Commentary upon Digital Image Processing Techniques

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Abstract

This paper proposes the emergence of digital image processing that can cogently improve the quality of images debased by many factors ranging from human, environment and much more. Digital image processing is the new, most conducive and commensurate way which used for image intensification, removal of a big stink in noise, pattern recognition by the help of computers Image processing is applied mainly on images that are 2-Dimensional in nature. Digital image processing has a vast variety of algorithms and classifiers that can be used to work on an image. This paper discusses the various techniques that are used in the field of Image Enhancement. The payback of this correlation dissolution amidst various parameters gave the perception about the amount of work done so far in the Digital Image processing enclosure.

Keywords: Image intensification, Removal of big stink, Pattern recognition, Image Refurbishment, Image Restitution

I. INTRODUCTION

Digital image processing is new and the most exponentially growing technique in the field of computer science. Digital image processing is the promising technique which was developed in order to improve the quality of images. It basically works on images that are 2-dimensional in nature. It can work on both single image and the entire dataset of images. The basic idea of digital image processing is to improve the quality of images debased by many factors (humans, environment and many more.). Digital image processing consists of various steps when applies to an image. The steps are:-Image acquisition, Image Enhancement, Image Restoration, Morphological Processing, Segmentation, Object Recognition, Representation and Description. Digital image processing makes use of many algorithms and classifiers during working on an image. The algorithms and classifiers to be chosen depends on the type of work to be done on an image. The algorithms used are KNN (k-nearest neighbor), Random forest, ANN(Artificial neural network),CNN(Convolutional neural network) and many more.

II. LITERATURE REVIEW

The author, Hussain K Khleaf et.al in [1], proposed the use of "Fuzzy Hyperbolic Threshold Algorithm" to intensify quality of aged record pictures like "MRI,X-RAY". The author also explained the earlier methods for image binarization that is Ostu's, which is planted on alteration of "Pixel Intensity". The local verges are calculated with the help of neighbors. Local mean and standard deviation is used by Niblack. The researcher proposed that an image can apply both algorithms in accordance to measure different brink for every pel.

Avekash Gupta et.al in [2], focused on the improvement in the quality of scanned images of old manuscripts. The author proposed the segmentation based histogram matching scheme to intensify the quality of the degraded images. The degraded text can automatically be identified by using the matched wavelet based text extraction algorithm along with the crewed innovation. The main benefit of using this method is that it does not need information like geometric information, font, size and

many more. After applying the proposed method on the old manuscript, the result that can be derived from this method is that, this method is very effective tool, robust and versatile in nature.

Sitti Rachmawati Yahya et.al in [3] noticed that old images were having damaged background. The damaged background can be due to noise, variation in contrast, improper handling of images and many more. The aim of the authors is to give a detailed and comprehensive view of different methods for intensification of old images with damaged background. So, the authors describes three methods which are, Image intensifying method using "Binarization or Thresholding" technique , Image Intensifying technique using "Binarization or Thresholding" techniques and additional method, Picture intensification using some additional method for enhancing the quality of damaged background.

Amila Hendahewa et.al in [4] describes bulk of picture intensification accessible at present, the main advantage of this is that it is used for removing the unwanted noise and help in reducing the storage requirement. The author describes the various image intensification methods that are black page deletion, punch hole filling, dekewing, and color drop out, despeckling, thresholding, black border cropping and removing.

Hilda Deborah et.al in [5] proposed the genetic algorithm for the purpose of old images intensification and refurbishment. The main reason behind this was to maintain the veracity of the contained information in old images and transform them into digital form. The transformation of old images in digital form is more accurate and fast in comparison to doing the same task physically. The results using genetic algorithm depict that it is effective technique for image intensification, the result show that out of all the data 92.9% of data out of all data get 90% of success rate, and if the median filter is used for the intensification of same data then blurring effect takes place and only 59.5%out of all the given get success rate above 90%.

