Novel approach of copy moves forgery detection by SIFT features optimize by Swarm intelligence

[1]Jenia Bajaj,[2]Mr.abhinash single
[1,2]Bhai gurdas institute of Engg.and tech,sangrur
[1]jeniarajatkukreja@gmail.com

Abstract-In our society digital images are a powerful and widely used communication medium. They have an important impact on communication and IT industry. the proposed versatile over division calculation sections the host picture into no overlapping and sporadic blocks adaptively. Then, the element focuses are removed from each block as block elements, and the block components are coordinated with each other to find the named highlight focuses; this technique can around show the presumed forgery districts. 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 SURF Respectively but use hybrid approach of rtificial bee colony with grey wolf optimization (ABC_GWO) in matching and feature selection phases ,in case of SIFT features and proposed SIFT with ABC_GWO features which also use in classification with support vector machine with Gaussian and polynomial kernel.

Keywords-*forgery image ;optimization ;gwo.*

I. INTRODUCTION

In this era due to presence of low-cost and high-resolution digital cameras, there is wide amount of digital images all over the world. Digital images play a very important role in areas like forensic investigation, insurance processing, surveillance systems, intelligence services, medical imaging and journalism. But the basic requirement to believe what we see is that the images should be authentic [1]. With the availability of powerful image processing software's like Adobe Photoshop it is very easy to manipulate, alter or modify a digital image. Any image manipulation can become a forgery, if it changes semantic of original image [2]. There can be many reasons for a forgery to be occurred by a forger like: To cover objects in an image in order to either produce false proof, to make the image more pleasant for appearance, to hide something in image, to emphasize particular objects etc.

The digital image forensics can be broadly classified into three branches as Image source identification, Computer generated image identification and Image forgery detection. The image forgery detection techniques can again be classified into many categories like, geometry based technique, format based technique, camera based technique, physics based technique and pixel based technique. Many tools are available for doing the copy move in Photoshop, proliferation digital cameras, digital signatures, watermarking etc. Copied areas are usually textured regions. Thus it is very much important to have a detection system that automatically identifies the copied move forgery areas, because it may hide some important details and can even change the contents of the image [3].

II. LITERATURE REVIEW

Yang, F., et al. introduced a copy move forgery detection method by using the hybrid features. Matching algorithm is used to find the best features from the all features. False matches of the features are filtered out by using the segmentation process. This process finds the duplicated regions in the image. This method performs better than existing methods and approaches in duplicate region detection [1]. Zhong, J., Gan, et al. proposed the block based method for forgery detection under the image geometric transforms. In this work pre-processing of the image then divides the forged image into overlapped circular blocks. Discrete radial harmonic Fourier function is used to extract the inner and local feature from the image. Nearest neighbour method is used to found the similar feature vectors. Isolated features are removed by using Morphological operation [2].

Beste Ustubioglu et al. proposed a method to calculate threshold automatically. Threshold is value that is used to compare similarity between feature vectors. Authors utilize DCT-phase terms to restrict the range of the feature vector elements' and Benford's generalized law to determine the compression history of the image under test. The method uses element-by-element equality between the feature vectors instead of Euclidean distance or cross correlation and utilizes compression history to determine the threshold value for the current test image automatically. Experimental results show that the method can detect the copied and pasted regions under different scenarios and gives higher accuracy ratios/lower false negative compared to similar works [3].

One of the problems in image forensics is to check the authenticity of image. This can be very important task when images are used as evidence which cause change in judgment like, for example in a court of law. In this author has done a survey on different Key point based copy-move forgery

detection methods with different parameters [4]. M. Buvana Ranjani et al proposed an image copy move forgery detection with new techniques DCT (Discrete Cosine Transform Techniques) and IDCT (Inverse Discrete Cosine Transform Techniques by Row and Column Reduction method). The new method reduces the computational complexity related to time, cost and parallel increase the efficiency of the image. Initially the original image is divided into matrices such as rows and columns. Then DCT is applied to each row and columns with the help of row reduction and column reduction techniques. Then it is transformed into various blocks with various dimensions. Finally the duplicated image gets sorted out with its threshold value [5].

