UNDEREXPOSED AND UNDERWATER IMAGE ENHANCEMENT VIA IMAGE REDUCE HAZING ALGORITHM

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ABSTRACT

Underexposed and Underwater image processing is a knowledge investigate field that can possibly assist engineers with bettering investigates the submerged condition. Submerged picture handling has been utilized in a decent sort of fields, as submerged minuscule identification, territory filtering, mine recognition, media transmission links, and self-sufficient submerged vehicles.Underwater and underexposed experiences solid retention, dissipating, shading, and clamor from the counterfeit light sources causing picture obscure, cloudiness and a pale blue or greenish tone. In this way, the upgrade can be separated into two techniques submerged picture de-right of passage and underexposed picture shading rebuilding. This paper presents the purpose behind underexposed and underwater pictures and studies the best in class knowledge calculations like picture lessen right of passage calculation. Right now two diverse de-preliminaries techniques simple dcp and approximate dcp to diminish cloudiness in a picture.

Keyword: - *Imreduce hazing, Simple dark channel prior, approximate dark channel prior, Histogram equalization.*

1. INTRODUCTION

Image enhancement plays an important role in vision and image processing. Enhancement under the water medium refers to accentuation or sharpening of image features such as edges, boundaries, exposure or contrast to make a graphic display more useful for display and analysis and to differentiate it from the background. The enhancement process does not inherent information content in the data but increases the dynamic range of the chosen features so that they can be detected easily. The main objective of enhancement is to process an image so that the result is more suitable than the original image. For this, various underwater imaging techniques have been introduced into underwater image processing field. This paper gives an overview of the defined techniques. Images captured in outdoor scenes can be highly degraded due to poor lighting conditions. These images can have low dynamic ranges with high noise levels that affect the overall performance of computer vision algorithms. To make computer vision algorithms robust in low-light conditions, use low-light image enhancement to improve the visibility of an image. The histogram of pixel-wise inversion of low-light images or HDR images is very similar to the histogram of hazy images. Thus, you can use haze removal techniques to enhance low-light images**.** Here we use two different dehazing algorithms, simple dcp and approximate dcp. These methods both rely on a dark channel prior, which is based on the observation that dehazed images of outdoor scenes usually contain some pixels that

have low signal in one or more color channels. The methods differ in how they estimate the dark channel prior and atmospheric light using haze removal techniques to enhance low-light images comprises three steps,
Step 1: Invert the low-light image.
Step 2: Apply the haze removal algorithm to the inverted low-light image.
Step 3: Invert the enhanced image.

1.1 OBJECTIVE

The principle objective of image enhancement is to process a given image so that the result is more suitable than the original image for a specific application. It accentuates or sharpens image features such as edges, boundaries or contrast to make a graphic display more helpful for display and analysis. The enhancement doesn't increase the inherent information content of the data, but it increases the dynamic range of the chosen features so that they can be detected easily.

1.2 SCOPE

The underexposed and underwater images generally suffer from blur, low contrast, non-uniform lighting, and diminished color. Digital image filtering is an important approach towards image enhancement. It involves the manipulation and interpretation of digital images. Images may get noisy due to various factors then filtering of images is become an important operation to de-noise the noisy images. Image sharpening must be performed to achieve it. This research paper proposed a preprocessing technique based on image to improve the quality of underwater digital images.

2. EXISTING SYSTEM

Underexposed image enhancement method based on optimal weighted multi-exposure image fusion algorithm. Firstly, we constructed multi-exposure image sequence containing different exposed versions of each underexposed image using a series of tone mapping curves. We adaptively located locally best exposed regions from all multi-exposure image sequences and then seamlessly integrated them into a well-exposed image through some weight values. These weight values could be solved by formulated as an energy function so that the colors of the output image match closely to those of images with high exposure while retaining details from the images with low exposure. Finally, we fused the image sequences and integrate the best exposed regions into a well-exposed image.

3. PROPOSED SYSTEM

This paper presents dark channel prior based haze removal algorithm and Imreduce haze. The dark channel prior is based on an observation that it is very often that some pixels of haze-free outdoor images have very low intensity. The algorithm is physically valid and can handle distant objects even in images with heavy haze. However, noise in bright regions including the sky could be amplified by using the algorithm and even though a lower bound was introduced for the transmission map.

4. MODULES

4.1 INPUT IMAGE DATASET

A dataset is a collection of data. In the case of tabular data, a dataset corresponds to one or more database tables, where every column of a table represents a particular variable, and each row corresponds to a given record of the dataset in question. The dataset lists values for each of the variables, such as height and weight of an object, for each member of the dataset. Each value is known as a datum.

