The Novel Technique for the Detection of Dust Patterns in the Source Camera Detection

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Abstract-The source camera identification is the technique to identify all information related to camera through which picture is clicked. The quality of the picture depends upon the camera lens and color combinations. The quality of the image gets reduced when noise get raised on the image. The noise on the image gets raised when dust particles are there on the camera lens. In the work, algorithm is proposed which on to detect dust patterns from the image. The proposed algorithm will generate patterns from the detected dust particles and simulation is performed in MATLAB and results shows that proposed technique performs well in terms of PSNR and MSE.

Keywords: *Patterns, Dust particles, Itti Koch, PSNR, MSE*

I. INTRODUCTION

Image Processing is a process to convert an image into digital form and perform some operations to get an enhanced image and extract useful information from it. Image processing comprises of various techniques. Image representation defines the layout or display format of an image. Image preprocessing is a common name for operations with images at the lowest levels of abstraction both input and outputs are intensity images. In image enhancement the goal is to accentuate certain image features for subsequent analysis or for image display. Contrast and edge enhancement are its examples. Image Restoration concerned with filtering the observed image to minimize the effect of degradations. Image Analysis is concerned with quantities measurement of the image to make it perfect and noise free [1]. Image Data Compression is concerned with minimizing the no of bits required to represent an image.

To detect text from the natural images scenes opposite to faxes, business cards and scan of printed pages is very important step of computer for computer vision applications. Therefore, the computerized aid for visually impaired, automatic decoding of businesses and robotic navigation in urban environments is important. Wide variety of vision tasks is available for both indoor and outdoor environment to retrieve text. There are two types of text detection [2]. The bottom-up methods do not relay on where text is. Images are directly segmented into regions and after that group characters region into word. Region grows and spilt merge methods are used for segmentation. Heuristic top-down methods first detect text blocks in images using heuristic filters and then segment them into text and background regions. In training based top-down methods the text detection step is based on filters that are trained using machine learning tools [3].

Text detection is used in automatic signboard recognition. Text detection approaches can be categorized into four categories. CC-Based Methods use bottom up approach by grouping small components into larger components successively until all the regions in an image is identified. Edge Based Methods focuses on the high contrast between the text and the background. Texture Based Methods are based on the textural properties of text. Stroke Based Methods separate text from other elements of scene [4].

To achieve number of tasks such as reduction of noise and re-sampling basic function of image processing is applied known as filtering. In the entire image processing, filtering is used as a basic process. The behavior of data and task performed by the each filter is determined by the filtering [5]. By preserving important and useful information, filtering is used to remove noise of the image. Different Type of Linear and Non-Linear Filters: There are different types of Linear and Non- Linear Filters. The mean filter is a type of simple spatial filter. It is a sliding-window filter. It replaces the center value in the window. Median Filter which is based on order statistics is a simple and powerful non-linear filter. It is type of soothing image. The main aim of Wiener filter is to reduce that noise which is caught as corrupted signal. This filter is also based on a statistical approach. Bilateral Filters are defined as a weighted average of nearby pixels in a manner very similar to the Gaussian Filter. The difference is that the bilateral filter takes into account the difference in value with the neighbors to preserve edges while smoothing [6].

II. LITERATURE REVIEW

Sandeep Sharma et al explained that one needs to identify the text images correctly to avoid wrong identifications which can cause further problems. To provide the correct input the recognition result should be fast, efficient and robust. This will feed an OCR classifier [7]. One can also say that the

actual text must relate to the segmented regions. Here is a profound method to improve the text detection mechanism. The automatic detection of the text from the images their localization and extracting horizontally aligned text in images which have harsh backgrounds is also give. The information available is difficult to be saved but the image text can help in bringing out the detailed information easily. The information is divided into segments and is easily studied upon.

Prof. N.N. Khalsa et al in his work discussed the properties of text and many other differences have caused problems for detecting text. Such issues need to be handled for there are many cases where such variations can be easily found. Various steps are undertaken to detect the text. The first step is the initialization step. This step extracts of gathers the particular character or to gather the text from the video or the image given. This is done by edge detection. The next step holds description of features [8]. The description is only about the area that holds the text. The variations such as geometric of text, its motion and edge, and also the color are helpful factors.

