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Image Acquisition on Unearthing Recaptured Images

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Abstract: As there is a huge growth of technology today we can't say properly that the image shown by someone is the original copy and other is duplicate just by seeing with our naked eyes .To detect such anomalies the technology to use should be also big in detection perspective. DCT coefficients features are proposed and central moments are analyzed to verify for detection. Furthermore, mode based first digit features of DCT coefficients in both luminance component and chrominance component are presented to distinguish the recaptured images from the real-scene images. Finally, these two kinds of features are combined to improve the detection performance.

Keywords: Recaptured image forensics, Color moments, Mode based first digit features.

I. INTRODUCTION

With widespread availability of high quality color ink - jet printers and liquid crystal display (LCD) devices, images can be easily reproduced by recapturing the printed or displayed images with a digital camera and the fine texture pattern sometimes present in recaptured images is detected by computing Local Binary pattern (LBP) features at multiple scales and[1] .We hope that the topic here presented will gives us additional information and scope in future. Moreover, with the development of multimedia technology and digital devices, it is increasingly easier to photograph a high quality image. Due to the facility of capture process, recapture phenomenon becomes popular, which is harmful sometimes. In this paper, an effective recaptured image forensics algorithm through color moments and DCT coefficients features is proposed. Central moments in chromatic space are analyzed to verify the effectiveness in the aspect of detecting recaptured images [2]. The mean, the standard deviation, and the third root of the skewness form the principal features. We projected this method to trace out the image based on some features.

A. Background Work

A set of statistical features were proposed including local binary pattern (LBP) texture feature, multi-scale wavelet statistics measuring the loss of ne details, color features reflecting the color anomalies. These features were used for recaptured image forensics in an image database which was set up with newly controllable settings.

A digital image is produced by one or several image sensors, which, besides various types of light-sensitive cameras, include range sensors, tomography devices, radar, ultra-sonic cameras and the concept of the flow of cycle image acquisition used here presented their such as

- Image
- Acquisition Pre-processing Feature
- Extraction
- Detection & Segmentation
- Decision & Analysis

B. Outline

In this paper unlike the normal methods used to detect the image nature there will be a homogeneous method is defined. As stated in the above paragraph we will follow the sequence for sure but the way of implementation is entirely different.

II. BASIC FEATURES

With the rapid diffusion of inexpensive and easy to use devices that enable the acquisition of visual data, almost everybody has today the possibility of recording, storing, and sharing a large amount of digital images. At the same time, the large availability of image editing software tools makes extremely simple to alter the content of the images, or to create new ones, so that the possibility of tampering and counterfeiting visual content[3] is no more restricted to experts.

Aliasing

Recapture of image is more likely to introduce the property of aliasing. Recaptured images which are still are characterized by these aliasing presences. It is of 3 ways to get blur in recaptured images

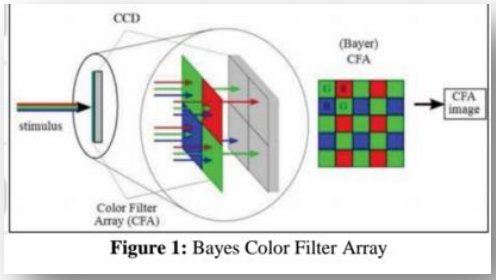

Figure 1: Bayes Color Filter Array

Blurriness

It is of different ways to get blur in recaptured image. One is capturing device is of consisting low resolution capability.

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Other reason is that the attacked image is relatively small in size. We can characterize the blur with PST (Point Spread Function) .To measure PST we will use LSF (Line Spread Function)

Contrast, Color and Illumination Non-Uniformity

A luminance gradient may be noticeable in recaptured images containing large regions that are low in texture or detail. Identification of the luminance gradient would enable recaptured images to be detected.

Contrast and color moments for an image can be computed as a distinguishing feature. Color balance errors in a recaptured image can be minimized by calibrating the display monitor and by presetting the white point of the recapture camera to the LCD monitor white point before recapture.

