RESEARCH ARTICLE OPEN ACCESS

Color Sensitivity Multiple Exposure Fusion using High Dynamic Range Image

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ABSTRACT
In this paper, we present a high dynamic range imaging (HDRI) method using a capturing camera image using normally exposure, over exposure and under exposure. We make three different images from a multiple input image using local histogram stretching. Because the proposed method generated three histogram-stretched images from a multiple input image, ghost artifacts that are the result of the relative motion between the camera and objects during exposure time, are inherently removed. Therefore, the proposed method can be applied to a consumer compact camera to provide the ghost artifacts free HDRI. Experiments with several sets of test images with different exposures show that the proposed method gives a better performance than existing methods in terms of visual results and computation time.
Keywords: High Dynamic Range Images (HDRI), Histogram Stretching, Multiple Exposure.

I. Introduction

The most popular HDR imaging technique acquires multiple differently exposed input images and appropriately fuses them to obtain the extended dynamic range and color [1].It is even more difficult to acquire motion-free multiple frames using a camera with limited computational power, has proposed global and local motion stabilization to fuse a pair of registered images that are taken with different exposure has proposed a multi-exposure camera system which captures three consecutive frames from the same scene with different exposure times[2]. This system acquires HDR images by combining the object-shape information from the under-exposed image and the color information from the two over-exposed images possibly with motion blur. [3] In this method for automatically generating HDR images, camera moment and dynamic scenes are considered. This can facilitate the performance of image processing systems, such as video surveillance systems, digital photography, medical imaging systems and low power display systems [4]. In this method the three LDR images, such as over-exposed, normal-exposed, and under-exposed images generates from a single input image using local histogram stretching.

Block Diagram Description

1. Image processing

Image processing frequently contains collection of objects essential for region. Image processing system should be possible to apply specific image processing operations to selected regions. Thus one part of an image (region) might be processed to suppress motion blur while another part might be processed to improve color rendition.

Fig 1.The proposed HDR algorithm using multiple input image

2. Maximum A posteriori:

The estimates displacement and occlusion and saturation region by using Maximum a Posteriori estimation and constructs motion blur free HDRIs.The displacement occlusion and saturation ration are detected by the MAP estimation.

II. Motion Compensation

Since, Moving object shows the motion blur, it is required to compensate the displacement as much as possible. The compensation done the two

steps, i.e., global motion and local displacement compensation steps [6]. In our method, assume that the global motion (e.g., motion caused by camera shake) Here, focus on the local displacement compensation.
1) Occlusion,2) Saturation, that is, underexposure and overexposure, and 3) differences in intensity caused by the failure of the camera response curve estimation.

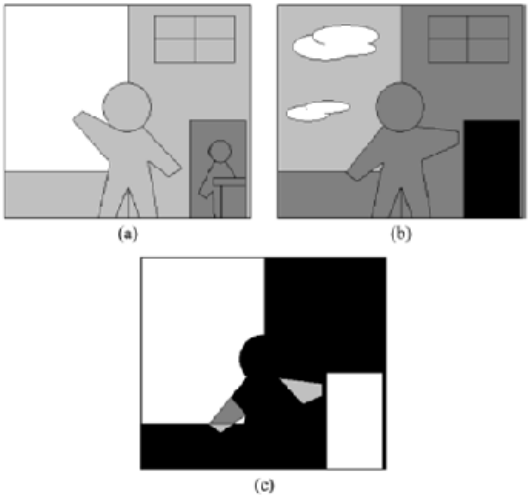

Fig.2 example of Multiple Exposure Images: (a) High exposure, (b) Low exposure, (c) Occlusion (gray), and Saturation (white).

Fig. 2 shows an example of two exposures, where some regions of the high-expo-sure image are overexposed [white region in (a)] and underexposed [black region in (b)].
The three types of regions where correspondence between the images is hard to find:
1) Occlusion [shows for light gray in (c)];
2) Saturation (overexposure shows for white);
3) Both of the two (dark gray)[6].
Algorithm Implementation Strategy
1. The photometric camera calibration is performed for the input image.
2. The image is required with different exposure setting. Assume that the exposure set by changing shutter speed while the aperture is fixed.
3. Select the main image from the multiple exposure images. This is done by the MAP-based motion compensation method. This method acquires three images:
a) Medium Exposure
b) Over Exposure
c) Under Exposure
4. Scratches the histogram the entire spectrum of pixels (0-255) for Normal, under and over Exposure.

