International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 09 , September 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

# CLASSIFICATION OF COPY MOVE FOREGERY AND NORMAL IMAGES BY ORB FEATURES AND SVM CLASSIFIER

**Neha Dhiman[1], Dr. Rakesh Kumar[2]**

*[1,2]Deptt of CSE,NITTTR Chd)*

**ABSTRACT**

*In our society digital images are a powerful and widely used communication medium. They have an important impact on communication and IT industry. In past few years, research goes to detecting and classified for copy move forgery images for forensic requirement. So detection is very important challenges for testing in forensic science. In this paper detection and classification by point base and block base features SIFT and ORB use with classification with support vector machine with Gaussian and polynomial kernel .*

***Keywords: SVM,ORB,SIFT,IMAGE***

## I. INTRODUCTION

Image forgerydetection is one kind of passive technique using blind algorithms to perceive hints of tampering in a given image without prior information or security codes. The images can be fashioned by splicing details from itself, which is called Copy-Move images, or from alternate images called spliced images. For Copy-Move images, copied regions in image can be post handled, turned/flipped and scaled before pasting to different spots to hide or expel any information.

**Types of Image forgery**

**a)** **Image Retouching:** This is considered to be less harmful kind of digital image forgery. Image retouching is not significantly change an image but instead enhances or reduces certain features of images. This technique is popular among magazines photo editors.

b) **Image Splicing:** This system is more forceful than modifying. Picture Spicing is a method that includes a composite of at least two pictures which are joined to make a phony picture.

**c)** **Copy-Move Attack:** Copy-Move attack is more like picture grafting in perspective of the way that the two systems change certain picture district with another picture. At the end of the day the wellspring of the altered picture began from a similar picture.

**FORGERY DETECTION**

Forgery detection procedures end up being generously more confounded to deal with the latest forgery strategies. This back to the availability of electronic modifying gadgets, change, and control end up being basic and therefore forgery detection transforms into a baffling and undermining issue. Picture forgery detection can be controlled in various courses with various clear operations like relative changes, for instance, translation, scaling, etc, pay operations, for instance, brightness, tones, separate adjustments, etc, camouflage operation, for instance, fuss extraction, filtering, weight, etc, also, more eccentric operations are moreover possible, for

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

instance, compositing, blending, matting, cropping, photomontage provoking apparently untraceable antiquated rarities in a photo. The modified and legitimate methodology for recognizing the designed pictures has transformed into a noteworthy testing issue for experts and a comparative issue is substantial for every multimedia contents.

**Techniques used for copy-move forgery detection**

The copy move forgery detection (CMFD) can classify into either Key-point-based methods or block based methods as shown in Figure 2.

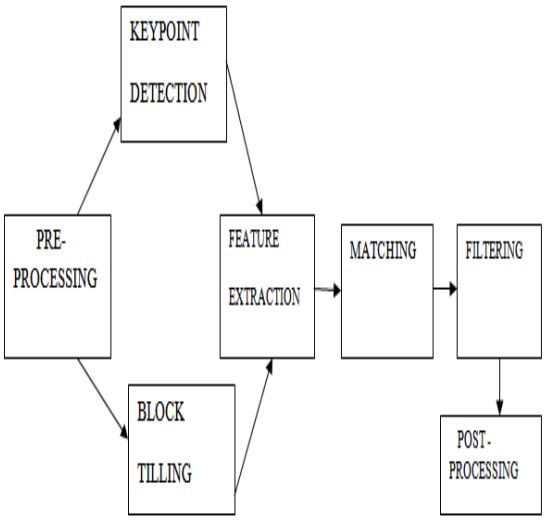


Figure 2 CMFD Classification

## II.LITERATYRE REVIEW

**Jian Li et al [1],** proposed an arrangement to recognize the copy move forgery in a photo, basically by expelling the key concentrations for evaluation. The genuine division to the standard procedures is that the anticipated plot at first segments the test picture into semantically self-governing patches going before key point removal. As a yield, the copy move areas can be perceived by organizing among these patches. The organizing methodology subsists of two stages. In the key sort out, they find the agitated arrangements of patches that may fuse copy move forgery regions, and they by and large acknowledge a relative change lattice. In the second stage, an Expectation-Maximization-based count is planned to refine the acknowledged grid and to exhibit the subsistence of copy move forgery. Trial yields show the colossal presentation of the organized arrangement by methods for differentiating it and the best in class schemes on individuals by and large databases.