Later it was explained by Mona Saudagar et al that every text holds different variations of font, size, and other factors. The parameters like automatic annotation and image indexing are held as the very important features [9]. The challenging parts are the variety of fonts and there alignments. This article gives a special method of identifying the image even though it contains different fonts and much more multi-oriented text. The similar problems are grouped and only then they are solved. They are easy to be solved when groped and solutions are provided easily. The differently recognized problem is not much easy to solve due to its unrecognized solutions. The study is made much more extending.

The two mains problems that are faced in detection of text are the variation of text and the background of the image. This article highlights a segmentation based text recognition method. It recognizes tests with a lot of variations much faster [10]. End-to-end text recognition and segmentations have been performed on such texts to identify the images. Although there are many such techniques also, but this method proposes a result which has high precision as compared to others. Not only the efficiency results but also there are an advantage of saving time, as it provides much less computational time for the user. So with this advantage it is useful to carry on with such method.

Camera Source Identification (CSI) can be done through sensor pattern noise and can also be helpful for the verification of image source. But it is not always necessary to have correct information within the image details. The edges are not easily separated and studied [11]. An eight-neighbor context-adaptive interpolation algorithm is written for CSI. It has profound results than the rest of the techniques. The Receiver Operating Characteristic performance increases. This method has been producing the best results of ROC than all the other methods. When the false-positive rate is low the performance resists. The images provided are used to gather parameters that can further help in knowing the source of the image.

M. Prabaharan1 et al in his paper elucidated that it is not an easy task to extract the text information from the image especially when there is a difference in the size, text, orientation and alignment [12]. The images which have such complex information are much likely to have wrong results when processed. Here the method is to extract the information and convert it into audio results. The output results have been much more prominent through this system and the text extraction has proven to be easy through the availability of such technique. Algorithms for scene text detection and recognition were also combined in this method for enhancing the results of this method.

III. ITTI KOCH METHOD

At first the Saliency Map of the original image is created. Here Itti-Koch algorithm has been taken after to create the map. Hiding limit estimation is done in light of the past map and primary regions where the watermarks can be covered up are approximated. In light of the hiding limit of the image, the watermark is installed into it by versatile Least Significant Bit (LSB) replacement process. More bits of the original image are supplanted by the bits of the watermark where the original image is more inconspicuous. In this way the Watermarked image is acquired. Saliency map of the original image is delivered and hiding limit estimation of the original image is done as it was done in the encoding process. On the premise of original image and hiding limit in the original image, LSB is extracted from the pixels of the watermarked image. Versatile symmetry of the bits of the same request, extracted from various regions of the watermarked image got from saliency, is processed to retrieve the binary watermark.

IV. PROPOSED METHODOLOGY

The source camera identification is the technique to identify the problems associated with the image which are taken with digital cameras or DSLR. The images which are taken with DHSL images are of high quality. When the dust particles are on the lens of DHSL cameras, and it leads to creation of dust patterns on the image which is captured. When the dust patterns are on the captured image it reduces the image quality. The image quality can be judged by MSE and PSNR value of the image. In this work, technique will be proposed in which dust patterns will be detected from the captured image. When the dust patterns are detected from the captured image and it will be removed from the image with the filter technique.

