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A Novel Study on Image Restoration Model Based on Improved Non Localized Method

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Abstract: Image Processing plays an important role in the fields of consumer electronics, information technology, computer science etc. As digital image processing use certain algorithms on the input data to produce enhanced image. But noise will degrade the quality of image such as salt and pepper noise, Gaussian noise etc. To improve the quality of images as well as compression of images is to be done by using large number of algorithms. The main objective of this paper is the removal or reduction of degradations that are incurred while the image is being obtained using image restoration. For this it proposes an image restoration model using sparse coding representation and patch group using K-Means PCA Analysis which will reduce the noise to a greater extent by improving PSNR value of image. All simulations will be done in MATLAB R2013a.

Keywords: Image Processing, Gaussian noise, MATLAB, PCA Analysis, PSNR value.

I. INTRODUCTION

Digital image processing is the one which uses computer algorithms to process on the digital images and produce enhanced image at the output. For fast development in mass-storage concentration, processor hustles, and digital communication system presentation, demand for data storage capacity and data-transmission bandwidth remains to outshine the capabilities of accessible technologies. For this the need for more efficient ways to encrypt signals and images but have made compression of these signals to produced enhanced output. But quality of image can be degraded by the addition of noise in the images and blurring effect. Various noises are as Gaussian, speckle, salt or pepper etc. In some applications like remote sensing, medical instrumentation, etc., the acquisition noise may be high enough. For this thresholding, histogram equalization, filters are used. But the quality & better output of the noisy images image restoration technique is used. Image restoration is a process used to restore the image information lost during blurring process. It use point source used to restore the image information lost during blurring process. It is different from image enhancement that makes the image more pleasing to the observer. Despite of various methods used for removal of noise and get enhanced image but due to relative motion the atmospheric turbulence is a severe limitation in remote sensing so to improve this problem sparse-based image restoration technique is used. To improve the sparse representation performance, it presents a non-locally centralized sparse representation model. For this the sparse code of reconstructed image should be as close as possible to the sparse code of the original image. For this, sparse noise must be minimum. So, PCA (Principal Component Analysis) method with K-Means algorithm for reduction of noise iteratively, is used.

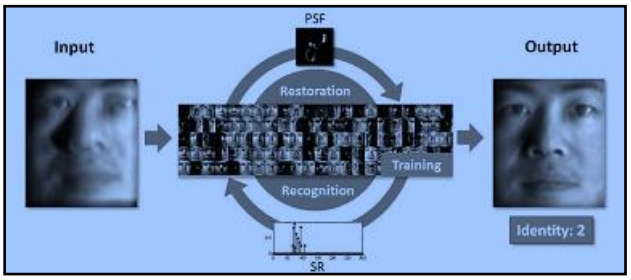

Fig 1: Image Restoration Based on Sparse Concept

PCA is a procedure for identifying a smaller number of uncorrelated variables called 'principal components' from a large set of data. PCA method is also used because it explains maximum amount of variance with the fewest number of principal components. The patch based image denoising will help in removing the noise in an image. The process of NSS compares entire patches to compute weights for denoising the intensity of the pixels. If two pixels are similar in a noisy image, they will be similar in the clean image with a very high probability. A covariance matrix is made to measure how a change in one input patch is associated with change in another input patch. The eigenvectors of the covariance matrix to show that variance across the set of input patches. The K-Means Algorithm performs clustering. It partitions data items of an image into 'K' (say) number of clusters in which each data item belongs to the cluster with the nearest mean so to get better output.

The paper is ordered as follows. In section II, it represents related work with proposed system in image restoration model. In Section III, It defines problem formulation of system. The section IV defines the proposed system. Finally, conclusion is explained in Section V.

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II. RELATED WORK

YIN Lei et.al [2015] presented the problem of unreliable suffered and in the algorithm involved. It was introduced by the good terms of representation. The recognition task and the restoration task have been demonstrated. The conventional methods of treated improved the application be demonstrated. In practical image or video processing application system was time-consuming and unreliable. The blue kernel compensated and captured the training images, It can be incorporated into our framework to learned the training images directly and its interesting and its worth of investigation [3].

