

Image Forgery Detection Using Adaptive Over-Segmentation and Feature Point Matching

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Abstract- A novel copy-move forgery detection scheme using adaptive over-segmentation and feature point matching is proposed in this paper. The proposed scheme integrates both block-based and key point-based forgery detection methods. First, the proposed Adaptive Over-Segmentation algorithm segments the host image into non-overlapping and irregular blocks adaptively. Then, the feature points are extracted from each block as block features, and the block features are matched with one another to locate the labeled feature points; this procedure can approximately indicate the suspected forgery regions. To detect the forgery regions more accurately, we propose the Forgery Region Extraction algorithm, which replaces the feature points with small super pixels as feature blocks and then merges the neighboring blocks that have similar local color features into the feature blocks to generate the merged regions; finally, it applies the morphological operation to the merged regions to generate the detected forgery regions. The experimental results indicate that the proposed copy-move forgery detection scheme can achieve much better detection results even under various challenging conditions compared with the existing state-of-the-art copy-move forgery detection methods.

Keywords- Discrete Wavelet Transform (DWT), Image forgery, Tampering, Segmentation

I. INTRODUCTION

Imitations are not new to humanity however as an opportunity are a very old trouble. In the beyond it changed into restrained to craftsmanship and writing but did now not have an effect on the overall population. These days, due to the headway of automatic image handling software program and changing gadgets, a image can be results managed and changed. It is alternatively tough for people to apprehend outwardly whether or now not or now not the photo is unique or manipulated. There is speedy increment in digitally controlled falsifications in great media and on the Internet . This sample shows authentic vulnerabilities and abatements the credibility of digital photographs. In this manner, growing techniques to check the honesty and realness of the superior snap shots is essential, specially considering that the pics are delivered as evidence in a courtroom docket of regulation, as facts things, as part of restorative records, or as coins related opinions. In this revel in, image forgery detection is one of the critical

purpose of photograph forensics. The most essential goal of this paper is: To present numerous element of photograph forgery detection; To assessment some overdue and modern methods in pixel-primarily based absolutely picture forgery detection; To give a comparative examine of modern techniques with their benefits and downsides. The rest of the paper is prepared as follows. A assessment of photo forgery detection have presented in first segment. In second segment we speak particular form of virtual photograph forgery. In third phase we present virtual photograph forgery detection method. In fourth Section we introduce and talk approximately unique present strategies of pixel-based completely image forgery detection, specially duplicate-float. Comparison of numerous detection algorithms are given in fifth phase and the remaining section gives the notion of this paper.

SYSTEM MODEL

In this paper we are discussing regarding the forgery happened in an image. Depending upon the system(input image) input the detecting will work. Here we are taking some of the database images like original images and duplicated images from the original image to duplicated image we comparing the image feature values and by using clustering process we are detecting the forgery location. And the results will come in the images format. Before this things some of the projects have been done to forgery detection. Here we have one of the existing system.

EXISTING SYSTEM

The existing types of image tampering, a common manipulation of a digital image is copy-move forgery, which is to paste one or several copied region(s) of an image into other part(s) of the same image,

DRAWBACKS

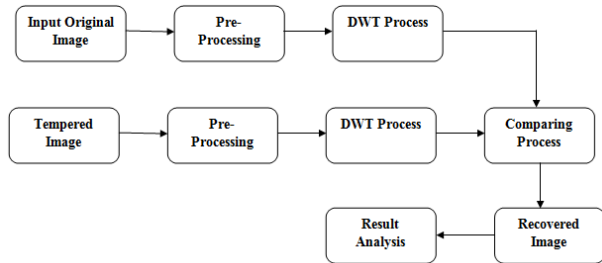
During the copy and move operations, some image processing methods such as rotation, scaling, blurring, compression, and noise addition are occasionally applied to make convincing forgeries. Because the copy and move parts are copied from the same image, the noise component, color character and other important properties are compatible with the remainder of the image; some of the forgery detection methods that are

based on the related image properties are not applicable in this case.

PROPOSED SYSTEM ANALYSIS

An adaptive over-segmentation method is proposed to segment the host image into non-overlapping and irregular blocks called Image Blocks (IB). Then, we apply the Discrete Wavelet Transform(DWT) in each block to extract the SIFT feature points as Block Features (BF).

