IDENTIFYING IMAGE FORGERY USING RANDOM SAMPLE CONSENSUS(RANSAC) ALGORITHM

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ABSTRACT

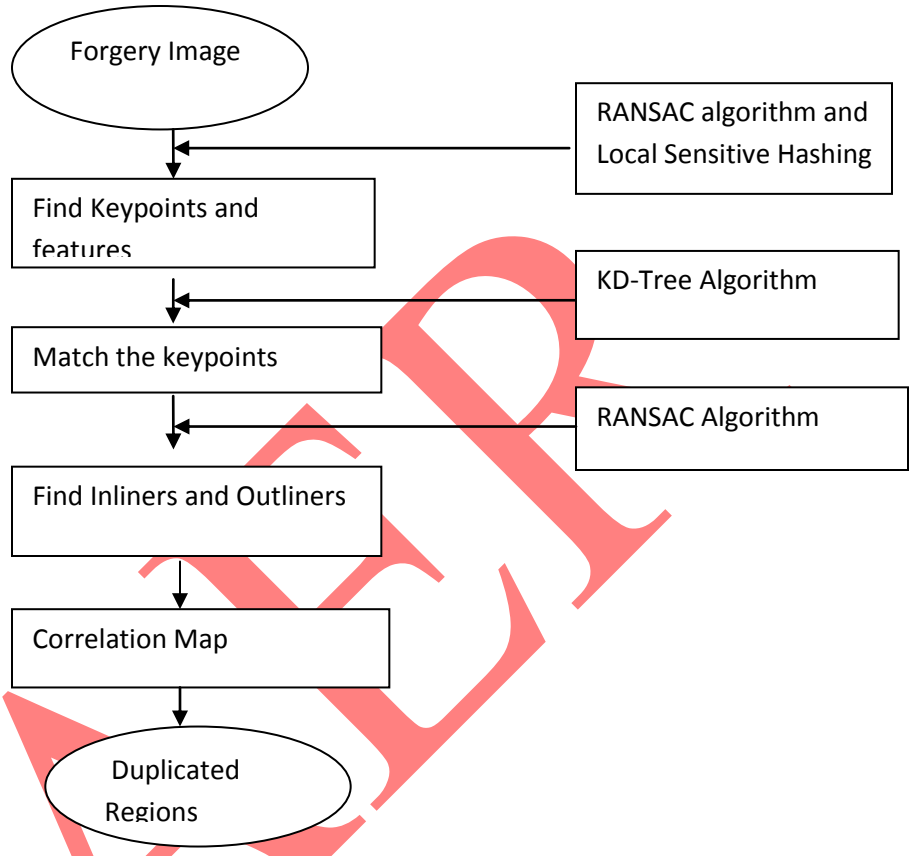
Digital Image Forensics is the field that deals with the authenticity of the images. In recent trends, the image forgery is rapid worldwide and it considered offensive. To identify the image forgery ,and to find the duplicated region in each image RANSAC algorithm is used. The proposed system uses RANSAC(Random Sample Consensus) for finding the keypoints and features and obtaining the matched pattern which is much faster compared to other algorithms. The KD-Tree algorithm is used to match the plotted points. The RANSAC algorithm along with KD-Tree helps to find the duplicated regions more effectively.

Terms Used: Image Forgery, RANSAC (Random Sample Consensus), KD-Tree.

INTRODUCTION

To find the forgery in the images the following steps has to be proceeded. With the help of KD-Tree and RANSAC algorithm the following methods are generated.

Fig1.Flow Chart



To find the keypoints and features,RANSAC algorithm and Local Sensitive Hashing(LSH) is used.LSH is a method of performing probabilistic dimension reduction of high-dimensional data.Since SIFT algorithm is used in existing system for finding the keypoints and features,LSH is used because it is more advanced than SIFT(Scale Invariant Features Transform) algorithm.LSH is used for finding multiple points and perform the operation.To match the keypoints from original image to duplicate image ,KD-Tree algorithm is used.

