Study of Copy Move Image Forgery Detection Based On Surf Algorithm

1Gurmeet Kaur Saini, 2Manish Mahajan
1Research Scholar, 2Head of Department
Department of Computer Science
CGC College Of Engineering, Landran
Mohali, Punjab
Email:1Gurmeetsaini02@gmail.com, 2cgccoe.hodcse@gmail.com

Abstract: Now a day’s verification of images plays an important role. Various modification (alteration of image) tools are available in the market which can make changes in different ways. By using these tools we can make so many slight changes in the image by resizing, rotating or copy move etc. which is difficult to detect by human eyes. This poses a need to verify the authenticity of images. So we need some forgery detection technique for digital image. This paper review technique for copy move image forgery detection. In copy move image forgery detection some portion of the image is copied and then pasted in another part of the same image. This proposed method is based on SURF (Speed Up Robust Features).

Keywords: Image forgery, Image authentication, Copy move Forgery, SURF.

I. INTRODUCTION

Today mostly information is carried out in a digitized form especially in the form of either digital videos or digital images. These sources can be tampered very easily. Now, our concentration is on image forgery, which is difficult to detect so it becomes a topic of serious concern. These days image editing software’s such as Adobe Photoshop, Maya are easily available. By using these tools, an image can be easily modified, which can lead to serious consequences.

So, the matter of verification of the images is a topic of serious concern. Forgery detection techniques are classified into two major domains: intrusive/non-blind, non- intrusive/blind Intrusive method.

The original image where digital information is mandatory to be embedded are called blind intrusive methods. Examples of non- intrusive methods are digital watermarking and digital signature. Non-intrusive method also known, as a blind method that does not require any embedded information in an original image [3]. When various changes are applied on to digital image like rotation, scaling, resizing, etc. that tampers its original version is known as forged image. In copy move forgery, some content of original image is manipulated to hide some information. It is very common type of forgery because it is difficult to predict by human eyes so it is used to alter the content of an image.

So, our focus is on copy-move forgery detection because it is too difficult case which leads to serious concern. This is because when we copy a part of image from one picture and pastes it on another picture having same characteristics as
original picture. Then we will use dyadic wavelet transform (DyWT) to decompose a tampered image. DyWT is best because it is shift invariant [1]. After this decomposition, we can apply Speed up robust feature (SURF) algorithm to extract image features, it will find descriptor for both color as well as boundary images. Then we will perform a search for same features at different area of images. The parts of image that return similar SURF (speed up robust feature) features from all four images and these are marked as forged regions. This way forgery will be detected.

The below figure shows two images in which first image shows the original picture and second image shows the tampered or forged image in which one truck is covered by trees using photo editing software.

The detection results show that the proposed method identifies the forged regions with high accuracy. Scaling and rotation are the most common transformations which are applied to the forged part in order to hide the trace of forgery. Fig.3 shows the results of the method for detection of plain copy move forgery.

II. PROBLEM FORMULATION
Some of the previous proposed algorithms for image forgery detection were block based in which the given image is divided into blocks and then searching for block similarity that are obtained to conclude the image forgery. As previous proposed algorithms are the invariant feature transforms, these algorithms are different from the previous proposed algorithms because these algorithms are applied on the whole complete image for obtaining the features rather than portioning the image into various blocks.

To prevent the attacks that are occurred using SIFT and DyWT methods. For this DyWT is combined with SIFT to get the tampered part and the results that obtained were better than SIFT alone and algorithm proposed.

III. PROPOSED METHODOLOGY
This proposed method is used to detect the copy move image forgery and is based on SURF algorithm. The first step in this method is input is taken i.e an image. This method requires a Gray scale image for further processing. In this, the SURF method is used to perform the feature extraction and description and SIFT is used so that these features are matched with each other to locate the forged part in digital images. Figure 4. Shows the flow of SURF algorithm.
IV. SURF Algorithm

Speed Up Robust Features (SURF) is used to obtain rotation and scale invariant keypoint detector and descriptor. It is very fast algorithm and better than previous proposed methods in terms of repeatability and robustness. SURF algorithm becomes popular because its computation time is faster than other methods. This is achieved by the use of integral images.

SURF combined with DWT

In this section new algorithm is proposed by combining SURF and DWT algorithm. Firstly DWT is applied on a given image which helps to decompose the given image in to four sub-images i.e LL, LH, HL, HH. In these four sub-images LL part contains large part of the information. So SURF is applied on a LL part to find the key points and their corresponding descriptors. In last, we find match between descriptors using different methods like best bin first method to find tampered region. The complete flow of the algorithm is presented in the Fig.3.

V. RESULTS

In this research project, the work has been performed using the proposed model for the image forgery detection in the natural scene. The natural scene image extraction procedure has used several morphological methods amalgamated with the principle component analysis for image forgery detection. The image region is extracted using the proposed model’s SURF points operations. The natural scene image forgery recognition can assist the digital media houses to check the image forgery on their digital image data.

EMP (Evaluation Method Performance) is measured using a matching task of image on a number of datasets using a various algorithm. The feature correspondence is recorded if nearest neighbour is within a threshold in feature space. The matched image is selected on the basis of image with the most feature correspondences from the collection. We also identify distance thresholds by observing the matching variance between various feature descriptors for all descriptors of SIFT. Some of the important measures of image are described in Table 1.

<table>
<thead>
<tr>
<th>Evaluation measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>True Positive (TP)</td>
<td>Images that have been correctly detected as tampered</td>
</tr>
<tr>
<td>False Positive (Fp)</td>
<td>Images that have been falsely detected as forged</td>
</tr>
<tr>
<td>False Negative (FN)</td>
<td>Images that have been falsely missed but they are actually forged</td>
</tr>
<tr>
<td>True Negative (TN)</td>
<td>Images that have been correctly detected as not-forged (clean).</td>
</tr>
</tbody>
</table>
Precision represents the probability that forgery that is detected is truly a forgery and Recall represents probability that a forged image has been detected. it is also called as True Positive Rate (TPR)

![Graph 1: Representation of performance measures of various algorithms](image)

### VI. CONCLUSION

In this paper image forensic method is used to detect copy move image forgery which uses SURF (Speed Up robust feature) algorithm for feature detection and description. This method not only detects the simple one to one copy move forgery but also performs well when certain post processing operations are applied. The experiment results show clearly that the method is highly robust to all such operations. This method also detects multiple copy move forgeries with high accuracy as it applied on a complete image.

### VII. FUTURE SCOPE

The future work will be concerned with the improvement of the method to detect the copy move forgery when the copied part is not easily detected by SURF algorithm.

### REFERENCES