BLOCK DIAGRAM



PRE-PROCESSING

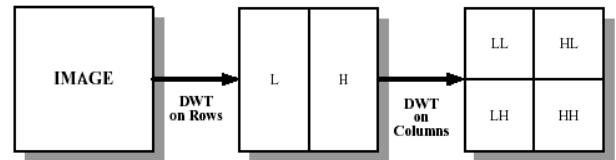
Image recuperation is the operation of taking a corrupted/noisy photograph and estimating the smooth unique photograph. Corruption might probable are also to be had many bureaucracy on the side of motion blur, noise, and digital digital camera misfocus. Image healing isn't like photo enhancement in that the latter is designed to emphasize capabilities of the photo that make the photograph extra captivating to the observer, but no longer constantly to supply sensible information from a systematic difficulty of view. Image enhancement techniques (like evaluation stretching or de-blurring by a nearest neighbor approach) supplied thru "Imaging packages" use no a priori version of the manner that created the image. With photo enhancement noise may be successfully be removed by using sacrificing some choice, but this isn't suitable in many programs. In a Fluorescence Microscope selection inside the z-route is terrible as it is. More advanced image processing techniques ought to be carried out to get higher the item. De-Convolution is an example of picture recovery approach. It is able to: Increasing decision, especially within the axial route removing noise developing evaluation.

Wavelet Decomposition of Images

In wavelet decomposing of an photo, the decomposition is achieved row thru row after which column through column. For example, proper here is the technique for an N x M photograph. You filter out every row after which down-sample to acquire N x (M/2) pictures. Then clear out each column and subsample the filter output to attain four (N/2) x (M/2) pictures of the four sub snap shots obtained as visible in Figure 12, the most effective acquired through the use of low-

pass filtering the rows and columns is referred to as the LL image.

The one acquired with the aid of way of low-skip filtering the rows and high-pass filtering the columns is referred to as the LH snap shots. The one obtained thru immoderate-bypass filtering the rows and espresso-skip filtering the columns is referred to as the HL photo. The sub image received by using manner of the use of immoderate-bypass filtering the rows and columns is referred to as the HH photograph. Each of the sub snap shots obtained on this fashion can then be filtered and sub sampled to acquire 4 extra sub pictures. This machine can be persisted till the popular sub band form is acquired.



Block diagram of DWT

CLUSTERING MODEL

Clustering may be considered the most vital unsupervised mastering hassle, so, it gives with finding a shape in a tough and speedy of unlabeled records. Acluster is therefore a fixed of devices that are "comparable" among them and are "one-of-a-type" to the gadgets belonging to distinctive clusters. Cluster evaluation, an vital era in data mining, is an powerful approach of reading and discovering useful statistics from severa data. Cluster set of guidelines groups the statistics into education or clusters simply so items internal a cluster have excessive similarity in evaluation to each other, however are very various to gadgets in special clusters. Dissimilarities are assessed based totally on the function values describing the objects. Often, distance measures are used. As a branch of records and an instance of unsupervised getting to know, clustering offers us an unique and subtle evaluation device from the mathematic view K-approach set of guidelines belongs to a famous partition approach in cluster evaluation. The most widely used clustering mistakes criterion is squared-errors criterion, it may be defined as

$$J_c = \sum_{j=1}^c \sum_{k=1}^{n_j} \|x_k^{(j)} - m_j\|^2$$

where J_c is the sum of square-error for all objects in the database, x_k is the point in space representing a given object, and m_j is the mean of cluster C_j . Adopting the squared-mistakes criterion, K-way works nicely on the identical time as the clusters are compact clouds which is probably instead well separated from every different and aren't appropriate for coming across clusters with nonconvex shapes or clusters of

very special size . For looking to reduce the rectangular-emor criterion, it'll divide the devices in a unmarried cluster into or extra clusters.

FEATURE EXTRACTION

Gray-degree co-occurrence matrix (GLCM) is the statistical method of finding the textures that considers the spatial dating of the pixels. The GLCM capabilities signify the feel of an image with the resource of manner of comparing how often pairs of pixel with particular values and in a very unique spatial relationship that determined in an image, workplace work GLCM. This makes the extraction of statistical measures from this matrix.

Here we are using Statistical approach to texture assessment a number of the 4 techniques (Structural, Statistical, model based totally and Transform). It is the most appreciably used and extra generally carried out method because of its excessive accuracy and lots much less computation time. For the calculation of features we need some of the parameters, some of them are given below

Contrast

Contrast is a degree of the close by versions found in an photo. It is given as,

$$C(k, n) = \sum_i \sum_j (i - j)^k P_d[i, j]^n$$

If there may be a huge amount of variation in an image the P [i, j]'s may be centered faraway from the precept diagonal and evaluation can be excessive (typically k=2, n=1).