Shi ya pinget.al [2015] presented an important research field of image processing. Restoration has to improve the observed visual effect of image. Image restoration Model was introduced based on the degradation function to solve the ill-posed problem of the image restoration. More image details of iteration can be detected. They were based on restricted adaptive image restoration algorithm. To improved the recovery of adaptive control capabilities. Feasibility and effectiveness of the image restoration of smoothness constraints adaptively constructive by Fuzzy Edge evaluation function. The restored image was more consistent with the human eye of the visual characteristics [4].

Changhun Cho et.al [2014] explained a method that has been has been presented by the least squares for real time. To fit for retardation the method of original constrained used distribution kernel. The proposed method presents more detail and less restoration artifacts. The restoration was based on the edge of generated filters, that method provided to increase for restoration. That was based on the proposed set of restoration filters to perform the methods. They can restore edge details and present applicable efficiency [5].

Yifan Zhang et.al [2014] presented the same scene of restoration approach with two available observation of spectral resolution. It was based on a multi-band image restoration scheme. In hyper spectral and multi spectral image restoration and fusion to acquire image applied with resolutions. A performance comparison was made with its counter parts in image domain. It was tooled in orientation specific estimation and wavelet domain to allow a scheme of model parameters. That experiment was employed to give validity to proposed compare and approach with its counter parts [6].

K.Sakthidasan et.al [2014] presented that the image restoration has to capture a noisy image and estimating the original image that scheme of image restoration has to defects which can corrupted the original input image. In the three methods can be implemented and the noise to make smaller by iterative method. The level added has been made constant and iteration performed. The efficiency of image restoration improved denoising and in painting was achieved. High variance noise has been added to the input image and removed by iteration method obtaining the better quality image and their performance graphs has strategized and value has calculated [7].

Tian Chenet. al [2014]presented that a new single image restoration method has been self-adaptive to the layer color. It was used to solve the problem that single image state of being visible has limited adaptability for environment. Propagation medium layer from input image caused visibility image restoration realized. Experiments method has been proposed by adaption ability for dielectric layer color. The visibility and contrast ration of images acquired under water or in fog weather. This method was not able to obtain the idol processing effect [8].

Weisheng Dong et.al [2013]presented that a few atoms has been chosen out from an over-complete. Dictionary of linear combination due to the degradation of the observed image by conventional models may not be accurate. The concept of Sparse coding noise has to bringing and introduced, we treated unfairly on local self- similarity to obtained good estimates. Then presented a novel non-locally centralized sparse representation. It was presented for an efficient function to solving the NSCR minimization problem. Its super-resolution demonstrated that approach can achieved highly competitive performance [9].

M. A. O. Marques et.al [2013] presented that the strip-shredded document reconstruction is an often problem in questioned document examination. The proposed method uses the color as feature matching and then computes the Nearest-Neighbor algorithm using a distance matrix to carry out the reconstruction. The results reported in this paper achieved 97.68% - RGB and 98.53% - HSV models. These results take into account a two hundred documents database and demonstrate that color-matching-based method produces interesting results for the problem of document reconstruction and can be of interest to the forensic document examiners [10].

S.OudayaCoumalet.al [2013] presented that an image proposed restoration using filtered before the quality assessment has performed. It was done to quality variances. It was two methods of image restoration namely improved median filter and adaptive median filter. That was used to perform impulse noise removal function. Assessment Quality restored image with original image was performed. Metrics was implemented; limited information has been used from the reference image. That reduced reference metrics, use to obtain the face and magnitude value. It presented better result in the term of combination of phase and magnitude score denoted. It indicated that images to bribed with higher variance can be restored by means of improved median filter [11].

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Shoulie Xie et.al [2012] presented that the competent algorithm for solving the weighing instruments problem in the frame-based image restoration. It was formulated as a minimization problem. The balanced regularization approach bridges the analysis –based approaches and the synthesis- based for solving the optimal problem. It was based on variables splitting strategies and it was efficient and fast in solving the standard image restoration with balanced regularization. It can performed the quite efficiently for the frame-based standard image restoration applications. It has been presented by the frame-based to the regularization problem by one purpose. The fast tight frame transform algorithm [12].