Feature processing depends on the method used for detection. In case of Block based method there are a number of features like blur, HU, Zernike, Principle Component Analysis, Kernel Principle Component Analysis, etc. which are classified under categories like Moments based , Intensity based, frequency based etc. In case of Key point based method we have lesser features. SIFT and SURF are used mainly to extract local features of images [8]. Alkawaz, M. H., et al. This paper proposed the forgery detection method using discrete cosine transform. DCT is used to identify the tampered region from the image. In this work the image is converted first RGB to grey scale and then divide the image into block. Zig-Zag scanning is used for every block to calculate the feature vector. These feature vectors are sot by using lexicographic sort. Duplicated block are identified by using Euclidean distance method. The performance evaluation of the proposed method is done on the basis of parameters like storage, accuracy and threshold [10].

Bi, X., Pun, et al. proposed Multi-level Dense Descriptor method for extraction and feature matching method for forgery detection in the images. This method detects the feature descriptor using multiple levels. Dense descriptor extracts by using color descriptor and Invariant moment descriptor. This method detects the similar features on the basis of textures. Morphological operations are applied to detect the forgery. This method performs better than existing methods and approaches in duplicate region detection **[11]**. Convolution neural network is used to detect the forgery in the images. In this method weights are assigned at first layer of network and high pass filter is used to calculate residual maps. Dense features are extracted by using CNN as patch descriptor on images. In SVM classification discriminative features are used. This method performs better than existing methods and approaches in duplicate region detection **[12]**.