To find the original image and the duplicate image the inliners and outliners methods is used (i.e) if the points are matched in the original image as well as in duplicate image then it is said to be inliners and if the points are mismatched in original image as well as in duplicate image then it is said to be outliners. These are done with the help of RANSAC algorithm. Then Correlating the image with the original image and the duplicate image is essential. Initially if the images are matched then the correlated value will always be 1.Suppose if it is mismatched then the correlated value differs. This Correlation map contains two methods. They are Auto

Correlation and Cross Correlation . The duplicated region is found and it is shown with the help of histograms.

Why this RANSAC algorithm is used in this paper is, it is faster and effective than SIFT algorithm. Moreover Random Sample Consensus(RANSAC) is used in rotational (i.e)90-180 degree angle. But SIFT algorithm is used in same angle (i.e) only in 90 degree.

In proposed system copy-move attack forgery is used.Copy-Move forgery is used in which a part of the same image is copied and pasted into another part of an same image .By this the duplicated regions can be found by plotting the points with the help of KD-Tree. RANSAC algorithm is used to find the keypoints and its features because it is more efficient and faster than SIFT algorithm,Sice SIFT is used in existing system .The duplicated regions are found to be shown in the form of Histograms. Since 2D images are more faster than 3D images, the 2D image is used in proposed system but with the angle of 90-180 degree rotation to handle the duplicated regions.

ADVANTAGES

- Hypothesis of the images can be easily determined and the images are found to be 90-180 degree angle.
- Easier than the SIFT algorithm in computations.
- Easier to select the key points in an image.

LITERATURE SURVEY

The growth of the image processing and editing software availability has made it easy to manipulate digital images.The copied adjustments of an image are pasted to a different location in the same image based on directly matching blocks of image pixels.This is known as region duplication.The main steps of the proposed system using region duplication detection with SIFT are:

- Image SIFT features:

The SIFT image features have been proposed by several effective local image feature by scale invariant feature transform (SIFT) .It is very reliable and effective.The Properties of SIFT features include
Robustness to local geometrical distortion, illumination variations, noise and other degradations. The first step in collecting SIFT features is to identify keypoints that are locations with distinct image information and robust to scaling and rotation.

- Matching and Pruning of SIFT keypoints:

Using the Best-Bin-First (BBF) algorithm the SIFT features are collected from an image, and finds matches of SIFT keypoints in each small non-overlapping pixel blocks (known as examination block) in the whole image.

- Estimating Region Transforms:

