic image colorization that transfers color from the reference image to the grayscale target image.

B. Applications enabled by Video Colorization :

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 is inexpensive and fully automatic one, 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.

II. DESIGN

This project comprises of converting a target video which is in gray scale in to colored video by using a colored source image which is in RGB format.These source images can be changed with respect to the particular image in target video according to user.The algorithm that have been used is color mapping algorithm.The conversion proceeds in a way that first an image is divided in to frames and then converting a source image image in to YCbCr format and also converting the target video in to YCbCr format .The conversion here is necessary as we don't have anything common in both RGB and gray scale image.

The flow diagram of the proposed work is as follows:

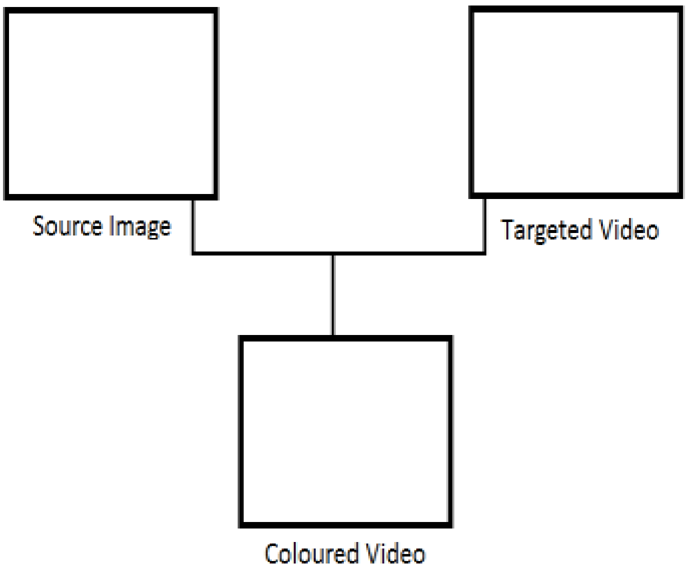

Figure 1: Flowchart

This is the welcome page of video colorization application

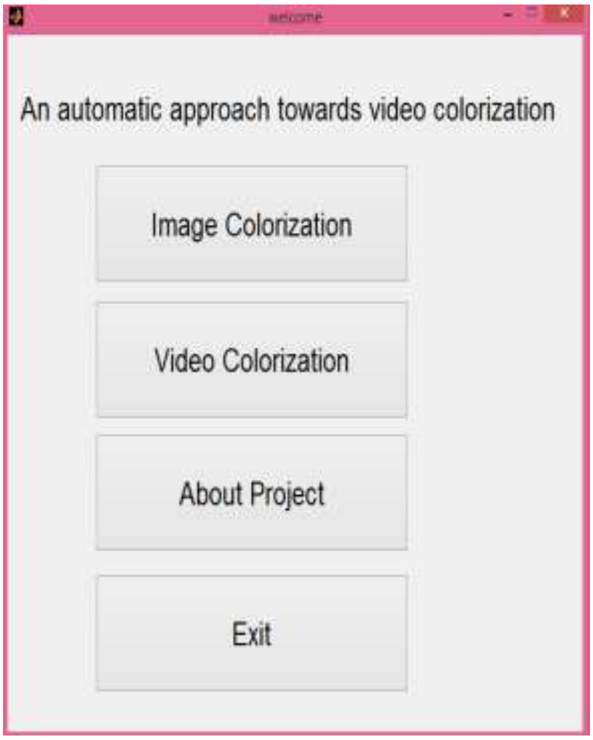

Figure 2: Welcome page

In this page you get various image options

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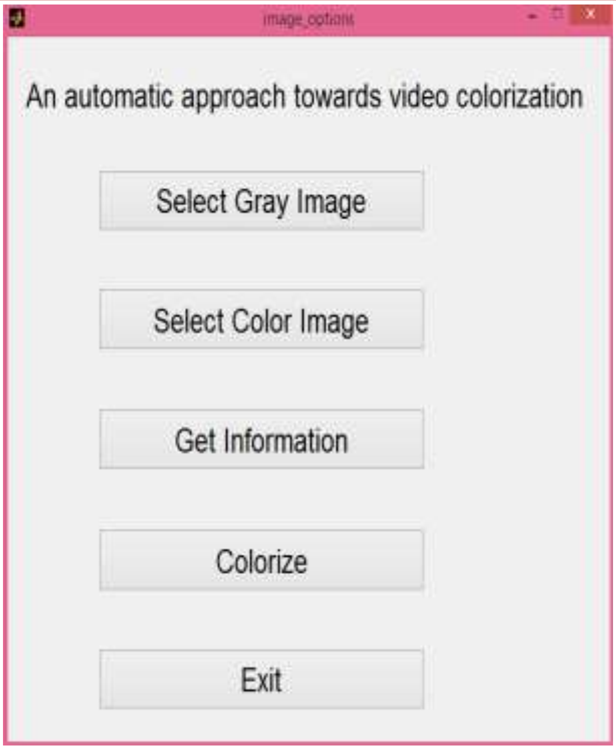

Figure 3 : Image_options

Selection and Colorization of video

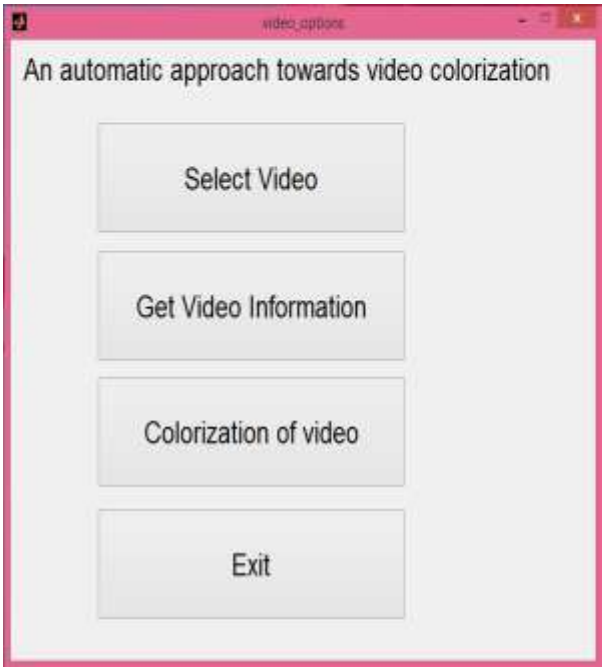

Figure 4 : video_options

III. RESULTS

Results of colorization are as follows:

Figure 4 : Colorization of image

Figure 5 : colorization of image(optimised)

