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Image Enhancement from low light Image using Median Filter

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Abstract— *Image enhancement technology is one of the basic technologies in the image processing field. The aim of image enhancement is to improve the interpretability or perception of information in images for human viewers or to provide better input for other automated image processing techniques. Recent years, gray image enhancement technology has developed rapidly. However, we usually deal with color images in daily life. Due to many factors, such as the limited dynamic ranges, lighting influences and display devices, the obtained image's quality declines, which means much important information is hard to tell by the human eye. Meanwhile, it is not suitable to directly use gray image enhancement technologies for color images. As a result, we need to develop color image enhancement technologies to deal with the problems. A lightening back projection histogram algorithm is used. The algorithm can enhance color image without distortion but the edges of the color image could not be handled well. The algorithm uses a Gaussian filter to estimate background images. Gaussian kernel function is isotropic, which leads to the inaccurate estimation of background image. For resolving the disadvantages of Gaussian filter, we use Median filter enhancement algorithm. The algorithm proposed consists of three major parts: (1) obtain luminance image and background image, (2) Median adjustment, (3) color restoration. The proposed method improves the visual qualities of the images and it also has better visibility. The details in the images are clear and the colors are vivid and natural. The edges of the images are handled well and thereby improving the quality of the images at the edges.*

Keywords – *Low light images, Median filter, pixel matrix, gray scale images, median coloration.*

I. INTRODUCTION

Taking photos is one of the most popular and convenient ways to record memorable moments of our life. Images taken in low-light conditions are usually very dim. This makes it difficult to recognize the scene or object. However, often it is inevitable to take photos in low-light conditions. The image is captured by the camera and it is stored in the memory. Sometimes the image captured will have low light and the visibility of the image will be low. It is due to some impulse noises and also it is mainly due to low lighting. The Impulse noises have the potential to cause some damage to the acquired image. It affects the quality of an image. They could happen for a number of causes, including air disturbances during image transmission, temperature switches in the sensor during acquisition or channel interference. The purpose of this project is to build a hybrid median filter in MATLAB and apply it to an image which has low light and also to remove impulse noise and create an improved quality image. A hybrid median filter can be a better choice than a traditional median filter. A median filter is a typical tool in image processing used to increase the brightness of low light photographs. The median filter is a nonlinear filter that replaces the value of each pixel with the median value of its nearby pixels. In order to preserve the edges and other information in the image, the median filter smoothes the image and reduces noise. As a result, the image appears to be more vivid and bright. It's crucial to remember that applying a median filter to an image might also cause some blurring or loss of clarity. This is so that no fine features or edges are lost when the filter replaces each pixel's value with the median value of its neighbors. In order to balance noise reduction and detail preservation, it is crucial to operate the filter carefully and adjust its parameters.

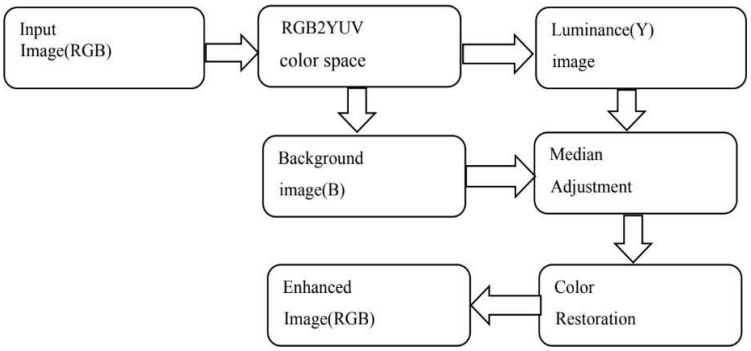
II. RELATED WORK

For better simulated spiculation identification in dense images, contrast limited adaptive histogram equalization image processing: In multiple input multiple output transmission, the Kalman filter tracks the phase noise caused by independent transmit and receive oscillators. Dehazing a single image with contrast enhancement. At the same and nearby sample moments, colored noises that are related to the state noises and measurement noises are present. A technique for denoising and contrast boosting in low light images: The suggested method outperforms state-of-the-art picture denoising techniques in terms of peak signal to noise ratio and structure

similarity index, according to simulations and real SAR images. A dynamic histogram equalization for improving the contrast of an image: A method used in image processing to improve contrast in an image is histogram equalization. The fundamental goal of histogram equalization is to change an image's intensity values so that the resultant image's histogram is roughly uniform. This method can enhance the visibility of details in areas of an image that are bright or dark. Automatic picture enhancement using Retinex processing: Retinex processing is a method for automatic image enhancement. It is predicated on the notion that an object's reflectance and internal illumination determine how color is perceived of that object. Retinex-based algorithms frequently function locally and adaptively, performing image enhancement on discrete areas of the image at a time. Imagenet classification with deep convolutional neural networks: Imagenet is a large scale dataset of images used for object recognition research. The model uses rectified linear units as a activation functions which have been found to be effective for training deep neural networks. Deep retinex decomposition for low light enhancement: It involves decomposing an input image into its base and detail layers using deep neural networks.

III. THE PROPOSED MECHANISM

In order to reduce the dynamic range of the color image and improve local contrast, we first use color space conversion to obtain the luminance image and the background image. The high dynamic range image is meant to be compressed since there is a limited range of intensities that human eyes can distinguish at once. Important visual features can be improved with contrast enhancement to produce images with enhanced visibility. Finally, a linear color restoration method yields the enhanced color image. We get the luminance image and background image using color space conversion, and then Median adjusts the luminance image to compress the color image dynamic range and enhance local contrast. The intensity level human eyes can identify at one time is small, so the high dynamic range image is intended to be compressed. Contrast enhancement can improve important visual details so that we can get an image with better visibility. Finally, we obtain the enhanced color image after a linear color restoration process.



IV. PERFORMANCE EVALUATION

The result of the project mainly aims to improve the quality of the image. It enhances the image without affecting the information present in the image and also reduces the halo. As we are using median filter the noise is reduced. We are changing the input image to grey scale and background image is obtained. The purpose of converting the image to grey scale is to obtain the enhancement accurately. Then median filtering and median adjustment is done and color restoration is performed. After color restoration, the output image is obtained with better enhancement accurately without affecting the edges in the image.

Figure 1. Output Screen

V. CONCLUSION

The aim of the image enhancement is to improve the information in images for human viewers or to provide 'better' input for other automated image processing techniques. After applying both the regular and adaptive median filters into practice, we can see that the adaptive median filter accurately detects salt and pepper noise, an impulse noise. The adaptive median filter produces results for Gaussian noise that are significantly better than those of the standard median, but we can also see that these results are not accurate and satisfactory, necessitating further modification of the proposed model. We use a hybrid median filter that enhances the image accurately and also removes noise from the image. By using a graphical interface, we can view the step-by-step images in a single screen. The image with low light can be modified to a bright light image for useful purposes without reducing the quality and features of the image. The edges of the color images are handled well and background images are accurately obtained. It improves the quality of the images at the edges. This method proposes a solution in reducing the halo in the images and thereby it achieves a better visibility of the images.

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