4.2 PRE-PROCESSING

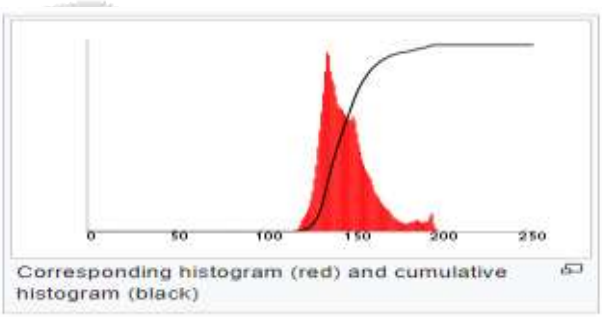
Datasets can require preprocessing techniques to ensure accurate, efficient or meaningful analysis. Data cleaning refers to methods for finding, removing, and replacing bad or missing data. Detecting local extreme and abrupt changes can help to identify significant data trends. Smoothing and detrending are processes for removing noise and linear trends from data, while scaling changes the bounds of the data. Grouping and binning methods are techniques that identify relationships among the data variables. In this project we use image complement to complement the image. In the complement of a gray scale or color image, each pixel value is subtracted from the maximum pixel value supported by the class (or 1.0 for double-precision images). The difference is used as the pixel

value in the output image. In the output image, dark areas become lighter and light areas become darker. For color images, reds become cyan, greens become magenta, blues become yellow, and vice versa.

4.3 HISTOGRAM EQUALIZATION

Histogram Equalization is a computer image processing technique used to improve contrast in images. It accomplishes this by effectively spreading out the most frequent intensity values that is stretching out the intensity range of the image. This method usually increases the global contrast of images when its usable data is represented by close contrast values. This allows for areas of lower local contrast to gain a higher contrast. In the above figure, X-axis represents the tonal scale (black at the left and white at the right), and Y-axis represents the number of pixels in an image. Here, the histogram shows the number of pixels for each brightness level (from black to white), and when there are more pixels, the peak at the certain brightness level is higher.


Before Histogram Equalization



Corresponding histogram (red) and cumulative histogram (black)

4.4 IMAGE REDUCE HAZE ALGORITHM

Bad weather conditions such as haziness, mist, foggy and smoky degradation in the quality of the outdoor scene. It is an annoying problem to photographers as it changes the colors and reduces the contrast of daily photos, it diminishes the visibility of the scenes and it is a threat to the reliability of many applications like outdoor surveillance, object detection, it also decreases the clarity of the satellite images and underwater images. So removing haze from images is an imperative and broadly demanded area in image processing. The large quantities of these suspended particles in atmosphere because scattering of light before it reaches the camera which corrupts the outdoor image quality. Haze attenuates the reflected light from the scenes and blends it with additive light in atmosphere. Haze removal techniques tend to improve this reflected light (i.e. scene colors) from mixed light. The constancy and strength of the visual system can also be improved by using this effective haze removal of image. There are many methods available to remove haze from image like polarization independent component analysis, dark channel prior etc. Algorithm to refine the different kinds of an amorphous on the foggy image after apply dark channel prior. The results showed that this method makes the de-hazing result more close to actual scene. The procedure is developed mainly for enhancing images acquired under extremely low light situation where the features of images are nearly unseen. After using better and effective image defog algorithm to the inverted input image, the contrast get improved and the dark surface become bright when the intensity can be amplified.

PARAMETERS

AMOUNT

Amount of haze to remove, specified as a number in the range [0, 1]. When the value is 1, Imreduce haze algorithm reduces the maximum amount of haze. When the value is 0, Imreduce haze does not reduce haze and the input image is unchanged. Larger values can cause more severe color distortion.

NAME-VALUE PAIR ARGUMENTS

Specify optional comma-separated pairs of Name, Value arguments. Name is the argument name and Value is the corresponding value. Name must appear inside quotes. You can specify several name and value pair arguments in any order as Name1, Value1, NameN,ValueN.

METHOD

Technique used to reduce haze specified as the comma separated pair consisting of Method and one of these values, simple dcp (Simple dark channel prior method). This method uses a per-pixel dark channel to estimate haze and quad tree decomposition to estimate the atmospheric light. Approximate dcp (Approximate dark channel prior method). This method uses both per-pixel and spatial blocks when computing the dark channel and does not use quadtree decomposition.

ATMOSPHERICLIGHT

Maximum value to be treated as haze, specified as the comma-separated pair consisting of Atmospheric Light and a 1-by-3 numeric vector for RGB images or a numeric scalar for grayscale images. Values must be in the range [0, 1]. Atmospheric light values greater than 0.5 tend to give better results.

BOOST

Amount of per-pixel gain to apply as postprocessing, specified as the comma-separated pair consisting of BoostAmount and a number in the range [0, 1]. This argument is only supported if Contrast Enhancement is specified as boost.

5. CONCLUSIONS

Intelligence de-hazing and color restoration methods for underexposed images are novel research fields that have great potential to help developers better explore the underexposed environment... In this survey, we summarize a comprehensive review of the current research. We first introduce typical underexposed image degradation types such as absorption, scattering, color distortion, and artificial light source disturbance in detail. Subsequently, we outline dehazing and restoration algorithms for underwater images, which help scholars, better comprehend underwater image processing. According to this paper, we envision the intelligence dehazing and restoration methods like deep learning will be hot research topics in research of underexposed image processing. We hope that this review will be useful for researchers and developers to understand the significance and enormous applications in underexposed image processing.

6. FUTURE ENHANCEMENT

We predict that the intelligence underexposed image processing will provide a great contribution to help researchers better explore underexposed environments in the future.

7. REFERENCES

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