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Enhancement of Imagery in Poor Visibility Condition by Using GUI

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Abstract—Our focus in this work will be primarily in examples of enhancements in poor weather condition. GUI will be made in order for better user interference. These tools classify the overall brightness, contrast, and sharpness of an image based upon its regional statistics. Wavelet transform is the most exciting development in the last decade. The method focuses on wavelet-based image resolution enhancement and suitable for processing the image/video resolution enhancement. The Software tool used is MATLAB.

Keywords—*Video enhancement, self enhancement, frame-based fusion enhancement, spatial-based domain enhancement, transform-based domain enhancement, wavelet transform.*

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I. INTRODUCTION

Digital video has become an integral part of everyday life. It is well-known that video enhancement as an active topic in computer vision has received much attention in recent years. The aim is to improve the visual appearance of the video, or to provide a "better" transform representation for future automated video processing, such as analysis, detection, segmentation, and recognition. Moreover, it helps analyses background information that is essential to understand object behavior without requiring expensive human visual inspection. There are numerous applications where digital video is acquired, processed and used, such as surveillance, general identity verification, criminal justice systems, civilian or military video processing. Carrying out video enhancement understanding under low quality video is a challenging problem because of the following reasons.

(i)Due to low contrast, we cannot clearly extract moving objects from the dark background. Most color-based methods will fail on this matter if the color of the moving objects and that of the background are similar.

(ii) The signal to noise ratio is usually very low due to high ISO (ISO is the number indicating camera sensors sensitivity to light. Using a high ISO number can produce visible noise in digital photos.

(iii) Environmental information acts in many types on information. So, dealing with moving tree, fog, rain, behavior of people in night time video are the difficult because they lack background context due to poor illumination.

(iv) The moving objects region as weight sin successive images should change smoothly.

(v) One pixel from a low quality image is important even if it is small, such as the area between the head lights and the tail lights of a moving car.

Image contrast enhancement algorithms can be divided into two main types – model-based and non-model-based. Model-based algorithms improve image contrast by reversing the underlying cause of image degradation whereas non-model-based algorithms require no information about the cause of degradation. In this paper, we focus on video enhancement considering wavelet transform and image enhancement. Research in the field started as early as in the 70s with the advent of computers and the development of efficient video processing techniques.

II. METHOD

1. Self-enhancement of low quality video:

In this section, we focus on self-enhancement of low quality video. The approaches can be classified into four categories: contrast enhancement, HDR-based video enhancement, compressed-based video enhancement and wavelet-based video enhancement. An overview of some of the well-known methods inthese categories is given below.

1.1. Contrast enhancement:

Video enhancement techniques involve processing an image/frame to make it look better to human viewers. The aim of contrast enhancement process is to adjust the local contrast in different regions of the image so thatthe details in dark or bright regions are brought out and revealed to the human viewers.

Contract enhancement is usually applied to input images to obtain a superior visual representation of the image by transforming original pixel values using a transform function.

1.2. Histogram equalization

It is one of the most commonly used methods for contrast enhancement.

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It attempts to alter the spatial histogram of an image to closely match a uniform distribution. The main aim of this method is to achieve a uniform distributed histogram by using the cumulative density function of the input image. The advantage is that it suffers from the problem of being poorly suited for retaining local detail due to its global treatment of the image.

HE methods are divided into two major categories: global and local methods.

III. THEORY

Wavelet transform is the most exciting development in the last decade. The wavelet transform has been shown to be an invaluable tool in signal processing applications such as data compression and fast computations

1.Wavelet-based transform video enhancement:

The method focuses on wavelet-based image resolution enhancement and suitable for processing the image/video resolution enhancement. The wavelet can be classified into four categories: continuous wavelet transform, discrete wavelet transform, complex wavelet transform, and dual wavelet. The discrete wavelet captures both frequency and location information.

The noise is reduced using threshold the empirical wavelet coefficients. The threshold is adaptive and a threshold level is assigned to each resolution level. The enhanced video will reduce noise using wavelet shrinkage denoising method. In the case of video denoising, a robust, high-quality video denoising algorithm is required to not only be scalable to differing levels of noise corruption, but also scalable to differing amounts of motion in the original signal. Unfortunately, this principle has not been seriously considered in video denoising. First, the individual frames of the sequence are denoised by using method. Then a new selective wavelet shrinkage method is used for domain processing.

2. Video enhancement based on shift invariant wavelet:

The most commonly used implementation wavelet transform. The critically sampled discrete wavelet transform is shift variant and so is unsuitable for many signal analysis applications. However, use of image fusion technique of shift-invariant discrete wavelet to integral all those context information in the final result of video enhancement.