Correlation

$$C_c = \frac{\sum_i \sum_j [C_{ij} P_d[i, j]] - \mu_i \mu_j}{\sigma_i \sigma_j}$$

Correlation is a measure of image linearity

Where

$$\mu_i = \sum_i i P_d[i, j] \sigma_i^2 = \sum_i i^2 P_d[i, j] - \mu_i^2$$

Energy

One approach to generating texture features is to use neighborhood kernels to come across numerous forms of texture. After the convolution with the desired kernel, the feel power diploma (TEM) is computed via summing truely the values in a neighborhood network:

$$L_e = \sum_1^M \sum_1^N |C(i, j)|$$

If n kernels are finished, the quit result is an n-dimensional feature vector at each pixel of the photograph being analyzed.

Entropy

Entropy is a diploma of records content. It measures the randomness of depth distribution.

$$C_e = - \sum_i \sum_j P_d[i, j] \ln P_d[i, j]$$

TAMPER DETECTION

Tamper detection is the functionality of a tool to experience that an active attempt to compromise the device integrity or the records associated with the tool is in improvement; the detection of the risk can also permit the device to initiate appropriate defensive actions.

APPLICATIONS

The tamper detection format can be completed to feel differing types, strategies, and sophistication of tampering, counting on the perceived threats and dangers.

The strategies used for tamper detection are usually designed as a set of sensors every specialised on a unmarried danger kind, some of which can be physical penetration, warmth or cold temperature extremes, input voltage versions, enter frequency variations, x-rays, and gamma rays. Examples of strategies used to come upon tampering may additionally encompass any or all of the following: switches to find the hollow of doors or access covers, sens.

ADVANTAGES

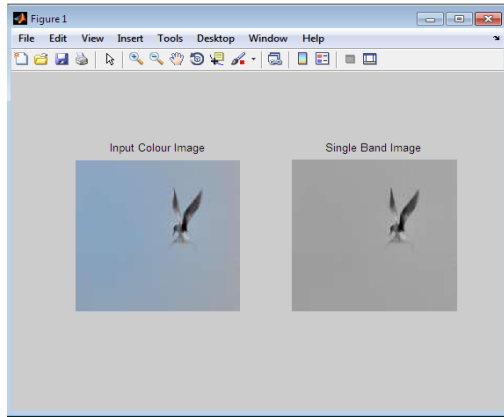
The proposed copy-move forgery detection scheme can achieve much better detection results even under various challenging conditions compared with the existing state-of-the-art copy-move forgery detection methods.

FUTURE SCOPE

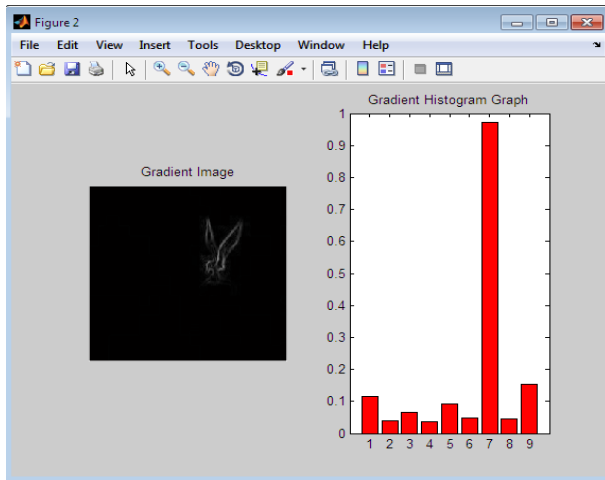
Level set algorithm is used as an extension work to improve the quality of an image with high efficiency and flexibility.

