

DETECTING COPY MOVE FORGERY IN DIGITAL IMAGE USING SIFT

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Abstract—This paper produce key-points descriptors, local features in the image in this we use two methods SIFT and SURF. These are used to establish copy-move image forgery detection scheme. Linkage and Clustering has been used to create this algorithm.

Keywords—*SIFT, SURF, Copy-Move, Linkage Clustering, 2D-DWT.*

I. INTRODUCTION

With advancement in computer multimedia technology, digitization of image has become a reality, it has a huge scope in printing equipment as the old film images have today improved to modern day digital photos.

The latest enhancement of Photoshop and updates in digital processing has made theses editing software so easy to handle that even the non-professionals can also easily edit the image as per their requirement [4]. Modifications of these digital images can bring some pleasure to one's life and one can use or modify it as per his need or just to have fun without causing any harm to others [2].

However the idea behind tampering can be covert or hidden at times, which can spoil the reliability of image, its accuracy, and the safety in case of armed forces. When we match or use those images for some purpose, it results in huge losses.

Therefore, it is essential to develop techniques to confirm the aurtherization, validity and uprightness of digital images and it the primary goal of image forensic. Image forensic is used for detecting the confirmation of forgeries, and its objective is to strengthen the validity of digital image. In comparison to the water marking based verification approach, forensic has been still progressing and number of algorithms for modifications are used. The basic focus is on detecting Copy-Move image tampering technique in that one part of image is copy as well as pasted and the original image gets modified. Human eyes cannot detect the changes in the image. Changes are so refine. The process of making borders unclear is called blurring which modifies the region so that you cannot distinguish between original and pasted images. In contrast to the block-based methods, the image is not split into blocks so that the features are taken out from the complete image in the key-point image. SURF and SIFT are highly used in used in this approach. These methods are used to abstract unique features, key-point descriptors which present in that feature [8]. Feature like vector and descriptor are remains unaffected to variation, transformation and scaling and is partially affected to change in brightness and are robust in geometric alteration.

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Features like Scale invariant features transform that are constant if we changes the brightness, alternation are applied by Huang et al. so that duplicated regions in the image is detected.[2]

II. LITERATURE REVIEWS

Bharat M. Prajapati, Nirav P. Desai[1] -Digital images have been widely used from last few years in various applications such as forensic evidences, medical, insurance and military etc. With easy availability of low-cost image modification and editing software such as Adobe Photoshop, GIMP (GNU Image Manipulation Program), paint etc. digital image content is not considered as safe. There are various types of image tempering techniques but Copy-move is the mostly used. In this technique, some part of image is copied then it is pasted on same Image, which changes the visual contents of image. A new methodology is used for the forensic analysis of Digital image tempering. In this technique, we propose detection method based on SIFT (Scale Invariant Features Transform). In this we use RANSAC (Random Sample Consensus) algorithm which accurately detect tempered location and regions. This method is robust and less time is required for detecting tempering in digital images than other methods.

Feng Liu,Hao Feng[8]- With the development of so many digital processing softwares, digital tampering is commonly done. Based on Discrete Wavelength Transformation and SVD, algorithm is planned for image forgery detection by copy and move in this paper. In the experiment, Gaussian blurring was used to distort the image, even though this algorithm determined multiple copy-move forgery. It also traces the replicated regions, by JPEG compression and their diverse processes.

Rani Susan Oommen, Jayamohan M.,Sruthy S.[9]- Development of new image editing tools, modification of images has become a very easy task. In Copy-move forgery, image meaning has changed, where one area is copy and after that pasted to another area inside on the same image. The objective of copy-move forgery may be to add some features that are unwanted, or to delete some local features which are otherwise present according to our requirement. Techniques like dimensionality reduction, moments, texture analysis has been experimented. This paper presents a study of various image forgery techniques and a survey of various attempts in copy-move forgery detection. A comparative analysis of various techniques has also been done.

S. Fattah,M. Ullah,M. Ahmed,C.Shahnaz [6]- Based on a block matching algorithm, a forgery detection scheme using copy-move is established in this paper. 2D-DWT is used rather than most common spatial blocks. Co-efficient of DWT is utilized from forged image and then block domains are considered. In this we basically reduce the computational burden. Previously we used block matching in all the blocks but in this we have selected some unique candidate blocks. For non-overlapping blocks we use similar measure. For Next stage, candidate blocks will compare with overlapping blocks. Similarly method is used to finally detect the forged blocks. In the proposed algorithm it detects copy-move forgery by using extensive simulation.

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[5]- In this paper, multiple copies of the same area and different areas have been detected. In key point-based Method (mainly used in this paper),Speeded up Robust Features method is used for extracting the feature. The matched points can be identified by g2nn. Then the Agglomerative Hierarchical .False detection rate can be reduced by using clustering.

Hitesh Batra, Dr.Sanjay Badjate[1] -In this paper basically passive image has authentication identified and the various copy move Forgery detection techniques are analysis.

III. PROBLEM FORMULATION

From the deep analysis of work in study, it has been calculated that lot of work has been done using 2-DWT but we will create technique that combined and analysis an efficient, robust and hybrid technique for copy-move image forgery detection in image is purposed.

IV. PROPOSED WORK

It is very difficult to detect copy-move forgery on the similar image. In this section, we use linkage, clustering to detect the forgery part.