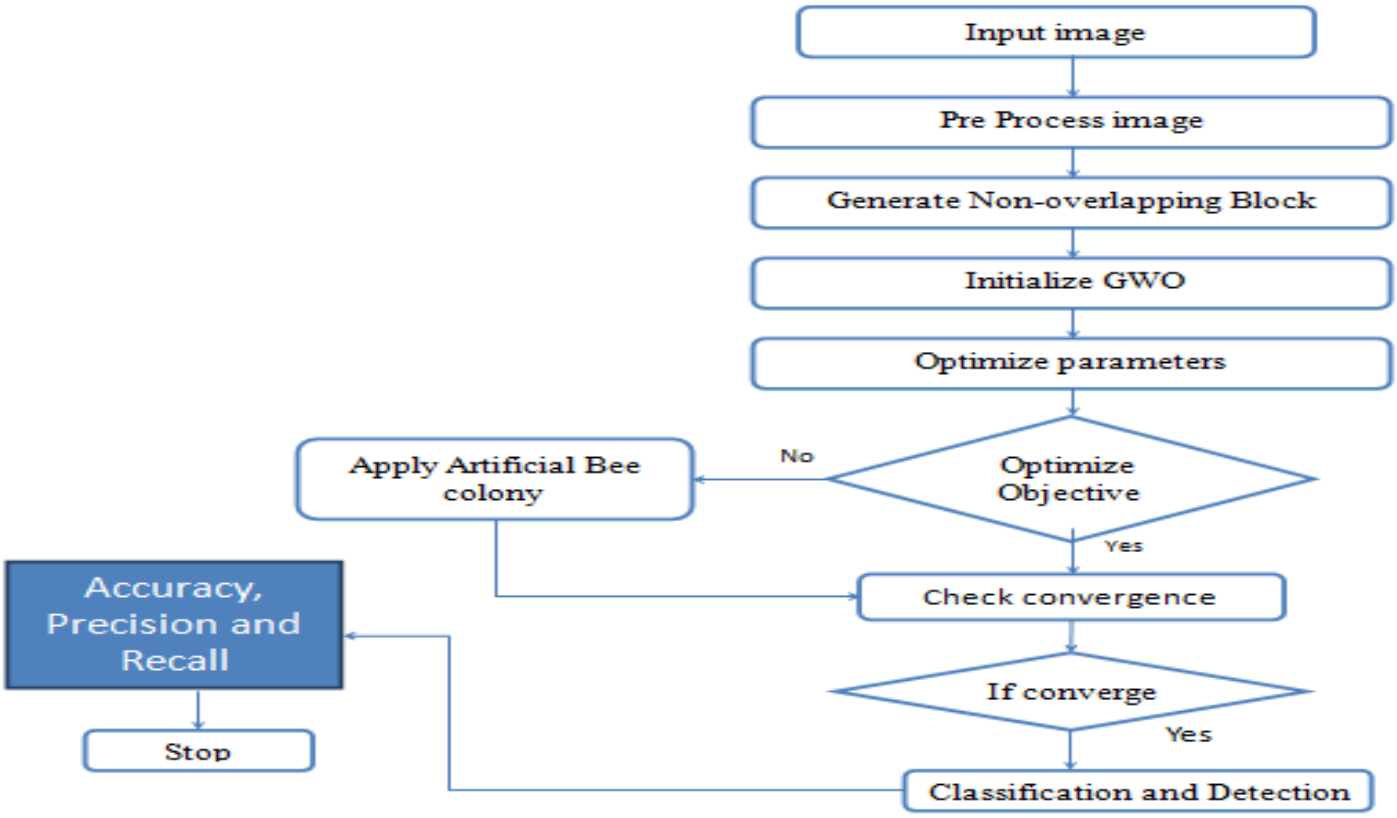
III. PROPOSED METHODOLOGY

In this design methodology firstly image is converted into overlapping blocks after converting into grey scale, then features are extracted using Grey wolf Optimization, then matching will be performed using Artificial Bee colony and at last forged regions are marked. Steps are as following:

A. Take a colored forged image as input.
B. Convert image into Grey Scale.
C. Divide grayscale image into overlapping blocks.
D. Store these blocks into a metrics.
E. Extract feature vectors using Grey wolf Optimization.
F. Match similar feature vectors using Artificial Bee colony.
G. Initialize ants.
H. Evaluate results and update Wolf values.
I. Check if exit criteria met.
J. If yes give final detected forged regions, else initialize new BEES.

IV. RESULTS AND DISCUSSION

In this section of the paper the result evaluation is performed on the basis of the different parameters that are Precision, Recall, and accuracy. The Graphs show the variation in these parameters according to the methods. The comparative graph shows that the proposed method is effective and efficient.Figure 1.1 depicts the precision of the four classifiers that are SIFT with ACO (polynomial), surf (Gaussian), SIFT with GWO_ABC (Gaussian) and surf (polynomial). The graph show the maximum precision is on SIFT with GWO_ABC (Gaussian) classifier and minimum is on surf (Gaussian).Figure 1.2 depicts the accuracy of the four classifiers that are SIFT with ACO (polynomial), surf (Gaussian), SIFT with GWO_ABC (Gaussian) and surf (polynomial). SIFT with GWO_ABC (Gaussian) shows the maximum accuracy classifier and minimum is on surf (Gaussian).Figure 1.3 depicts the recall of the four classifiers that are SIFT with PSO (polynomial), surf (Gaussian), SIFT with GWO_ABC (Gaussian) surf (polynomial). SIFT with ACO (Gaussian) shows the maximum recall classifier and minimum is on surf (Gaussian).