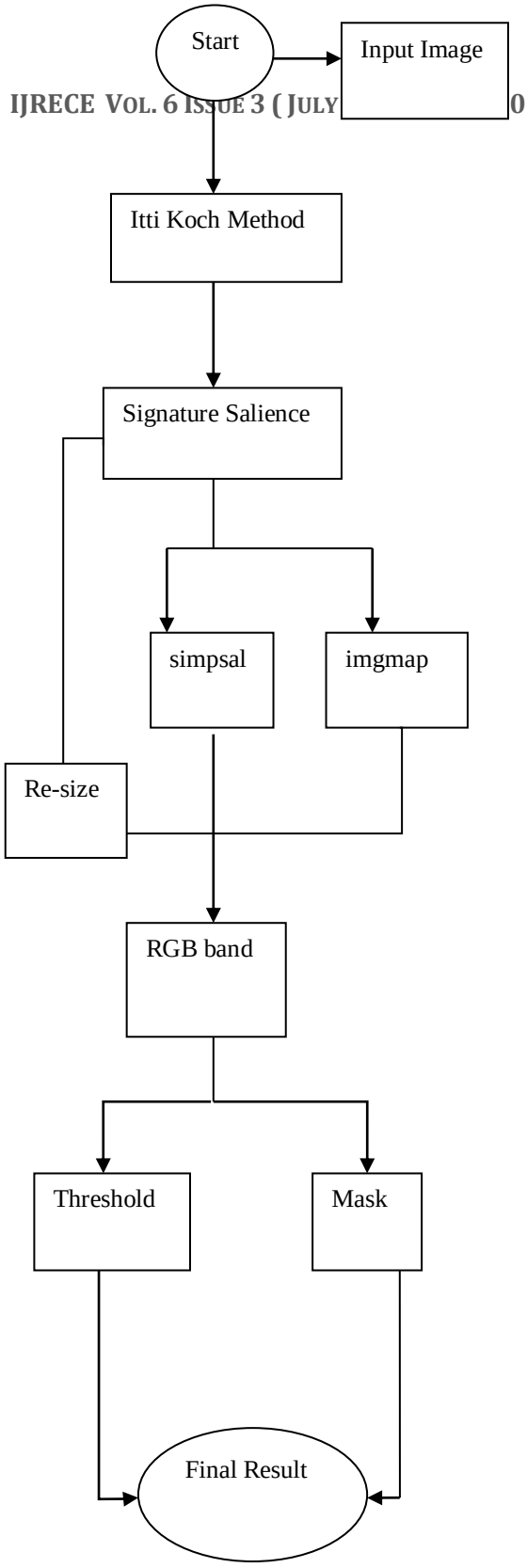

Fig.1 Flowchart of Proposed Technique

V. RESULTS

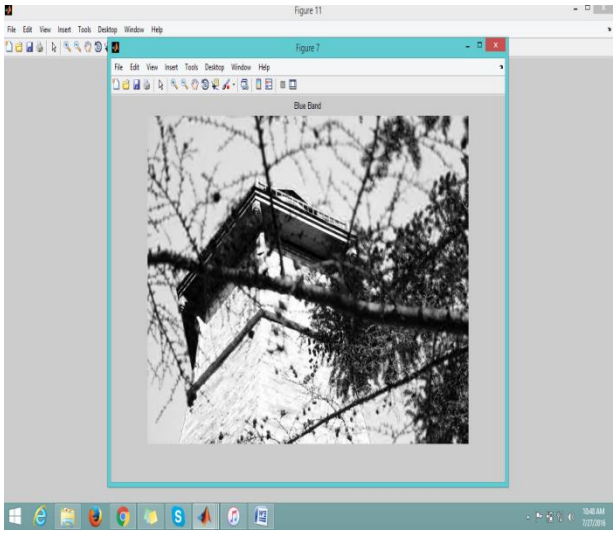

Fig.10 Calculation of blue band

As shown in figure 10, the image which is taken as input for the dust detection is the rgb image. The image is converted to RGB and on that image blue band are calculated.

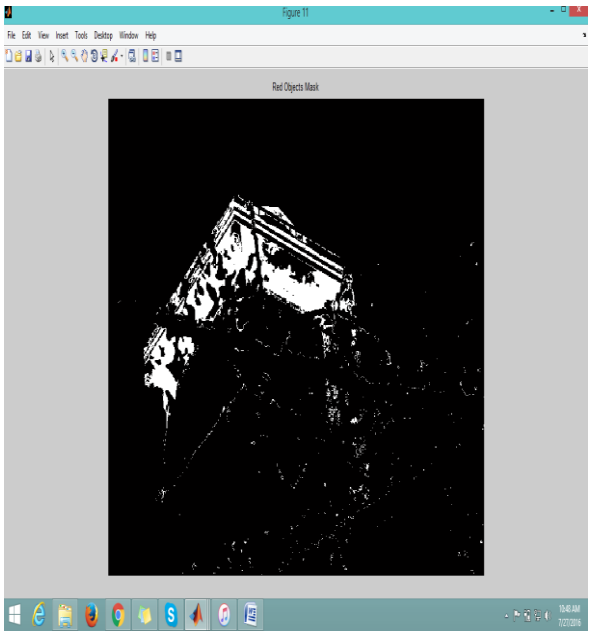

Fig.11 Masking of bands

As shown in figure 11, the image which is taken as input for dust detection, on that image RGB bands are calculated and each band in the image is masked and in this figure, red bands are masked. In this image the detected dust particles are shown with the small dots.

