IMAGE FORGERY DETECTION USING DCT

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Abstract **- The manipulation of digital image to hide some meaningful information of the image.In some cases it becomes difficult to differentiate between the region edited and that of the original image. so in order to maintain the authenticity of the image it is necessary to differentiate between the doctored region from that of the original region, thus maintaining the integrity of the image. Digital image forgery involves altering the original image by using transformations like scaling, resizing etc. an original image is one which is obtained directly form a digital camera and not edited in any kind i.e. resolution size .copy move forgery is either done for hiding some detail or adding some trivial details resulting in forgery .so it is necessary to identify this kind of discrepancy.**

Here we put forth a method for detecting duplication forgery by using Discrete Cosine Transform. The image is divided into overlapping blocks and then searched for the duplicated blocks in the image.

Keywords **- Image forgery, Copy move forgery, Region Duplication Detection.**

I. INTRODUCTION

Technological advancement has reached new heights on today's world; we are exposed to a remarkable array of visual imagery. Historically we may have confidence in the integrity of the image, but technological advancement has led to this trust to erode. From magazines to fashion to political campaigns doctored photographs are appearing with more sophistication.

Currently no established methodology exists to check the authenticity and integrity of the image. IT is an emerging field which has important implications pertaining to ensure the credibility of digital image.

Techniques for detecting digital image forgery are mainly classified in two approaches - active and passive. The active approach to digital image forgery usually involves some kind of preprocessing like watermarking , digital signature etc. The passive approach is different from active approach it does not require any pre-processing operations.

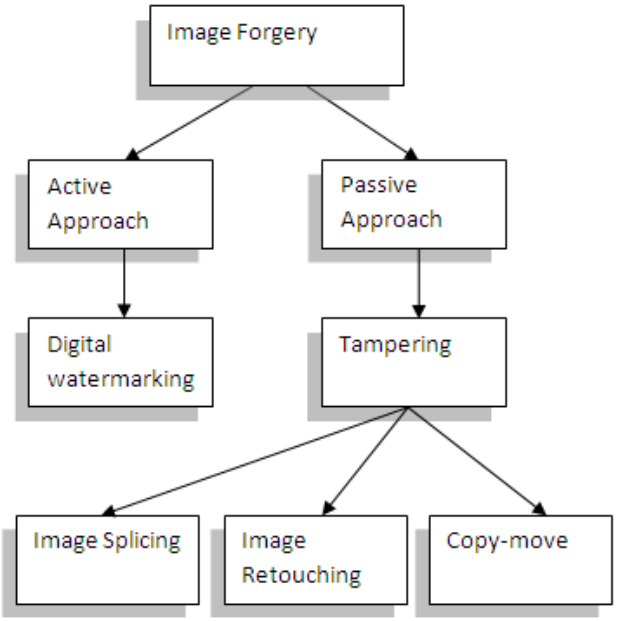


Fig. 1 Image forgery classification

A. Digital Watermarking:

Digital Watermarking technology involves embedding of digital information into images. Watermarking is also called data embedding and information hiding.

B. Image Splicing

Image splicing is a technology of image composting that involves cropping and pasting fragments from the same or separate sources into a single image. It is a one of the most important steps used in digital photomontage.

C. Image Retouching

Manipulating an image for restoration of picture or enhancement of it is known as image retouching. It is widely used for commercial purposes to create interesting advertisement

D. Copy move

Copy move forgery is a difficult kind of image forgery technique. Here one needs to cover a part of image for adding or removing information. Copy-move technique is a kind of image forgery technique in which a part of image is copied and pasted into another part of the same image. In

copy-move attack mainly parts of original image are copied and pasted to the desired location, thus detecting copy move forgery includes a broad search of local patterns and region matching.

The structure of paper is as follows. In section II we have reviewed the work which has already been done in the field of image forgery detection. In section III we propose a method to detect copy move forgery in digital image

II. RELATED WORK

There have been a number of techniques that were proposed to detect image forgery in the field of digital image forensics. Copy move forgery is one of the most popular and widely used methods for creating forged images. Fridrich et al [5], proposed a method to detect copy move forgery which involved performing a rigorous search by comparing the image to every cyclic-shifted versions of it. However the complexity of this approach is very high since it requires $(mn)^2$ steps to execute for an image of size M×N. Hence practical implementation of this method is tough.