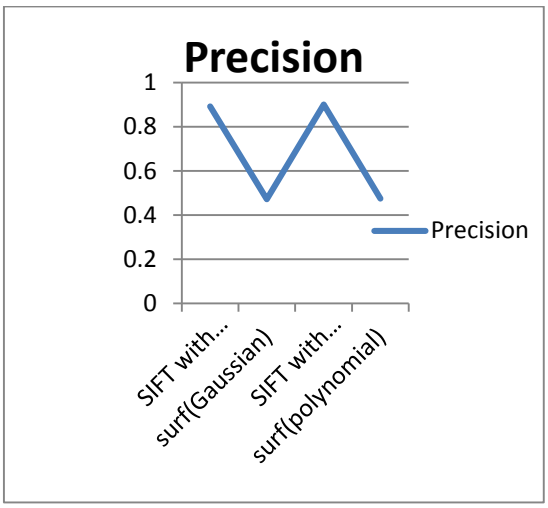


Fig 1.1 :Graph showing the precision for different classifiers

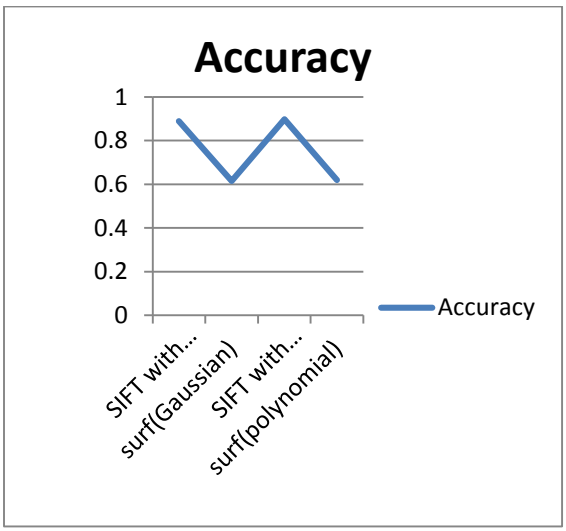


Fig 1.2 :Graph showing the accuracy value for different classifiers

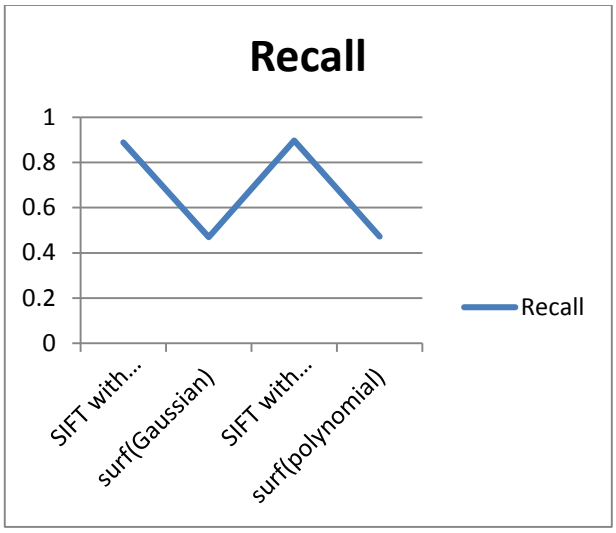


Fig 1.3 :Graph showing the Recall value for different classifiers

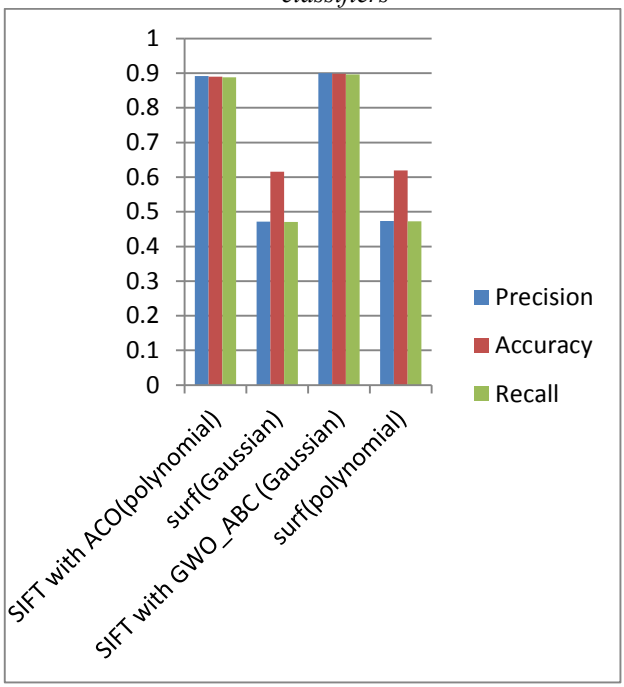


Fig 1.4: Graph showing the comparison of all the parameters

Figure 1.4 depicts the precision of the four classifiers that are SIFT with ACO (polynomial), surf (Gaussian), SIFT with GWO_ABC (Gaussian) surf (polynomial). This figure shows the comparison of Precision, recall and accuracy on the different classifiers. The overall good result of the SIFT with GWO_ABC (Gaussian) Classifier.