**Cheng-Shian Lin et al [2],**have used a skilled arrangement for perceiving copy move forgery modifying ambushes. The copy move forgery ambush is described as a region of a photo is supplanted by a copy of other region in a comparable picture. This detection is significant for threatening changing a photo. The predicted plot develops before cluster reinforcing piece intend to gathering by mean and change for diminishing the calculation time. Trial yields exhibit that the normal arrangement needs less estimation times. In spite of the way that the overhead of pre-dealing with is a further load that takes additional time than earlier cluster developing square

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

arrangement, however the total computation time is so far made no under 10% differentiating and earlier examination. Also, the using of square contrast diminishes the false positive rate.

**Harpreetkaur et al [3],** have used two copy-move image forgery detection techniques namely 'SURF' and 'PCA combined with SIFT' have been implemented using MATLAB platform. It has also been practical that the recognition correctness of 'PCA combined with SIFT' techniques is superior to 'SURF' and 'DWT combined with SIFT' techniques. On the other hand, this technique is unable to detect image forgery in flat region significantly.

**Hashmi et al [4],**have utilized a vector with seven parts to clarify the character of every little obstructs, a 9-dimensional vector is likewise acquainted in with resolve the issue with a settled point turn on the duplicated locales. Parts of this vector are figured in view of the powers from four equivalent measured sub-obstructs on each piece. The principal constituent is the normal force, the following four components are proportions of normal powers and the last four components are contrasts of normal powers. A radix sort calculation is connected to perform lexicographical arranging on this vector sand a forgery control is moreover detected. The alternation with fixed angle can be detected but not with arbitrary angles by this method.

**HieuCuong et al [5]**arranged Radon transformation to advance the characters and utilize stage connection to recognize the sets of coordinating vectors. The foreseen method is first rate for the manufactured pictures which the turn point of the replicated area is under 4o, has Gaussian commotion encourage with a SNR more prominent than 35dB and littler square size 8x8 pixels.

**PreetiYadav et al [6]**presented a created calculation by applying DWT into a picture to diminished the estimation showing. The character vectors will be extricated from the little covering pieces of the consolidated picture and arranged lexicographically to discover the copied squares. The acknowledgment was done on the most reduced level picture portrayal and furthermore demonstrated best appearance on little size duplicate move forgery, distinguished the various Copy-Move forgery with bring down computational many-sided quality

**Fredrich, et al [7],** proposed a technique to identify copy move forgery. Discrete Cosine Transform (DCT) of the picture pieces was utilized and their lexicographical arranging was considered to stay away from the computational weight. Once arranged, the nearby indistinguishable match of pieces is thought to be duplicate moved squares. A downside of this technique is that it can't distinguish small duplicate regions.

**Cao et al [8],** display region duplication detection algorithm which depends upon upgraded DCT and shows low computational unconventionality. The critical differentiation between this system and the other DCT-based methodologies is that here the quantized piece is requested by a circle square. The circle square is then isolated into a settled number of parts, for which the character vectors are enrolled. Euclidean detachment among neighboring sets is processed after lexicographic orchestrating of vectors. The genuine division between the equivalent vectors is moreover considered before the last approach duplication is made. This procedure is fit for recognizing various region duplications and is moreover fiery against darkening and included substance fuss anyway it has poor execution with poor picture quality. It is not overwhelming to geometrical operation either.

**Bayram, et al [9],**guided an examination to perceive copy move forgery by using Fourier-Mellin Transform (FMT). They pick FMT in light of the fact that it is solid to lossy JPEG weight, darkening, uproar, scaling and elucidation impacts associated as post-taking care of. At the beginning, the photo is isolated into a couple of

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

little assessed squares and the Fourier Transform of each piece is processed. In this manner, they ensured that change is translation invariant. By then the resulting degree regards are re-tried, expected and quantized into logpolar headings to get feature vectors. These segment vectors made swing invariant to little upheaval edges. By then they are facilitated to find similar part vectors by using either lexicographic orchestrating or counting bloom channels. In reality, even a trademark picture may have a couple of practically identical pieces. Along these lines, fabricating is affirmed exactly when there are a certain number of related obstructs inside a comparable partition. This methodology lessens false positives making the strategy more capable. This strategy could distinguish frauds including impedes upheavals of to 10 degrees and a scaling of 10%. Their computation is furthermore intense to JPEG compression.