  For estimating SIFT images there are three regions.They are

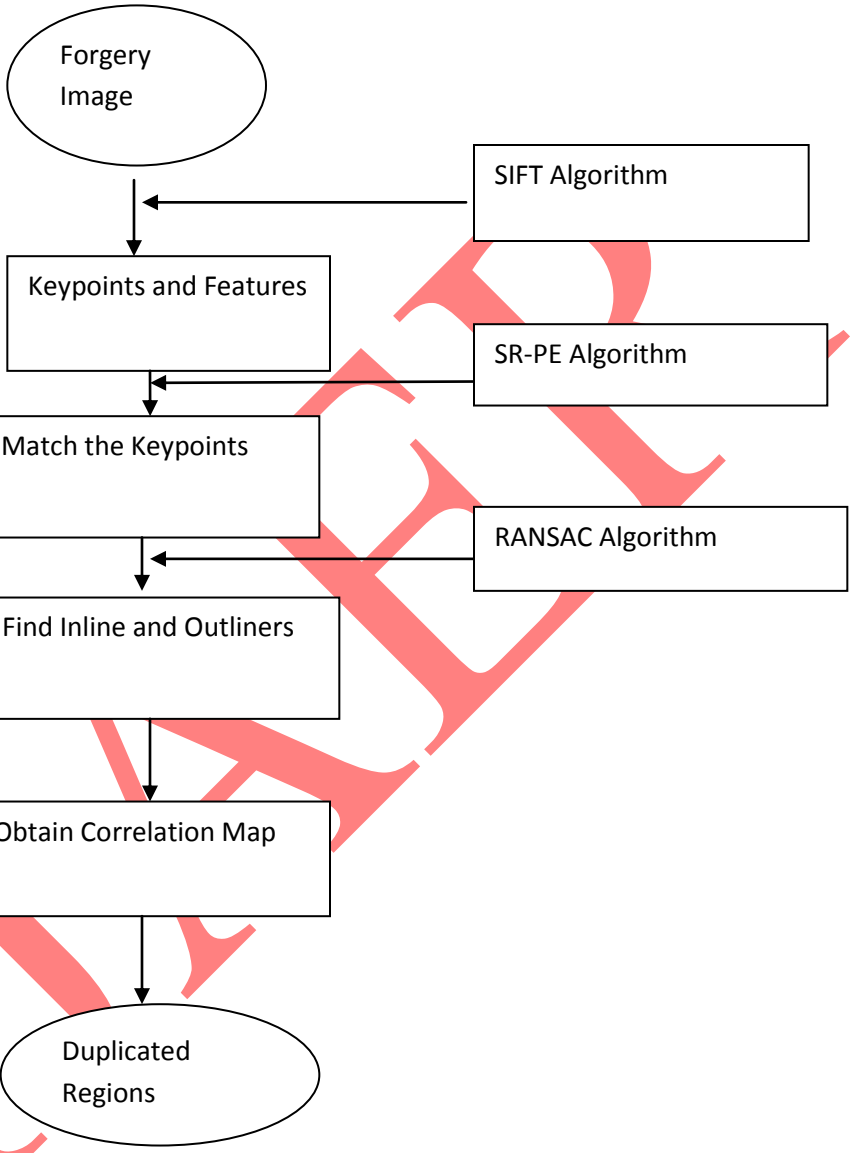
  - Copy-Move
  - Scaling
  - Rotation

- Showing Duplicated Regions:

The estimated region transform can establish the correspondence between all pixels in the original region and their counterparts in the duplicated region. For this, a map of region correlations to identify the original and the duplicated regions. Finally, the contours of the potential original and duplicated regions are connected with mathematical morphological operation.

Region duplication is a form of image manipulation where part of an image is copied and pasted to different location on the same image. Scale Rotation Invariant Pattern Entropy(SR-PE) is used for matching pattern. It is used for finding the duplicated regions more effectively.

Fig2:Flow Chart



SR-PE Algorithm is used to find the matched keypoints.This SR-PE is used for matching the plotted points with the help of image pixels and RANSAC is used to finally find the duplicated regions. SIFT algorithm is also used for keypoints and features.Using Correlation map value the duplicated regions can be found in an image.

Due to rapid advances and availabilities of powerful image processing software, digital images are easy to manipulate and modify for ordinary people. This makes it more and more difficult for a viewer to check the authenticity of a given digital image. Copy-move forgery is a specific type of image tampering where a part of the image is copied and pasted on another part of the image. Hence, the goal in detection of copy-move forgeries is to detect image areas that are same or extremely similar. It is possible to change the information represented by an image and create forgeries, which are indistinguishable by naked eye from authentic photographs and documents. In the proposed method Harris Interest Point detector along with SIFT descriptors are used to detect copy -move forgery. KD-Tree is used for matching.

Digital images are foremost source for information transfer. Due to advancement of technology images are not now treated as reliable source of information. In order to make the algorithm more robust, some parameters are proposed to remove the wrong similar blocks. Experiment results show that our proposed scheme is not only robust to multiple copy-move forgery, but also to adding with low computational complexity.

CONCLUSION

Identifying image forgery is an important factor in the field of digital image forensics.The proposed method is based on RANSAC features, which makes it applicable for the detection of duplicate regions. An important feature work is, several applications can be done with other detection schemes based on intrinsic signal statistics to provide strong cues when image keypoints and features are not sufficient.

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