Liwei Zhang et.al [2012] presented that on LAB and RBF neural network image was obtained by the LAB transform method in color image. Image restoration model was got by the operating of the window training of RBF and the corresponding relation and roaming between the clear images. The image has been recovered according to the model. It can be recovered well with the new algorithm, the clear image according to the got by the LAB which can keep the color information. The effect was more advantage then the classical algorithm [13].

Tanveer Ahsan et.al [2012] presented that a gray scale image has a block based scheme by DWT Coefficient. It was used to transform of restoration of a recovery mark on based LL band was stored. When 25/- of the cropped imaged received then it was compared to watermarked image. This method was computationally fast as it used only integer based operation. It used as fast method and its estimate was integer based operation. Those methods showed that images indicated very honesty. The location to have secret dealings has achieved by the quality of recovered image [14].

Chao Dong et.al [2012] presented that it has been known by the PSF. It's also called blind image restoration. It can be divided in to two categories. Latter belonged EM for the reason of large noise, EM algorithm resulted poor. We used a noisy image to filter algorithm that can solve the problem which was caused by large noise. The original image can recovered the method of PSF. This method can explain the problem of algorithm that depends on the value of initial Section. That was based on NL and EM. Restoration depended on the selection of the initial value. To identify the correct PSF, then get the better restoration result [15].

Haichao Zhang et.al [2011] presented that in the presence of disgrace; the blind image restored and then classified the restored image. It separately recognized and a joint blind image presented. Its method was based on the prior representation achieved based in independently. That were two tasks, between training and the test images can be captured by the blue kernel .The training images learned directly for interesting and worth of investigation [16].

III. PROBLEM FORMULATION

An image is a visual representation, reproduction, or imitation of something. In most cases the blurring of images is a spatially continuous process. Many types of motion blur can be distinguished all of which are due to relative motion between the recording device and the scene. Atmospheric turbulence is a severe limitation in remote sensing. The blur introduced by atmospheric turbulence depends on a variety of factors such as temperature, wind speed, exposure time etc. The sparse coding noise (SCN), which is defined as the difference between the sparse code of the degraded image and the sparse code of the unknown original image, should be minimized to improve the performance of sparse-based image restoration. Due to this, it proposes an image restoration model using sparse coding representation and patch group using K-Means Analysis. The main objective of this work is to reduce noise sigma value by improving PSNR value of image.

IV. PROPOSED SYSTEM

The basic idea behind this is the estimation of the uncorrupted image from the distorted or noisy image, and is also referred to as image "denoising". There are various methods to help restore an image from noisy distortions. Selecting the appropriate method plays a major role in getting the desired image. The denoising methods tend to be problem specific. For example, a method that is used to denoise satellite images may not be suitable for denoising medical images. The main task of image restoration is to capture a noisy image and estimating the original image. The important scheme of image restoration is to stabilize the defects which can corrupt the original input image. In this thesis, a study will be made using sparse coding and each will be implemented in Matlab 8.1 (R2013a). In order to quantify the performance of the various denoising algorithms, a high quality image will be taken and some known noise will be added to it. This would then be given as input to the denoising algorithm, which will produce an image close to the original high quality image. The performance of algorithm will be compared by computing Signal to Noise Ratio (SNR) besides the visual interpretation. Noise removal or noise reduction can be done on an image by filtering or by wavelet analysis. So, the main objective is to design an image restoration model using sparse coding representation and patch concept using K-Means Analysis and then Experimentation on image restoration problems like deblurring and denoising etc. The main performance parameters will be PSNR and noise sigma value etc.

V. CONCLUSION

In this work, it proposes image restoration using sparse concept and denoising the noisy image by iterative method. The main task of image restoration is to capture a

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noisy image and estimating the original image. The important scheme of image restoration is to stabilize the defects which can corrupt the original input image. The value of PSNR & SSIM will be improved as comparison to other techniques. The efficiency of the proposed method will be compared with other conventional methods.

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