II. RESULTS

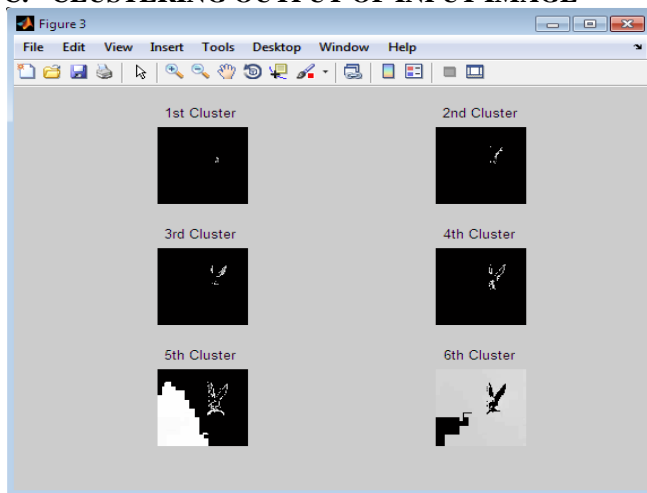
A. INPUT IMAGE



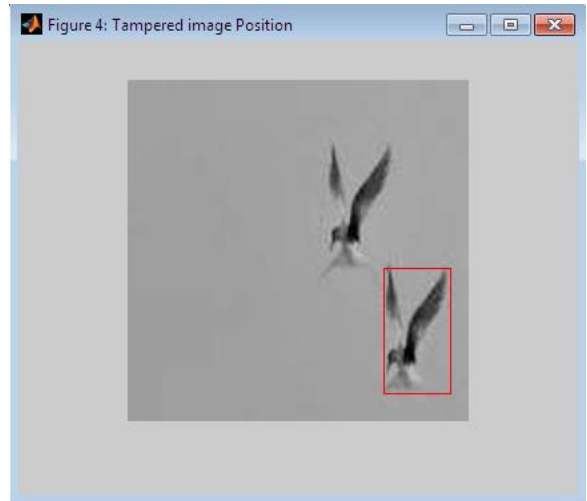
B. GRADIENT HISTOGRAM IMAGE



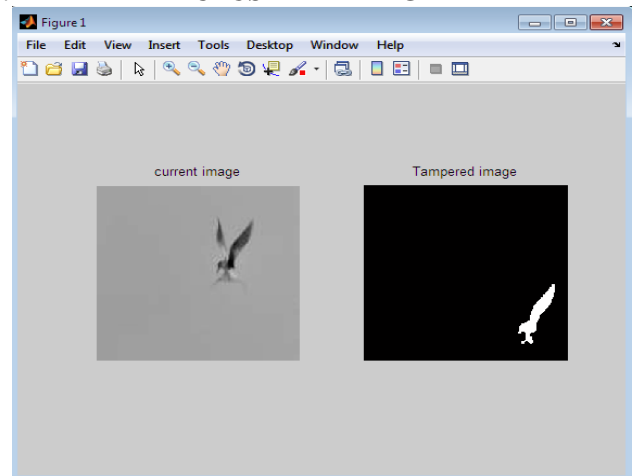
C. CLUSTERING OUTPUT OF INPUT IMAGE



D. TAMPERED IMAGE POSITION



E. TAMPERED CLUSTERED IMAGE



III. CONCLUSION

Digital forgery images created with copy-drift operations are hard to stumble on. In this paper, we have been given proposed a novel duplicate-skip forgery detection scheme using adaptive over-segmentation and characteristic-difficulty matching. The Adaptive Over-Segmentation set of rules is proposed to section the host photograph into non-overlapping and normal blocks adaptively consistent with the given host images; using this method, for every picture, we are able to determine the ideal block initial duration to decorate the accuracy of the forgery detection results and, on the identical time, reduce the computational fees. Then, in every block, the function elements are extracted as block abilities, and the Block Feature Matching set of rules is proposed, with which the block features are matched with each other to locate the categorized characteristic factors; this technique can about advocate the suspected forgery regions. Subsequently, to hit

upon the more correct forgery areas, we endorse the Forgery Region Extraction set of guidelines, wherein the categorised characteristic points are changed with small superpixels as characteristic blocks, and the neighboring characteristic blocks with community colour features which might be much like the function blocks are merged to generate the merged areas. Next, the morphological operation is applied to the merged areas to generate the detected forgery areas. We show the effectiveness of the proposed scheme with a huge massive fashion of experiments. Experimental outcomes show that the proposed scheme can gain an entire lot higher detection results for reproduction-circulate forgery pix underneath numerous difficult situations, collectively with geometric transforms, JPEG compression, and down-sampling, in assessment with the existing cutting-edge replica-pass forgery detection schemes. Future artwork must popularity on making use of the proposed forgery detection scheme based mostly on adaptive over-segmentation and function-detail matching on different forms of forgery, along with splicing or extraordinary styles of media, for example, video and audio.

IV. REFERENCES

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