To overcome the shift dependency of the wavelet fusion method, the input images are decomposed into shift invariant wavelet representation and a composite shift invariant wavelet representation is built by the incorporation of an appropriate selection scheme. Using final shift invariant wavelet fusion, the problems of video enhancement is the better resolved for nighttime surveillance video.

3. Video enhancement based on wavelet coefficients:

To better preserve significant image features, which are identified by the spatial correlation of the wavelet coefficients at different scales. Threshold scheme was performed only on the wavelet coefficients that do not correspond to any image features. The significant wavelet coefficients were determined. The wavelet-domain image resolution enhancement algorithm based on the estimation of detail wavelet coefficients at high resolution scales exploits shape function. The resolution enhancement of an image is achieved by using local extreme extrapolation of wavelet coefficients. Fusion operation is applied to the coefficients of registered pixels in the enhanced images of an image sequence. A fine resolution enhancement imageis reconstructed with inverse wavelet transform. To obtain estimates of local edge orientation from a wavelet decomposition of the available low-resolution image, it introduces directional variant of the cycle spinning methodology. This information to influence the choice of cycle spinning parameters is employed for resolution up scaling.The advantages include

(i) Lower computational complexity compared to the conventional cycle spinning.

(ii) The out performs competing methods for a wide range of images covering modest but consistent improvements both in objective as well as subjective terms.

For improving the clarity and continuity of ridge structures based on the multi-resolution analysis of global texture and local orientation by the wavelet transform, some the effect algorithm of image enhancement is proposed.

4. Video enhancement based on dual-tree complex wavelet transforms:

Using the dual-tree complex wavelet transform with the sub-band coefficients modeled as Cauchy random variables. The important map is produced to construct the composite approximation image. A unique characteristic of the algorithm is its ability to extract and maintain the meaningful information in the enhanced image while recovering the surrounding scene information. The algorithm has a lot of advantages.

(i) Using convolution of Cauchy models, it is able to develop a generative model where the distribution of the fused sub band is determined by the distributions of the input sub-bands.

(ii) The new model leads to a more accurate and reliable optimization process and doesn't take into account any assumption about the input images.

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(iii)The applied dual tree complex wavelet provides near shift invariance and good directional selectivity while preserving the usual properties of perfect reconstruction and computational efficiency.

5. Eliminate false background problem:

When using a combination of illumination fusion different time video or motion-based fusion to enhance low quality video, the most keys step is how to get the high-quality and clearly background image. General method use medians of several images, or select the Gaussian mixture model to exact moving objects. However, if we use medians of several images, there are many static objects in background image. E.g. a scene of daytime parking lot may contain many cars which parked at the parking lot for the whole day, while a scene of nighttime parking lot may be almost empty.

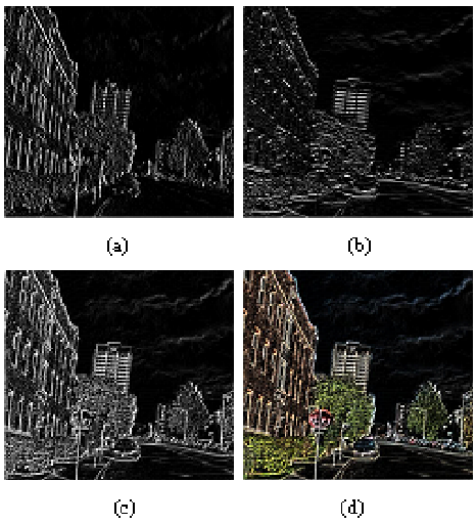

Figure8. Experimental result using the wavelet, (a) Gradient .led at axis (b) Gradient .led at axis, (c) Gradient field using and axis fusion, (d) Gradient field using and axis fusion with color.

So, the daytime background and night-time background could be quite different. If we use Gaussian mixture model, the background image is still false .E.g., in some cases some objects may remain in the frame for a long time.

IV. DISCUSSIONS

The video enhancement is still an active area of research by many experts. There are still many problems of video enhancement, such as false background. . Previous researchers maintain running average or database of high quality images may alleviate this problem. However, there isn't the more appropriate method to resolve this problem.

V. CONCLUSION

Video enhancement is one of the most important and difficult component of video security surveillance system. The increasing use of night operations requires more details and integrated information from the enhanced image. However, low quality video of most surveillance cameras is not satisfied and difficult to understand because they lack surrounding scene context due to poor illumination. A large number of techniques have been proposed to address this problem.

In this we focus on the existing techniques of video enhancement, which can be made better in poor visibility light condition. We show the existing technique of image/video enhancement and discuss the advantages and disadvantages of these algorithms. We also have described recent developments methods of video enhancement and point out promising directions on research for video enhancement for future research.

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