**Shao et al [10],**directed an investigation to recognize copy move forgery by utilizing Fourier-Mellin Transform (FMT). They pick FMT in light of the fact that it is vigorous to lossy JPEG pressure, obscuring, clamor, scaling and interpretation impacts connected as post-preparing. Toward the starting, the picture is separated into a few little measured squares and the Fourier Transform of each piece is computed. Thusly, they guaranteed that change is interpretation proposed a calculation which is computationally an unpredictable copy - move forgery detection calculation. These calculation wards on roundabout window extension and stage relationship. The picture is filtered by a round window which is then stretched out into a standardized rectangular piece utilizing bi-straight introduction. Discrete Fourier Transform (DFT) is figured for these extended squares to acquire the stage connection lattice. Improved pinnacle esteems mirror the likeness in locales. A band restriction method is connected to the DFT keeping in mind the end goal to expel the high recurrence segments as they don't make any helpful contribution towards the calculation of pinnacle esteems. This strategy likewise distinguishes replicated turned - moved districts in the picture. This strategy ends up being precise in forgery detection even after the manufactured area has experienced shift, obscuring, JPEG compression, and variety in luminance. The disadvantages of this strategy are spoken to in the way that it is not computationally quick and is additionally not scale invariant.

## III PROPOSED METHODOLOGY

**Support vector** machines in the machine learning, essentially are managed learning models in light of related learning calculations which investigates data used for relapse and order examination. A training set illustrations is given, denoted each as has a place with either classifications, a model is worked by a SVM training calculation in which new cases are alloted either for one of the classifications making it paired non-probabilistic linear classifier. An illustration portrayal of a SVM demonstrate as focuses (in space), mapped in a way that different classes cases are separated with a reasonable hole which can be wide as could be expected under the circumstances. What's more, in that comparative space, mapping another case and a forecast is made to which classification it has a place in view of the hole side they fall in. The calculation of the SVM classifier:Sufficient little esteem is deciding for yields the classifier for linear data that is linearly classifiable.

In this forgery detection strategy in which the info picture was partitioned into over-lapping rectangular squares, from which the quantized Discrete Cosine Transform (DCT) coefficients of the pieces were coordinated to discover the altered locales. A connected Principal Component Analysis (PCA) to diminish the element

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

measurements. In Used the RGB shading segments and bearing data as piece highlights. In Used Discrete Wavelet Transform (DWT) and Singular Value Decomposition (SVD) to extricate the picture highlights. In existing frameworks they have a few constraints, despite the fact that these plans are successful in phony identification.Step1: Input the different types of images.

Step2: Extract different type of features.

Step3: normalize the features by scaling method.

Step4: Matching using ORB features (Oriented FAST & Rotated BRIEF).

Step5: Classification by reducing the false positive error.

Step6: Post processing by analysis precision, recall, accuracy.

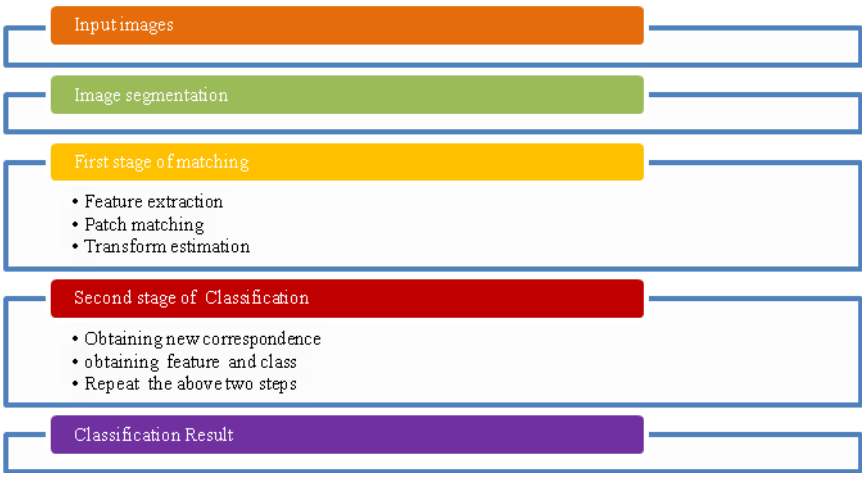


**Fig. 2 Flow chart of Methodology**

**Step1 :** Pre-processing: If the input image "C" is a colored image, convert it into a gray scale image using the standard formula. Where R, G, and B are red channel, green channel and blue channel of

