

Segmentation Based On Image Copy Move Forgery Detection by Using Image Feature Matching

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ABSTRACT: Image Duplication is become very common in all the fields. In that forgeries happened in that on same image. That means removing some important pixels in that original image and copying , pasting the other pixels .this paper focus on finding the duplication image into the original image by using extracting the key point method. Two stages of matching process. The first stage is find the dependent pair of the patches using affine transform matrix. Second stages is matching patches using execute loop iteration technique re-estimation process is avoided from that we speed up matching process and easy to find the fake image compare to other forgery detection method this method is having good performance.

KEYWORDS: image segmentation, keypoint extraction, copy move forgery detection, tampering operation,

I. INTRODUCTION

The copy move forgery regions having possibilities of copying and pasting the content within the same image. The main aim of the forgery is to hide original image content and some alteration also done by forgeries. so we need effective detection method using discrete cosine transform method we can able to detect the copy move forgery image immediately.

Compare to other detection method this DCT method is detection speed is high. Because of it reduced the re-estimation process .using parallel programming we can improve the efficiency. SHIFT and SURF algorithm are used.matching process and key point extraction is important steps in this paper. Dictionary sorting is known as matching process.using Discrete Cosine Transform method we can reduced complexity of detection method.to detect the CMF through defining local patches of one image.the images are divides into overlapping blocks. And find the similar blocks. The properties of an image colour temperature,brightness level, size,high entropy, also consider to forgery regions and this method has clear advantage in terms of complexity. Using Zernike moments most of the precision results can be archived.

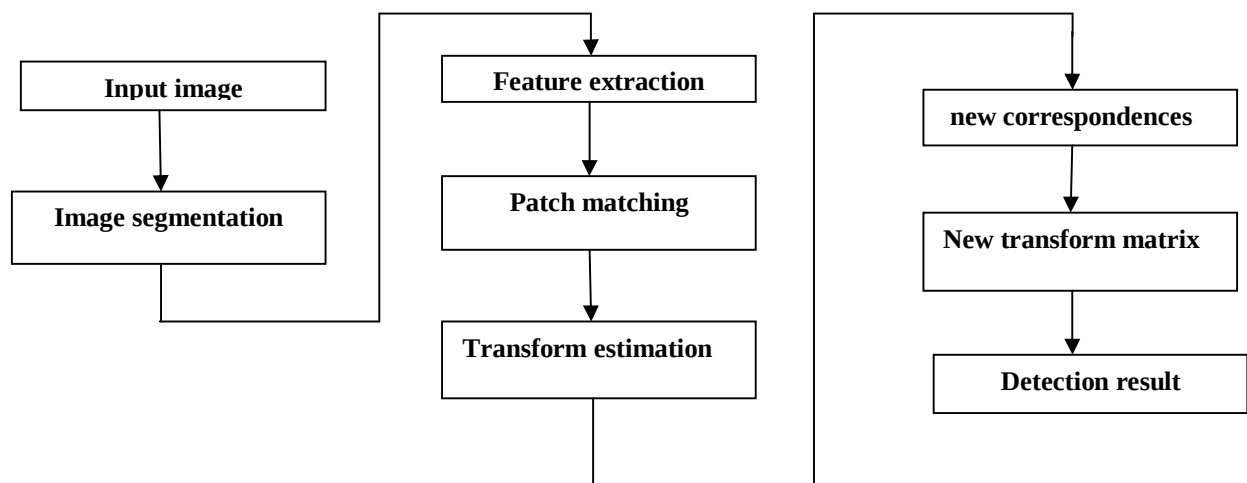
The matching process will be divided into two stages:1)First stage matching,2)second stage matching in that first stages having keypoint extraction,patch matching,transform estimation process using affine transform estimation,in second stage having new transform matrix for matching the patches. mainly two methods are used for detecting the CMF regions in that block based method is take more time to detect the forgery image because of comparing number of patches are too large. To avoid this problem key point method is more important.

II. IMAGE SEGMENTATION

Digital forensics methods are used for segmentation process. To detect the copying ,pasting content the input images are divided into several patches. Each patches semantically independent to others. This process done by digital forensic experts. our implementation is if the two regions are located at same patch. Each image is empirically segmented into on less then 100 patches. The CMFD is done by traditional method. One image sized

600×800 it will be segmented in 15 sec to using personal computer(3.3GHZ cpu,4GRAM) the cluster based CMFD Scheme used significant raise the accuracy of localization of CMF regions. Segmentation process used to test the image into non-overlapped patches. Then performed by matching this patches, as long as the pasting target region.

III. SYSTEM ARCHITECTURE



(a)Key point extraction

Keypoint extraction is the first stage of matching process. Many type of key point extraction methods are available. Using common covariant detection and description algorithms like different of Gaussian-affine transform, Harris-affine transform, Hessian-affine transforms can be provide similar detection performance . we are setting VIFeat keypoint description namely SHIFT. Using K-d tree the extraction of keypoints of an whole image.for each region keypoint extraction is done by KNN(K-nearest neighbour) one region is matched to another one means it is noted automatically.