Another technique which is based on Radon transform and phase correlation aims to improve robustness in image forgery detection. This method can detect forgery if the image underwent pre-processing such as rotation, scaling, Gaussian noise addition etc [7] [2] Popescu et al proposed a method which uses block matching approach and Principle Component Analysis(PCA). To detect images which underwent scaling, rotation and other operations quickly and efficiently, image tamper detection based on Radon and Fourier-Mellin transform is preferred [1]. M.sridevi proposed a method to verify the authenticity of image using the image quality features like markov and moment based features. If the image has been forged using image splicing ,then this technique gives best results [4]

Feature Extraction process is one of the most distinctive properties of copy move forgery detection .Some methods are based on reduction of dimensionality [2],[10] moments [8],[11] color properties [3] etc.

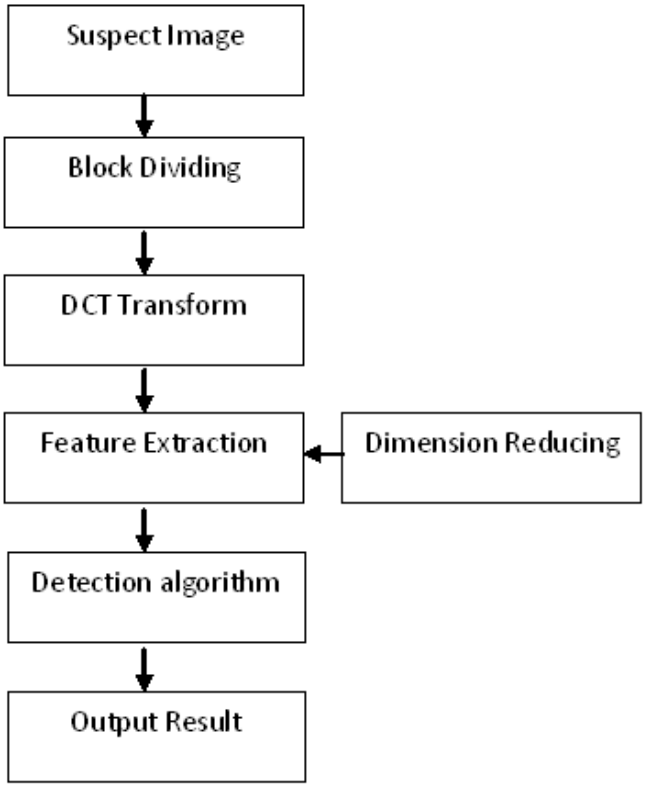
Other method to detect copy move forgery is by using (DCT) Discrete Cosine Transform. Junfeng He et.al proposed this method which can detect forged .Jpeg images and alsoe locate the doctored part by applying DCT transform on the image.This method also has other advantages including faster processing.

III. PROPOSED SYSYTEM

By examining the double quantization effect this method can detect the doctored JPEG image and further locate the doctored part. IT detects region duplication forgery by dividing image into overlapping blocks and then searches for the matching region in the image

A. Region Duplication detection

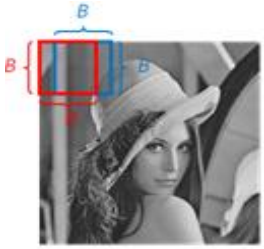
Detection is done as:



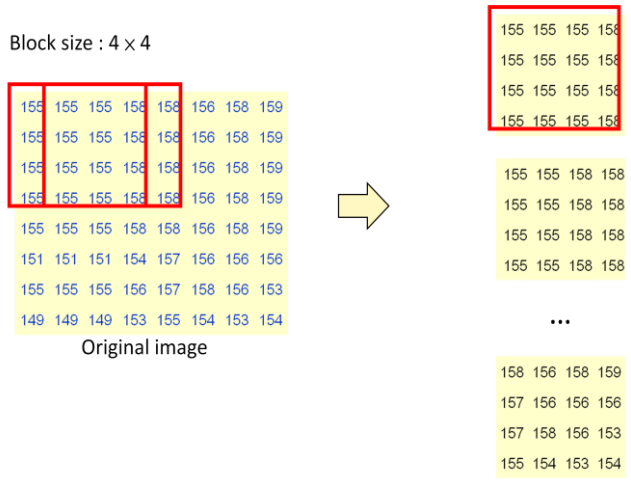
Aim of this research is to prove that DCT is better for detecting forgery of jpeg images than the predefined methods. Further efforts are made to make this method more effective by applying DCT instead of PCA. Since PCA is inefficient in detecting forgeries of jpeg images application of DCT enables to detect the latter.