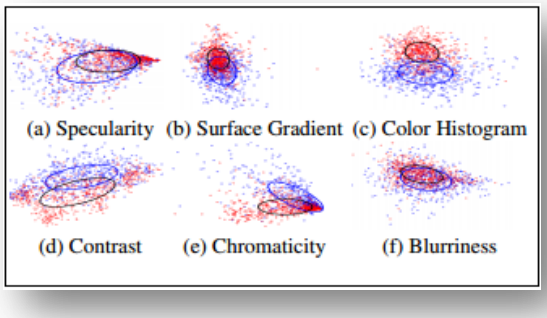


Figure: 2D projection of the physical feature distribution for the real-scene image sets (red) and the recaptured image sets (blue).

III. WORK FLOW

We focus on the detection of recaptured images shown on LCD (liquid crystal display) screen, and propose an effective recaptured images detection algorithm based on color moments and DCT coefficients features. Because of the differences of light and environments, recaptured images exhibit the color diversity. An image is converted from RGB space to HSV space, and then the central moments of chromatic spaces are calculated to form a color moment feature. From the aspect of compression, the recaptured images undergo double JPEG compression. A mode based first digit feature is applied both in luminance component and in chrominance component to generate an effective detection characteristic. The combined feature is constituted to input into a SVM classifier [2], [5].Finally, it will compare with the trained data set for evaluation.

IV. MODULE DESCRIPTION

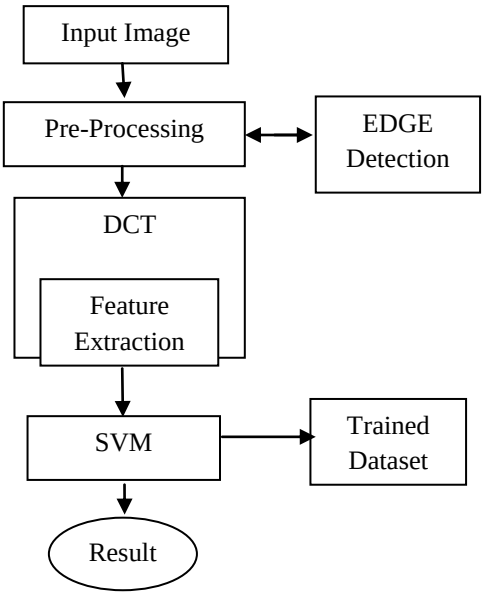
Preprocessing

Pre Processing is an improvement of image data that suppresses unwanted distortions and enhances the image Features.

Canny Edge Detection

The Canny operator was designed to be an optimal edge detector (according to particular criteria --- there are other detectors around that also claim to be optimal with respect to slightly different criteria). It takes as input a gray scale image, and produces as output an image showing the positions of tracked intensity discontinuities [6]. The Canny operator works in a multi-stage process. First of all the image is smoothed by Gaussian convolution. Then a simple 2-D first derivative operator (somewhat like the Roberts Cross) is applied to the smoothed image to highlight regions of the image with high first spatial derivatives.

Edges give rise to ridges in the gradient magnitude image. The algorithm then tracks along the top of these ridges and sets to zero all pixels that are not actually on the ridge top so as to give a thin line in the output, a process known as non-maximal suppression. The tracking process exhibits hysteresis controlled by two thresholds: T1 and T2, with T1 > T2. Tracking can only begin at a point on a ridge higher than T1 [7]. Tracking then continues in both directions out from that point until the height of the ridge falls below T2. This hysteresis helps to ensure that noisy edges are not broken up into multiple edge fragments.