**Step2:** Overlapping block pixel into a matrix: A "b × b" block is glided over the resulting image "LLL"and the image is scanned from the upper left corner to the lower right corner. The PCA coefficients are stored as one row in the matrix "A". The matrix will have (M-b+1) × (N–b+1) rows and b × b columns, Where "M" and "N" represent the number of rows and columns of input image respectively. The matrix "B" is formed in the same way as "A" with two additional columns for storing top-left co-ordinates. The block size, b, was set dynamically based on image size. The value of block size is doubled in the next level of PCA and this process of block value continues until final image (highest resolution) is reached for final detection.

**Step3:** Low Contrast Elimination: Calculate the contrast for each block in "A", then ignore blocks where contrast is the least, i.e. the contrast is less than the specified threshold.

**Step4:** Phase correlation: Calculate the phase correlation for the block corresponding to the current row "i" with the blocks corresponding to "p" rows above and below the current row. If the calculated maximum phase correlation value exceeds a preset threshold value "t", then store the top left coordinates of the corresponding reference block and the matching block from "B" matrix in a new row of a new matrix. The resulting candidate block is progressed to the next phase "Comparison of Reference and Match blocks":

International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 09 , September 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

**Step5:** Extract ORB and SURF features: Extract the key point feature based on orientation and capacity of neighbor points , these feature find out pattern in images.

**Step6:**Classifier : Use the SVM classifier with EM and RBF kernel model and test the model with analysis of recision, recall, accuracy.

## IV RESULTS

**Table 1 Comparison of Accuracy with different classifier**

| Classifier | Accuracy |
|---|---|
| 1. Exsvmroc1.m | 0.8896 |
| 2. Exsvmroc2.m | error |
| 3. Exsvmroc11.m | 0.6153 |
| 4. Exsvmroc22.m | 0.8896 |
| 5. Exsvmroc33.m | 0.6012 |
| 6. Exsvmrocsift.m | 0.6201 |
| 7. Exsvmrocsift2.m | 0.6101 |

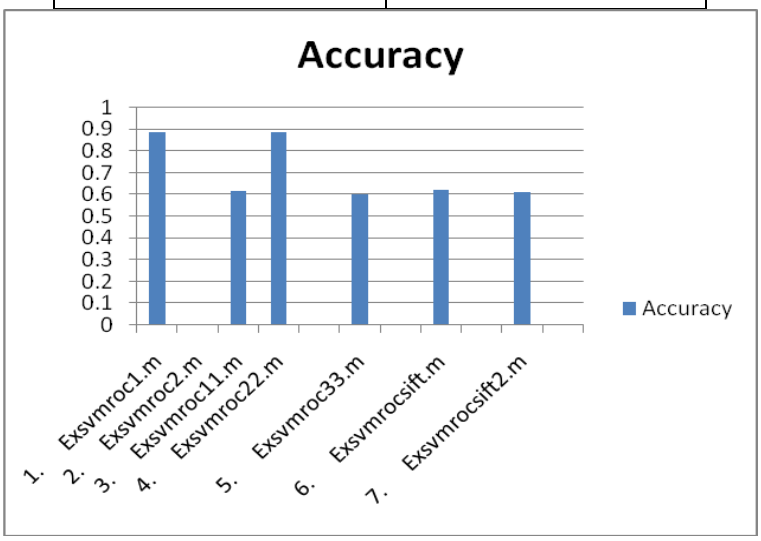


**Fig3 Graph of Accuracy Comparison**

International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 09 , September 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

**Table 2 Comparison of Precision with different classifier**

| Classifier | Precision |
|---|---|
| 1. Exsvmroc1.m | 0.8917 |
| 2. Exsvmroc2.m | error |
| 3. Exsvmroc11.m | 0.6153 |
| 4. Exsvmroc22.m | 0.8917 |
| 5. Exsvmroc33.m | 0.4631 |
| 6. Exsvmrocsift.m | 0.4747 |
| 7. Exsvmrocsift2.m | 0.4689 |