A. Clustering

Clustering is a collection of process which is similar between them. So it basically detects those points in an image which are similar and it has the ability to deal with similar pixels in the value. It deals with finding hidden pattern or grouping in dataset. In this I have used hierarchical clustering in this paper

Various Clustering Algorithms

- **Hierarchical clustering:** Create cluster tree for multilevel hierarchy.
- **K-Means clustering:** partitioning of data into k distinct clusters which are based on distance to the centric of a cluster.

Hierarchical clustering

In Hierarchical clustering, by generating a cluster tree the data is grouped over a variety of measures. This tree not uses single set clusters, but uses multiple hierarchies, one level is merged over the next level.

i.e.

Define a data set, Q, having five objects and each object has a coordinates a,b

Object i: 4,6

Object ii: 4.5,6.5

Object iii:4,4

Object iv:6,1.5

Object v: 6,3.5

Dataset used as matrix

$P = [1 \ 2; 2.5 \ 4.5; 2 \ 2; 4 \ 1.5; \dots \ 4 \ 2.5];$

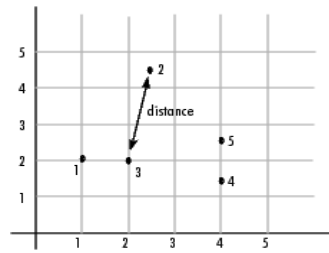


Fig 1-Hierarchical Clustering

B. Linkage

Linkage is used to find the distance. It uses Links and p-distance of an object which are very to two objects. It form newly clusters to one another in real data set that are connected to hierarchical object.

$$Z = \text{linkage}(Y)$$

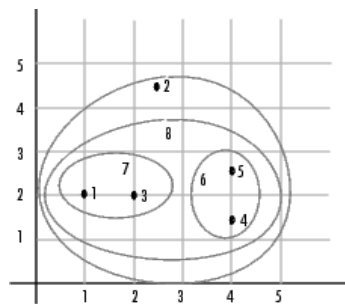


Fig 2-Linkage group using hierarchical Clustering

V. IMPLEMENTATION

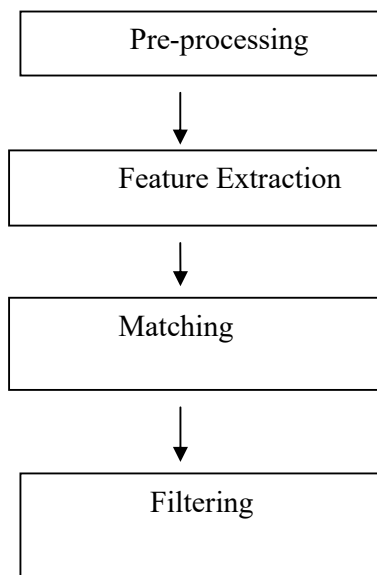


Fig 3.Flow-chart for Implementation

VI. RESULTS AND PERFORMANCE ANALYSIS

Collection of data has been used so that we can test the performance of algorithm. For the purpose of testing, some part is copy and paste on the same image and saved to the same image with JPEG format. We basically use inbuilt functions of MatLab - Linkage and Clustering for detecting the

forgery part which show the number of match point and further number of transformations. SIFT features in a single image uses our multiple match strategy. In this algorithm, 2D-homogarchy is also used for attaching similar point together. Finally we get the output as shown in the figures below.

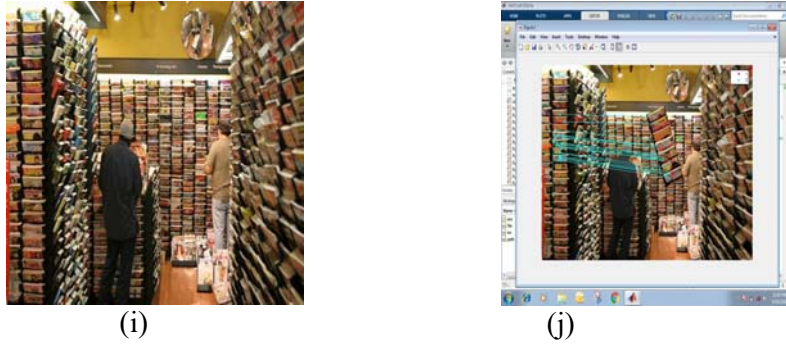


Fig.4. Copy Move forgery and its implementation.
 (i)Original image, (j) Resultant Image.



Fig.5. Copy Move forgery and its implementation.
 (i)Original image, (j) Resultant Image

This method effectively detect region that are forged in the above images.The proposed method is implemented using multiple images. In this we have a folder which contains multiple images and it detects the hit, miss, false detection rate which can be defined as

$$\begin{aligned}
 \text{Hit Ratio} &= \frac{\text{Image detected as forged being forged}}{\text{Forged image}} && 100\% \\
 \text{Miss Ratio} &= \frac{\text{Image detected as not forged being forged}}{\text{Forged image}} && 100\% \\
 \text{FDR} &= \frac{\text{Image detected as forged being original}}{\text{Original Image}} && 100\%
 \end{aligned}$$

Computational complexity is reduced by SVD based method is considered to compare performance. Table-I define the performance of average obtained from 35 images by using proposed method. Outcome shows that a nice performance in term of all the parameters is gained through the proposed method.

TABLE I: COMPARISON OF AVERAGE FORGERY DETECTION PERFORMANCE

Algorithm	Hit Rate Avg. (%)	Miss Rate Avg. (%)	FDR (%)	Avg.
Defined	97.106%	2.89%	0	
Method(SVD)	93%	7%	5%	

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