Apply DCT

Discrete cosine transform (DCT) is a powerful transform to extract proper features for face recognition. After applying DCT to the entire face images, some of the coefficients are selected to construct feature vectors. Most of the conventional approaches select coefficients in a zigzag manner or by zonal masking. In some cases, the low-frequency coefficients are discarded in order to compensate illumination variations. Since the discrimination power of all the coefficients is not the same and some of them are discriminant than others, so we can achieve a higher true recognition rate by using discriminant coefficients (DCs) as feature vectors.

Discrimination power analysis (DPA) is a statistical analysis based on the DCT coefficients properties and discrimination concept. It searches for the coefficients which have more power to discriminate different [8].Here we will show how the transformation will takes place in an image.

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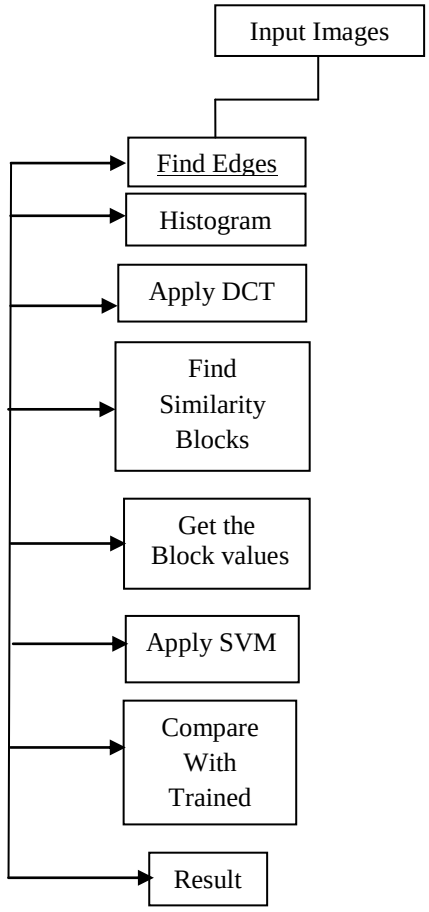

SVM

Support Vector Machines Recently, particular attention has been dedicated to Support Vector Machines as a classification method. SVMs have often been found to provide better classification results that other widely used pattern recognition methods, such as the maximum likelihood and neural network classifiers[9],[10].Thus, SVMs are very attractive for the classification of remotely sensed data. The SVM approach seeks to find the optimal separating hyperplane between classes by focusing on the training cases that are placed at the edge of the class descriptors.

These training cases are called support vectors. Training cases other than support vectors are discarded. This way, not only is an optimal hyperplane fitted, but also less training samples are effectively used; thus high classification accuracy is achieved with small training sets. This feature is very advantageous, especially for remote sensing datasets and more specifically for Object-based Image Analysis, where object samples tend to be less in number than in pixel based approaches [9].After conducting so many experiments we came to know that method may be same for different technologies but thein way of implementation and its uses are changing.

V. RESULTS

Initial step of refinemet process under which it will measures the parameters like height, depth and color patterns.