III. Limitations for HDRI

In image processing, computer graphics and photography high-dynamic-range imaging (HDRI or just HDR) is a set of techniques that allow a greater dynamic range of luminance between the lightest and darkest areas of an image. This wide dynamic range allows HDR images to be more accurately represented and the range of intensity levels found in real scenes. For example it is able to more clearly capture ranges such as that between direct sunlight to faint starlight.
1. The advantage of HDR image is its higher dynamic range. Generally there are large contrasts between images and their physical counterpart.
2. General digital camera is unable to see these contrasts and hence unable to capture them. With HDR details which are missing in digital camera pictures are intact and the darkest and the brightest area are captured smoothly.
3. The disadvantage of HDRI is everything is good when it used correctly and with the photos limitation in mind, when it is over used it damages the originality of that image and may distort the image.

IV. Experimental Result

In this experiment, we used three set of images called normal exposure, under exposure, over exposure of size 640×480. Image sequence consists of different exposures in the presence of camera motion.
Current high dynamic range technique uses multiple Exposure images that are acquired using different exposure times. The histogram three images are shown in fig3

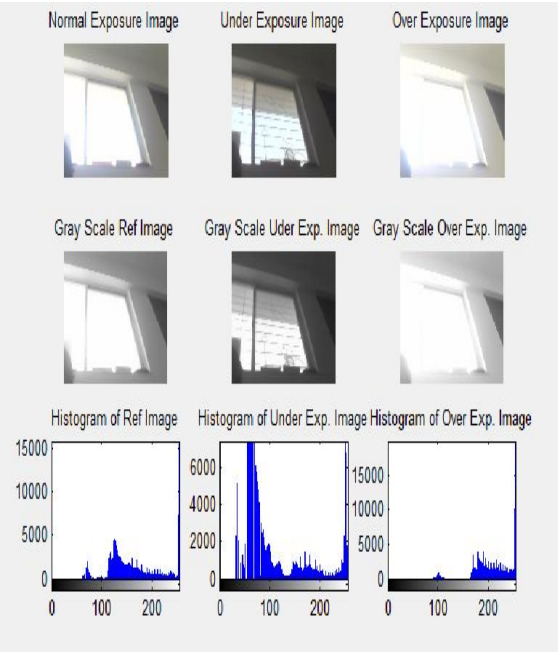

Fig.3 Multiple Exposure Images Input Images (a) Normal Exposure, (b) Under Exposure, (c) Over Exposure and the corresponding Histogram.

Because each image is captured with different exposure ,the corresponding histogram are biased towards a particular luminance range, which means that dynamic range is limited to corresponding brightness level. Fig. 1, the proposed method generates three images, an over-exposed, a normally-exposed, and an under-exposed images using local histogram stretching.

Table 1
Experimental Result of normal exposure, under exposure, over exposure

Multiple Exposed Image	Exposure Range	Histogram (Intensity of Pixel value)
Normally Exposed Image	-7	H1 =51.0031
Under Exposed Image	-9	H2 =62.0031
Over Exposed Image	-5	H3 =72.0031

In this, result can generate a high dynamic range image that has a histogram that is uniformly distributed over the entire brightness range However, this approach is successful in generating an HDR image of acceptable quality only in case of a static scene as shown in table 1. It Sketches the histogram across the entire spectrum of pixels (0-255). It can be converted true color image to gray scale image. Then showing to the normal exposure, under exposure and over exposure images histograms.

V. Conclusion

In this method, multiple image-based HDRI using local histogram stretching. As over-exposed, normal-exposed, and under-exposed images, from a multiple input image using local histogram stretching.HDR image by fusing three local histogram stretched images. For this reason the method provides easy acquisition using a camera capture images using a tripod for acquiring images.

VI. Work To Be Implemented

Find the Saturation field, Occlusion field, Displacement field and applying Markov Random Field Method, post processing and combined the image i.e. image fusion.

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