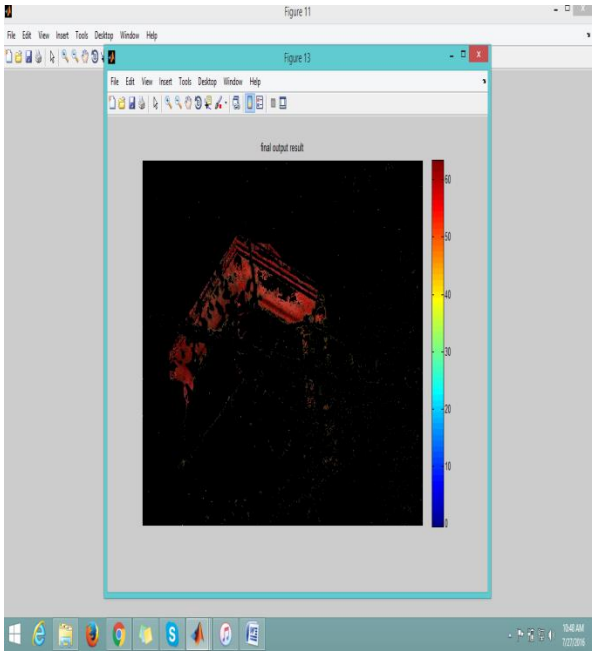

Fig.12 Dust particles in RGB image

As shown in figure 12, the image which is taken as input for dust particles and on that image bands are calculated. The image which is taken as input is then converted to gray scale and on that image dust particles are shown. In this figure, image is in the RGB and color intensity is shown with mesh graphs.

VI. CONCLUSION

In this paper, it is been concluded that proposed ITTI KOCH algorithm performs well in terms of dust pattern detection from picture. The noise is raised on the picture which is clicked by the camera on which dust is there on the lens. The ITTI KOCH algorithm will mark dust particles on the picture and it directly leads to reduce fault detection rate and increase accuracy. In future, proposed algorithm will further improved to remove detected dust particles.

VII. REFERENCES

[1] Boris Epshtein, E. O, "Detecting Text in Natural Scenes with Stroke Width Transform", IEEE Conference, 2963-2970, 2010

[2] Chong yu, y. S., "Text detection and recoginition in natural scene with edge analysis", IET Computer Vision , 9 (4), 2015

[3] Gaurav Jaswal , Amit Kaul ," Content Based Image Retrieval – A Literature Review", 2009 NCCC

[4] Honggang Zhang, K. Z.-Z. , " Text extraction from natural scene image: A survey", Neurocomputing , 310-323.

[5] Honggang Zhang, Kaili Zhao, Yi-Zhe Song, Jun Guo," Text extraction from natural scene image: A survey", 2013 NEUCOM13479

[6] Huizhong Chen, S. S., "Robust Text Detection in Natural images With Edge Enhanced maximally Stable Extremal regions", 18th IEEE International Conference (pp. 2609-2612) Image Processing (ICIP), 2011

[7] Sandeep Sharma and Jai Prakash, "A Survey of Image to Text Detection Methodology", 1998

[8] Prof. N.N. Khalsa1, Prof. S.G. Kavitkar, Nagendra.G.Kushwaha, "A Literature Review on Variation in Text and Different methods for Text Detection in Images and Videos", 2015 IJIRCCE

[9] Mona Saudagar1, S. V. Jain," A study of multi-oriented text recognition in natural scene images", 2014 IJARCCE

[10] Shashi Kant, Sini Shibu," Segmentation Framework for Multi-Oriented Text Detection and Recognition", 2015 IJEDR

[11] Xiangui Kang, Jiansheng Chen, Kerui Lin and Peng Anjie," A context-adaptive SPN predictor for trustworthy source camera identification", 2014 EURASIP Journal on Image and Video Processing

[12] M. Prabaharan1, K. Radha," Text Extraction from Natural Scene Images and Conversion to Audio in Smart Phone Applications", 2015 IJIRCCE