Finally to estimate the affine relationship based on execute loop iteration technique. scale selection is based on the laplacian,and shape of the elliptical region is determined with the second moment matrix of the intensity gradient .this is called autocorrelation matrix,is often used for feature detection. This matrix describes the gradient distribution in a local neighbourhood of a point

$$M = \mu(x, \sigma_I, \sigma_D) = \begin{bmatrix} \mu_{11} & \mu_{12} \\ \mu_{21} & \mu_{22} \end{bmatrix}$$

$$= \sigma_D^2 g(\sigma_I) * \begin{bmatrix} I_x^2(x, \sigma_D) & I_x I_y(x, \sigma_D) \\ I_x I_y(x, \sigma_D) & I_y^2(x, \sigma_D) \end{bmatrix}$$

The local image derivatives are computed with Gaussian kernels of scale σ_D (differentiation scale). The derivatives are then averaged in the neighbourhood of the point by smoothing with a Gaussian window of a scale σ_I (integration scale). The Eigen values of this matrix represent two signal changes in a neighbourhood of the point. The property enables the extraction of points. The signal changes is significant in orthogonal directions. Such points are stable in arbitrary lighting conditions and representative of an image. The number of larger than 2000 character of keypoints having good performance.

(b) Matching between patches

The suspicious pairs of the patches that have many similar keypoints. This process is performed by comparing each patch with the rest define the distance between two key points by the l-2 norm of the difference between the two descriptors. usually more than one couple of copy-move regions in the image for our implementation set $K=10$. We need not take all the keypoints consideration, only the difference is smaller than threshold 0.04 between the two keypoints are consider to be matched. The target region and source regions should have large proportion of matched keypoints. The threshold ϕ is defined to find the matched patches. In our implementation is empirically set as 10 times the average number of keypoints per patch

$$\phi = 10 \frac{|\{keypoints\}|}{|\{patches\}|}.$$

(c) New transform matrix

The computer vision usually focuses on the research of transform estimation of two distinct images. in second stage we propose to exploit all the pixels in the matched patches to find out a more accurate estimation H . The pixels belonging to CMF regions. since the really matched pixels in the copying source region and pasting target region should be close to each other. some correspondences are not accurate enough because they may be at the smooth image regions. One natural solution is RANSAC as it is rather good at handling outliers. Usually are a large number of pixel pairs and hence RANSAC is too time-consuming. One is the CMF region from the background is the same problem as classifying these two kinds of pixels. the classic registration algorithm consist of following these steps: 1) obtaining the matched points 2) calculating the new transform matrix.

(d) Affine Transform estimation

The effective replacement for this shift vectors that can expressly handle affine transformations. the core idea is to explicitly estimate the rotation and scaling parameters from a few blocks, expressed as an affine transformation matrix. the region on block pairs with similar transformation parameters.

$$\vec{p}_i = C(\vec{f}_{i1}), \quad \vec{q}_i = C(\vec{f}_{i2}).$$

If $\vec{f}_{i1}$ stems from a copy –move operation with rotation and scaling, then $\vec{q}_i$ is related to $\vec{p}_i$ via an affine transformation

$$\vec{q}_i = \vec{p}_i \cdot A + \vec{b}$$

We recover the transformation and treat it as an initial solution to an RS-CMFD region. If the number of blocks pairs that satisfy the hypothesis exceeds a certain limit t_2 , we consider the transformation a candidate for a copy-moved region. And report involved blocks as well as the transformation parameters as an RS-CMFD results. SATS follows the shift vectors for robustness to outliers clustering of similar results.

IV. EXPERIMENTAL RESULTS

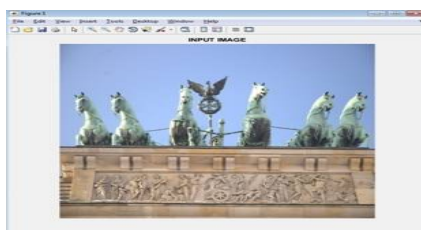


Fig a) example of input image



Fig b) segmented image

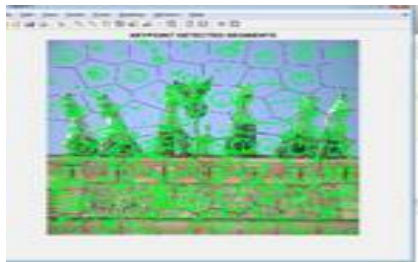


Fig c) extracting keypoints

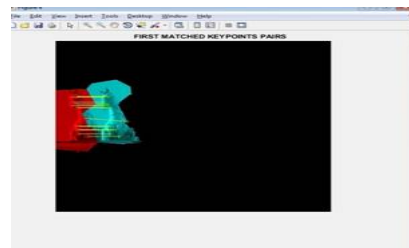


Fig d) first stage matching

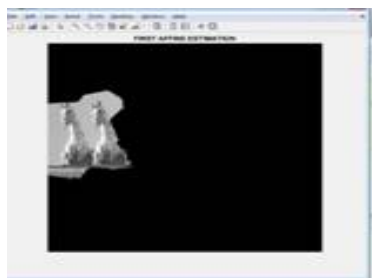


Fig d) first stage of affine transform estimation

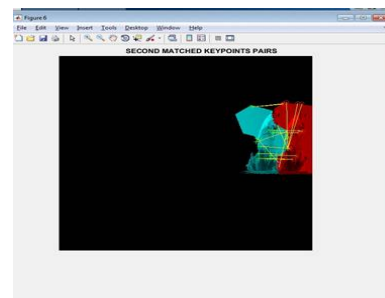


Fig e) second stage matching

Above experimental results defined cmf region detection and comparing the matching points.

V. CONCLUSION

In this paper the copy move forgery detection based on segmentation scheme. Forgery regions are detected by using extracting the keypoints description in the same image. Under Segmentation process the images are divided into several patches. using new affine transform matrix the copy regions are estimated. The matching process consist of two steps First stage of matching is used to find extracted keypoints using affine transform matrix from that we have to eliminate the unwanted keypoints and patch matching Second stage matching is used to find the new transform matrix and new correspondences.

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