M.Nandini et.al in [6] stated that it was easy to apprehend the images but the procurement of acuity out of it was laborious. The main reason for this is that it may be grief from having degraded quality due to many reasons like due to environmental factor or may depend on the device that is capturing the image. In order to improve the acuity and interpretability of the contained information in images for viewers, image intensification is required. As the digital image processing started rising many different algorithms came into limelight for improvement of the quality of the image or information contained in image. The author described spatial and frequency based algorithms for image intensification.. There are different types of algorithm can be used to intensify the quality of old images like to remove blureness of images, images describing the underwater scene, infrared images and many more.

D.N.Satange et.al in [7] construed the recursive methods for the onslaught and the augmentation of historical images. Many methods are used to onslaught and intensify the images and convert them to binary images and then contrivance amalgamations of complex image processing technique which as a result upsurge the complexity and computational cost. There is always a issue for storing the old documents from dilapidation due to many factors that can be imbalance of contrast between forefront and background due to stickiness, bad stowage techniques. The method proposed by the authors abridges the image processing techniques by taking only the significant physiognomies of the images. The result of the experiment shows that comparison made with different methods proves and provide information about which one is nest method for image intensification. They made use of the Prewitt filter, Laplacian filter, Median filter, Average filter, Wiener filter and compared the effect of each filter on images. The result also showed that Laplacian filter work less in comparison to median, prewitt and average filters.

Alicia Fornes et.al, in [8] stated different types of dilapidation and noise in historical images or documents such as dark spots, uneven lighting and upbringing disparity. The problem that arises in two sided document is mainly present in the back side. The problem is due to the delays with front side and the reason may be bleeding of ink or clearness of the document. So, this phenomenon is termed as show through phenomenon. The show through phenomenon mainly works by doing the scanning of both the sides of documents. The author states that there technique is only meant for the

use of one side of scanned document. The author assumes that show through are low distinction components, while foreground components are high distinction components. The technique makes the use of Multi resolution Contrast (MC) decomposition for the estimation of distinction of topographies at various spatial scales. Results depicts that readability of document is increased by image intensification [8].

The author Nishant Trivedi in [9] described the procedure of Inpainting which is rebuilding fragment of images grounded on the circumstantial evidence. This method is used for filling the smashed part image making use of spatial information of the adjacent area of smashed part of image. Inpainting technique can be used for refurbishment for old images and entity amputation in photographs. The work proposed by the author describes that inpainting method for image refurbishment and image intensification by making the use of texture, structural and exemplar technique. The paper grants effectual algorithm which cartels the compensations of above two approaches. The exemplar-based texture synthesis implies the important process that is required to imitate the structure and texture, the structure propagation success depends on the way in which stodgy proceeds.

Niti Kamboj et.al in [10] stated the swift increment of despoiled images. The main reason behind this can be the increment in computing power and immense expansion of internet. Due to the swift increment of despoiled images there is an urgency of image gratified portrayal to simplify reflex repossession. Image can be labeled by various stumpy level of image topographies that can be described in terms of texture, shape or color. The important low level image feature is Shape. The author in his paper describes the Global thresholding method for intensification of images. This method is used for deriving the numerical features from the binary images.

Bhawna Rana et.al in [11] apprehended the wide collection of ancient documents present in abounding libraries that were very decisive in terms of culture or scientifically. In order to maintain the integrity of the documents or images it is very necessary to transform them into digital form. There are various factors that are responsible for the degradation of the documents or images, factors can be uneven lighting, blurness, occurrence of slur and many more. These type of documents require specialized processing in accordance to remove background noise so that it may become more in readable. The paper also discussed the overview of various image intensification techniques that can take into practice for the purpose of removing noises and enhancement in quality of images or documents.

Mrs.Preeti kale et.al in [12] discussed the acumen for dilapidation of old images that can be changed in atmospheric conditions and mature factor. In order to preserve the historical images or documents, convert them into digital form and apply intensification method. The author in his paper compared the two image intensification method that is "Hybrid Binarization" along with the "Histogram Equalization" scheme. After amplification of descriptions their qualities are being précised via standard deviation. After applying both the methods on image metrics value and visual perception, performance of hybrid binarization found to be better than histogram equalization.