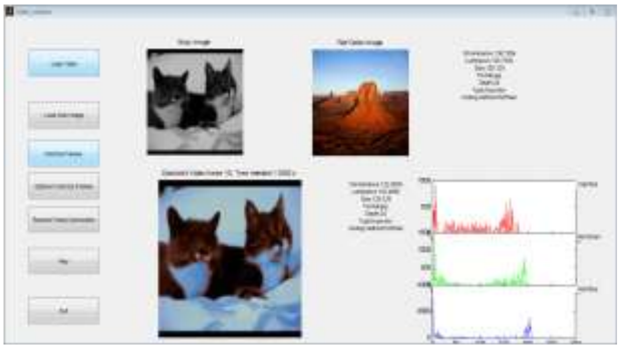

Figure 6: Video Colorization

Figure 7: Colorized frames

IV. LIMITATIONS

The colorization approach fails to colorize properly with scribbles when the pixels with high texture similarity did not have similar colors.

V. CONCLUSION

The core challenges of colorization are to assign similar colors to texture similar regions. In this approach a novel method to video colorization is presented. Basically the aim of project was to improvise the technique of colorization and help user to ease the procedure of colorization.

Conclusion of the project is as follows:

1. Ease the process

   Our project will help users to perform colorization by just selecting a reference (source) image and does not need to scribbled any of the colors, everything will be done automatically.

2. Limited human interference

   Human does not have to scribe color separately each time and for each frame, just selection of the image is needed to be done

3. Improved time constraint

   Earlier as the methods were manual user had to select color for each patch of the image. Here edge wise selection is done.

4. Less tedious work

   Earlier the methods were manual–selecting image, selecting patch, selecting color and then scribing it to get the desired output.

In future we will be trying to improve the colorization and to make it visibly clearer. Thus till now we have worked according to chrominance and luminance .So further we will proceed with texture components.

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