Fig (A) an image of unknown type

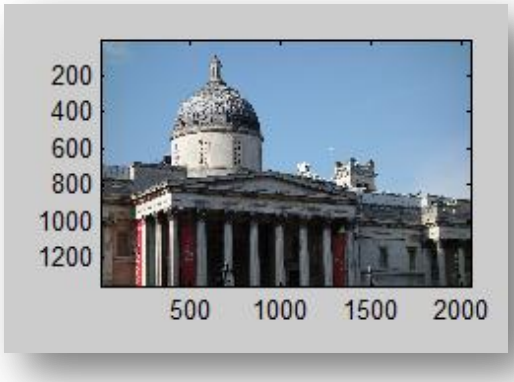

Fig (B) Initial step of refinemet

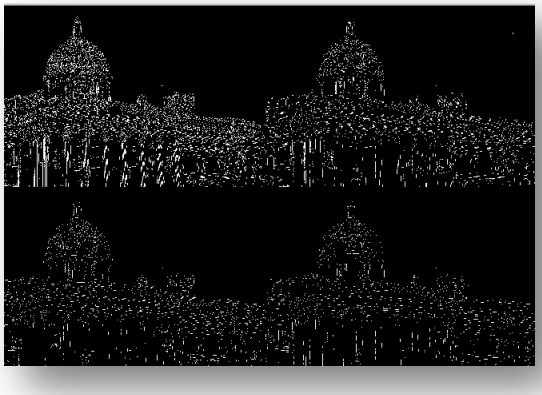

Fig (c) Incomplete Boundaries with four different patterns

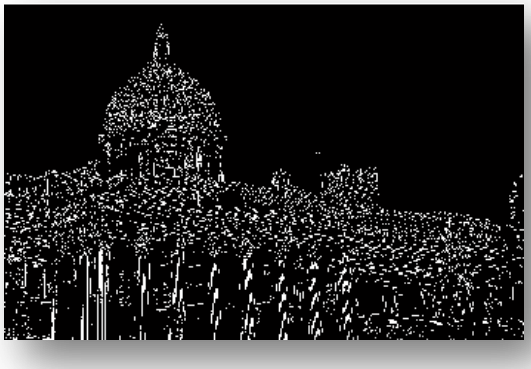

Fig (D) Blurry Edges

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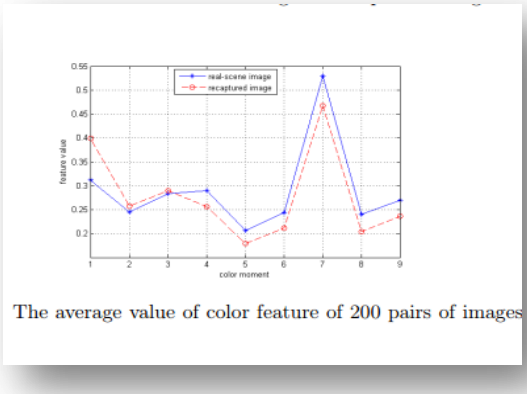
Carefully observe the change over here. There is incrementally high scope of missing edges is detected. So that it indicates the accuracy in tracking the recaptured images among the set of images.

Fig (E) Final Result in Extracting features

From the above picture many of the observers may misunderstand that after a series of transformation the final image appeared is darker than the previous so it is conversed. But according to image transformation in black and white cases reverse will takes place. ie, in black and white or grey scale images we can observe the white color when there is a plane surface and black lines if there is an object or an obstacle between surfaces.
Graph:



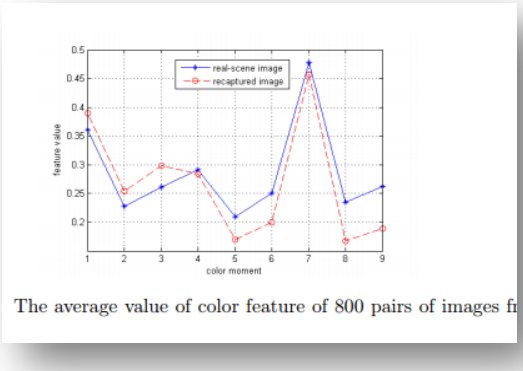


Fig: Graph to show the avg color feature from different data sets

Likewise here the figure shows the border which is like patch an blurry in c and d. Where as in E there is a clear refinement happened to show the quality of an image after completion of edge detection.

VI. CONCLUSION

An effective recaptured image forensics algorithm through color moments and DCT coefficients features is proposed here. By using this it was clearly seen that the images with no possibility of observing whether it is a original or forge were classified on the pattern basis. So this can give us more scope to move more on this area for detecting the images and piracy videos as well in coming future.

ACKNOWLEDGMENT

Here by, we have done an experiment which shows the real scene image and forged image discrimination. We can also provide the high accuracy prediction of image type by using many other methods such as fuzzy logic and sobel edge detection method which are more complex in this case than using canny.

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