Mrs.Preeti kale et.al in [13] described the valuable sources of information that were present in documents but they had to suffer dilapidation delinquent. This problem mainly arises in the case of historical images or documents, the problem can be variation in background, seepage of ink, unwanted noise and many more. to get rid of these problem binarization techniques is used. Binarization technique is applied for removal of unwanted noise and to enhance the document quality. In order to remove background noise in images specialized processing is required. The author in this paper proposes hybrid binarization technique to improve quality of historical or old documents or images. As, a result better compliance is attained. The advantage of using global thresholding is that it avoidance of applying local thresholding on the entire image is achieved. So, a result global thresholding is much more operative for removal of unwanted noise in the background and enhancing the besmirched quality of images.

The author Amol Bhand et.al in [14] proposed the intensification of password authentication system amid taking the assistance of images. The main focus of this paper was on the graphical password system concept. The cued click points (CCP) supports the authentication purpose. The concept used behind this is that user will get interacted order of five images. The logic which is used behind this technique it to get high level security which uses simple technique and should be easy for user and tough for the hacker to penetrate it. Graphical password authentication system can be considered as the effective means in comparison with the text password. CCP is considered as the five click point's combination on respective five images. The author combined the mobile phones, e-mail with CCP.

TABLE I. Comparative Analysis of Digital Image Processing Techniques

ATTRIBUTES	APPROACHES	AREA OF CONCERN
Classification	Image intensification method using binarization or thresholding "Image Enhancement" method I-"Binarization" method "Image Enhancement" method II-hybrid of verging method Image enhancement method III-non thresholding method	Broadly classified the image intensification method. Improvement of several idiosyncratic barriers in earlier manuscript.
Enhancement	Median filter, Prewitt filter, Laplacian filter, Average filter, Wiener filter Cued click points	Performance of "Median, Average, Wiener Filter" enhanced in comparison to "Laplacian" along with" Prewitt Filter". It is moreover pragmatic that pepper and salt noises is better removed by median filter. New technologies like mobile phones and email are clubbed with cued click point.
Improvement	"Texture Synthesis Based Inpainting", "Structure Inpainting"," Hybrid Inpainting", "Exemplar Inpainting", "Semiautomatic Inpainting". "Show -Through Cancellation And Document Enhancement"	These algorithms are the upgraded version of the previous inpainting algorithms. Document readability is improved which help to recuperate indecipherable words and to solve ambiguities.
Implementation	Spatial domain, Frequency domain.	Vague situation and handle imprecise of earlier manuscript is implemented using soft computing based technique.
Performance	Fuzzy Hyperbolic Threshold	Mainly used for enrichment

	algorithm.	of biomedical images.
Quality	Hybrid binarization and Histogram Equalization. Hybrid binarization. "Matched Wavelet Based Text Extraction Algorithm Followed By MRF(Markov Random Field)".	Hybrid Equalization is less active method in comparison to hybrid binarization in visual perception and image metrics value. Effective for extracting out upbringing sound and to enhance the aspect of degraded picture. Mature tool, robust in nature, versatile for the intensification of old images.
Restoration	Genetic algorithm	Operative image intensification. Out of 100% data, only 92.9% data got success rate of more than 90%.
Space	Memory betterment	Different types of algorithms work upon different computational time.

CONCLUSION

This paper presents comparative analysis of different techniques used in digital image processing based on various parameters. By doing comparative analysis of the various techniques of Digital Image processing, the paper reports the various approaches that recuperates the cited advent. The image enhancement method or the technique used in this paper advances the idiosyncratic barrier which leads to great improvement. The utility of the various filters enhances and intensify the process of Digital Image processing. It is also observed that the various inpainting practices utilized prove out to be superior to the previous inpainting versions. It is ascertained that the various approaches intimated in the document provides enhanced results as compared to the previously quoted.

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