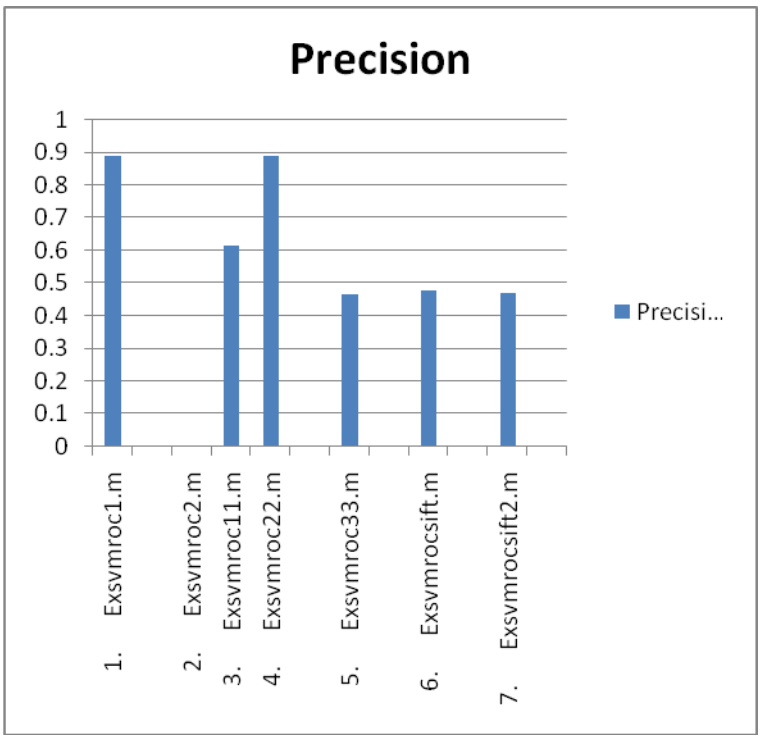


**Fig 4 Graph of Precision Comparison**

International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 09 , September 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

**Table 3 Comparison of recall with different classifier**

| Classifier | Recall |
|---|---|
| 1. Exsvmroc1.m | 0.8880 |
| 2. Exsvmroc2.m | error |
| 3. Exsvmroc11.m | 0.4703 |
| 4. Exsvmroc22.m | 0.8880 |
| 5. Exsvmroc33.m | 0.4621 |
| 6. Exsvmrocsift.m | 0.4737 |
| 7. Exsvmrocsift2.m | 0.4678 |

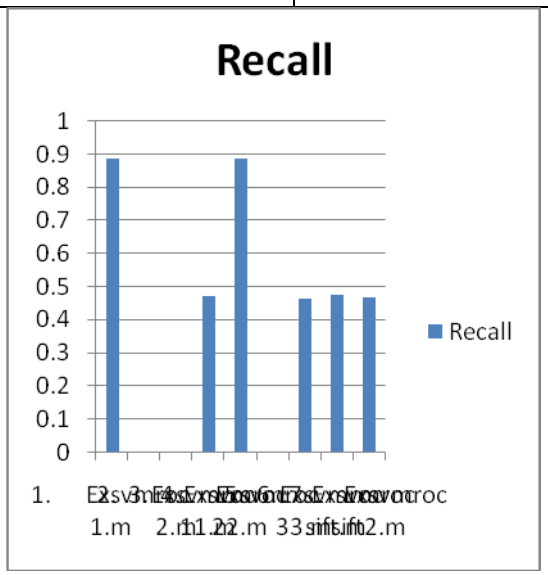


**Fig 5 Graph of Recall Comparison**

**Table 4 Comparison of Accuracy, Precision, Recall**

| Classifier | Accuracy | Precision | ecall |
|---|---|---|---|
| 1. Exsvmroc1.m | 0.8896 | 0.8917 | 0.8880 |
| 2. Exsvmroc2.m | error | error | error |
| 3. Exsvmroc11.m | 0.6153 | 0.6153 | 0.4703 |
| 4. Exsvmroc22.m | 0.8896 | 0.8917 | 0.8880 |
| 5. Exsvmroc33.m | 0.6012 | 0.4631 | 0.4621 |
| 6. Exsvmrocsift.m | 0.6201 | 0.4747 | 0.4737 |
| 7. Exsvmrocsift2.m | 0.6101 | 0.4689 | 0.4678 |