IV. METHODOLOGY

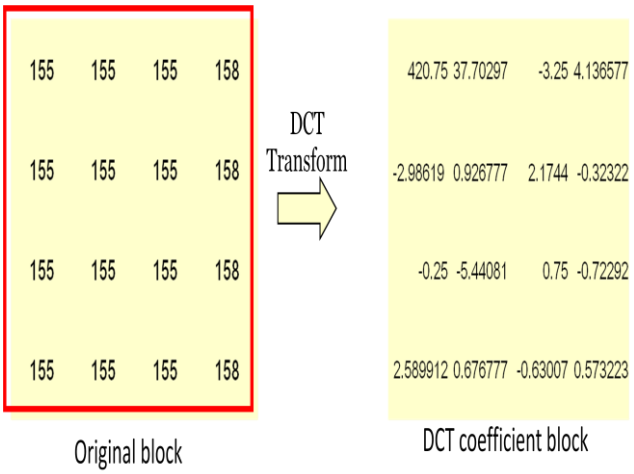
A. Block Dividing



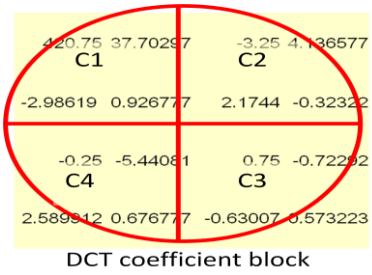
Generate (N-B+1)(N-B+1)blocks



B. DCT Transform



C. Feature Extraction



Generate matching feature:

$r=2$

$c\_area = \pi r^2 = 4\pi$

$c\_area = 4\frac{\pi}{4} = \pi \; for \; i = 1,2,3,4$

$v_1 = \frac{420.75+37.70+2.98+0.92}{\pi} = 145.27$

$v_2 = \frac{-3.25+4.13+2.17-0.32}{\pi} = 0.87$

$v_3 = \frac{0.75-0.72-0.63+0.57}{\pi} = -0.0095$

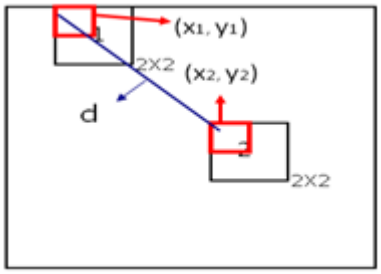
$v_4 = \frac{-.025-5.44+2.58+0.67}{\pi} = -0.77$

feature vector : V = [v1,v2,v3,v4]

$V_1 = [145.27, 0.87, -0.0095, -0.77]$

D. Matching

$$A = \begin{bmatrix} V_1 \\ V_2 \\ \vdots \\ V_{(N-B+1)(N-B+1)} \end{bmatrix}$$



$$d(V_i, V_{i+j}) = \sqrt{(x_i - x_{i+j})^2 + (y_i - y_{i+j})^2} > N_d$$

V. APPLICATION OF IMAGE FORGERY DETECTION

Image forgery detection has many applications as follows:

- It is used for authentication of images acquired from cameras
- For authenticating information available from an image

- For checking the authenticity of evidence
- For fingerprint recognition
- For authenticating documents

VI. FUTURE SCOPE

In the future, video forgery detection can also be possible using this technique because video is nothing but a number of frames or pictures one after another. Hence if we apply this technique to each frame of the video, then video forgery detection can be achieved.

VII. CONCLUSION

Copy move forgery is one of the most used technique for tampering image. In this paper we propose a forgery detection algorithm to detect copy move forgery. The process can be extended further to different formats.

VIII. ACKNOWLEDGEMENT

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