V. CONCLUSION

In present versatile over division calculation sections the host picture into no overlapping and sporadic blocks adaptively. Then, the element focuses are removed from each block as block elements, and the block components are coordinated with each other to find the named highlight focuses; this technique show the presumed forgery blocks in the images. In past few years, 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 thesis, detection and classification methods are done by using the machine learning with optimization method. In the present work forgery detection and classification is done by using SIFT with ACO and SIFT GWO_ABC with SVM Gaussian and polynomial kernel but GWO_ABC show significance high accuracy, precision and recall in case of classification

REFERENCES

[1] Yang, F., Li, J., Lu, W., & Weng, J. (2017). Copy-move forgery detection based on hybrid features. *Engineering Applications of Artificial Intelligence*, *59*, 73-83.

[2] Zhong, J., Gan, Y., Young, J., Huang, L., & Lin, P. (2017). A new block-based method for copy move forgery detection under image geometric transforms. *Multimedia Tools and Applications*, *76*(13), 14887-14903.

[3] Kashyap, A., Agarwal, M., & Gupta, H. (2017). Detection of Copy-move Image forgery using SVD and Cuckoo Search Algorithm. *arXiv preprint arXiv:1704.00631*.

[4] Kashyap, A., Agarwal, M., & Gupta, H. (2017). Detection of Copy-move Image forgery using SVD and Cuckoo Search Algorithm. *arXiv preprint arXiv:1704.00631*.

[5] Beste Ustubioglu, Guzin Ulutas , Mustafa Ulutas, Vasif V. Nabiyev," A new copy move forgery detection technique with automatic threshold determination", Elsevier – International Journal of Electronics and Communications Volume 70, Issue 8, August 2016, pp. 1076– 1087

[6] Devanshi Chauhana, Dipali Kasatb, Sanjeev Jainc, Vilas Thakared, "Survey On Keypoint Based Copy-move Forgery Detection MethodsOn Image", Elsevier - International Conference on Computational Modeling and Security (CMS 2016), pp. 206 – 212.

[7] M. Buvana Ranjani, R. Poovendran, "Image Duplication Copy Move Forgery Detection Using Discrete Cosine Transforms Method", International Journal of Applied Engineering Research ISSN 0973-4562, Volume 11, Number 4 , 2016, pp. 2671-2674.

[8] M. Duran Toksari, "A hybrid algorithm of Ant Colony Optimization (ACO) and Iterated LocalSearch (ILS) for estimating electricity domestic consumption: Case ofTurkey", Elsevier- "Electrical Power and Energy Systems", 2016 pp. 776–782.

[9] Manu, V. T., and Babu M. Mehtre. "Detection of copy-move forgery in images using segmentation and SURF." *Advances in Signal Processing and Intelligent Recognition Systems*. Springer, Cham, 2016. 645-654.

[10] Alkawaz, M. H., Sulong, G., Saba, T., & Rehman, A. (2016). Detection of copy-move image forgery based on discrete cosine transform. *Neural Computing and Applications*, 1-10.

[11] Bi, X., Pun, C. M., & Yuan, X. C. (2016). Multi-level dense descriptor and hierarchical feature matching for copy–move forgery detection. *Information Sciences*, *345*, 226-242.

[12] Ranjani, M. B., & Poovendran, R. (2016). Image Duplication Copy Move Forgery Detection Using Discrete Cosine Transforms Method. *International Journal of Applied Engineering Research*, *11*(4), 2671-2674.