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

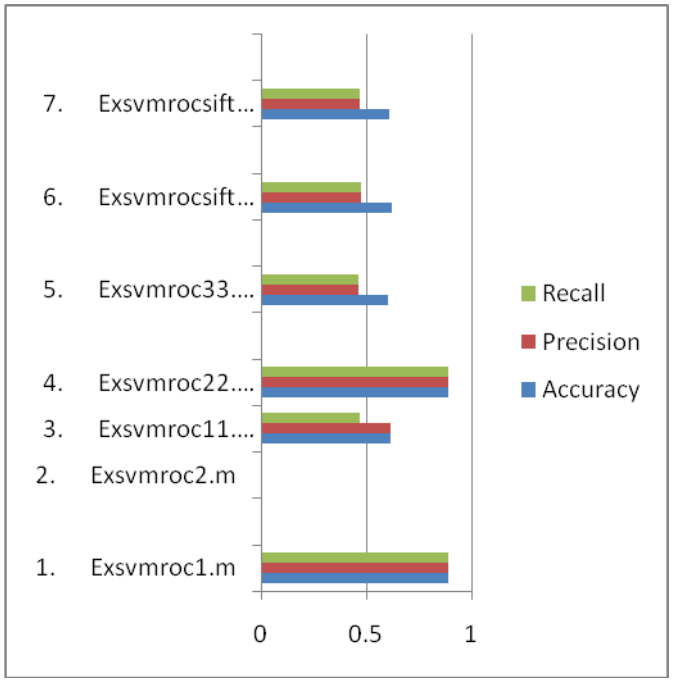


**Fig 6 Comparison graph of Accuracy, Precision, Recall**

## V. CONCLUSION AND FUTURE SCOPE

Copy-move forgery is a very common way to tamper an image. Many researchers have proposed various schemes to detect the tampered images. Sometimes the copied regions are rotated or flipped before being pasted. In this paper. In this paper propose Detection and classification method by machine learning and optimization method. In our experiment detection and classification with sift aco and SVM Gaussian and polynomial kernel.SIFT and ORB with polynomial kernel show significance high accuracy, precision and recall.

## REFERENCES

[1.] Jian Li., Xiaolong Li., Bin Yang, and Xingming Sun, (2015), "Segmentation-Based Image Copy- Move forgery Detection Scheme", IEEE Transactions on Information Forensics And Security ,10(3), pp. 507-518.

[2.] Cheng-Shian Lin, Chien-Chang Chen, Yi-Cheng Chang, (2015), "An Efficient Enhanced Cluster Expanding Block Algorithm For Copy-Move Forgery Detection", International Conference on Intelligent Networking and Collaborative System, pp. 228-231.

[3.] HarpreetKaur, JoytiSaxena and Sukhjinder Singh, (2015), "Key-point based Copy-Move Forgery Detection and their Hybrid" Journal of the International Association of Advanced Technology and Science, 16(2), pp. 1-7.

[4.] Hashmi M. F., Hambrade A. R. and Keskar A.G., (2013), "Copy Move Forgery Detection using DWT and SIFT Features", IEEE 13th International Conference on Intelligent Systems Design and Applications (ISDA), pp. 188-193.

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

[5.] HieuCuong Nguyen and Stefan Katzenbeisser, (2012), "Detection of Copy-Move forgery in digital images using Radon transformation and phase correlation", IEEE 18th International Conference on Intelligent Information Hiding and Multimedia Signal Processing, Piraeu, pp. 418-449.

[6.] PreetiYadav, YogeshRathore, AartiYadav," DWT Based CopyMove Image Forgery Detection", International Journal of Advanced Research in Computer Science an Electronics Engineering Volume 1, Issue 5, July 2012

[7.] Fridrich, et al., Detection of Copy-move Forgery in Digital Images, 2003.

[8.] Cao, Y. Gao, T. Fan, L. Yang, Q. (2012), A Robust Detection Algorithm For Copy-Move Forgery in Digital Images, Forensic Science International, vol. 214, No. 1–3,pp. 33–43.

[9.] Bayram, S. Sencar, T. Memon, N. (2009), An Efficient And Robust Method For Detecting Copy-Move Forgery," in Proceeding of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP '09), pp. 1053–1056, Taipei, Taiwan.

[10.] Li Jing, and Chao Shao," Image Copy-Move Forgery Detecting Based on Local Invariant Feature Journal Of Multimedia,Vol.7,No.1, February 2012.