



# INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume3, Issue4)

Available online at [www.ijariit.com](http://www.ijariit.com)

## An optimization technique to detect the forgery in digital images by using ANT colony optimization

**Neha Jain**

Maharaja Agersen University, Baddi  
[neha031jain@gmail.com](mailto:neha031jain@gmail.com)

**Er. Sushil Bansal**

Maharaja Agersen University, Baddi  
[sk93recj@gmail.com](mailto:sk93recj@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 the 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 ant colony optimization in matching and feature selection phases, in case of SIFT features and proposed SIFT with ACO features which also use in classification with support vector machine with Gaussian and polynomial kernel

**Keywords:** ACO, SIFT, Image Enhancing, Image Forgery, Image Splicing.

### I. INTRODUCTION

In this time because of the nearness of low-cost and high-resolution digital cameras, there is a wide measure of digital pictures everywhere throughout the world. Digital pictures assume a critical part in regions like measurable examination, protection handling, reconnaissance frameworks, insight administrations, medical imaging and news coverage. In any case, the fundamental prerequisite to accepting what we see is that the pictures ought to be genuine. With the accessibility of capable picture handling programming resembles Adobe Photoshop it is anything but difficult to control, adjust or alter a digital picture. Any picture control can turn into a forgery, on the off chance that it changes semantic of the unique picture. There can be many explanations behind a forgery to be happened by a falsifier like To cover questions in a picture so as to either create false evidence, to make the picture more lovely for appearance, to conceal something in the picture, to underscore specific items and so forth.

Sorts of Digital Image Forgery

There are numerous approaches to ordering the digital image forgery, however, principle classes of Digital Image Forgery are Enhancing, Retouching, Splicing, Morphing and Copy/Move [3]. Taking after is a brief depiction of various sorts of digital image forgery:

#### 1. Image Enhancing

Image enhancing includes enhancing an image with the assistance of Photoshop, for example, immersion, obscure and tone and so on. These upgrades don't influence image significance or appearance. However, by one means or another impacts the understanding of an image [5]. Enhancing includes changing the shade of articles, changing the time of day in which the image seems to have been taken, changing the climate conditions, Blurring out items.

#### 2. Image Retouching

It is fundamentally used to diminish certain element of an image and improves the image quality to catch the peruser's consideration. In this strategy, image editors change the foundation, fill some alluring hues, and work with tint immersion for conditioning [5].

#### 3. Image Splicing

In image splicing, distinctive components from various images are stuck into a solitary image. Finally, one image is gotten from the substance of various images.

#### **4. Image Morphing**

Image morphing is characterized as a digital method that slowly changes one image into another. Changes are finished utilizing smooth move between two images.

#### **5. Copy-Move**

In copy-move forgery, one district is duplicated from a picture and glued onto another locale of a similar picture. In this way, source and the goal both are same [3, 5]. Copy Move includes copying locales of the first picture and gluing into different regions.

##### **Copy-Move Forgery Attack:**

Copy-Move is a kind of forgery in which a piece of the picture is replicated and afterward glued on to another segment of a similar picture. The fundamental expectation of Copy-Move Forgery is to conceal some data from the first picture. Since the duplicated territory has a place with a similar picture, the properties of replicated region like the shading palette, commotion parts, dynamic range and alternate properties too will be perfect with whatever is left of the picture [3, 2]. Thus, the human eye more often than not has substantially more inconvenience recognizing copy-move falsifications.

Additionally, counterfeiter may have utilized some kind of corrector resample devices to the replicated zone so as it turns out to be significantly more hard to recognize copy-moved forgery. Retouching includes packing the replicated region, adding the clamor to the duplicated territory and so forth and re-examining may incorporate scaling or turning the picture.

## **II. LITERATURE REVIEW**

**Beste Ustubioglu et.al. [6]** In this paper authors proposed a method to calculate threshold automatically. The threshold is a value that is used to compare the 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.

**Bolun Chen et.al. [7]** In this paper, creators display a feature selection calculation in view of subterranean insect settlement improvement (ACO). Feature selection is an imperative errand which can altogether influence the execution of image classification and recognition. The calculation uses the classification execution and feature set size into the heuristic guidance and chooses a feature set with little size and high classification accuracy. Proposed calculation can get higher handling speed and also better classification accuracy utilizing a littler feature set than other existing techniques.

**M. Buvana Ranjani et.al. [8]** In this paper creators proposed a picture duplicate move imitation discovery with another technique DCT (Discrete Cosine Transform Techniques) and IDCT (Inverse Discrete Cosine Transform Techniques by Row and Column Reduction method). The new method decreases the computational complexity identified with time, cost and parallel increment the proficiency of the picture. At first, the first picture is isolated into grids, for example, rows and columns. At that point, DCT is connected to each row and columns with the assistance of row reduction and column reduction techniques. At that point, it is transformed into different pieces with different measurements. At last the copied picture gets dealt with its limit esteem.

**Shi Wenchang et.al. [9]** In this paper writers proposed a strategy to execute Copy-Move Forgery Detection with Particle Swarm Optimization. CMFD-PSO incorporates the Particle Swarm Optimization (PSO) calculation into the SIFT-based structure. It uses the PSO calculation to produce altered parameter esteems for pictures, which are utilized for CMF detection under the SIFT-based structure. The test comes about demonstrate that CMFD-PSO has great execution.

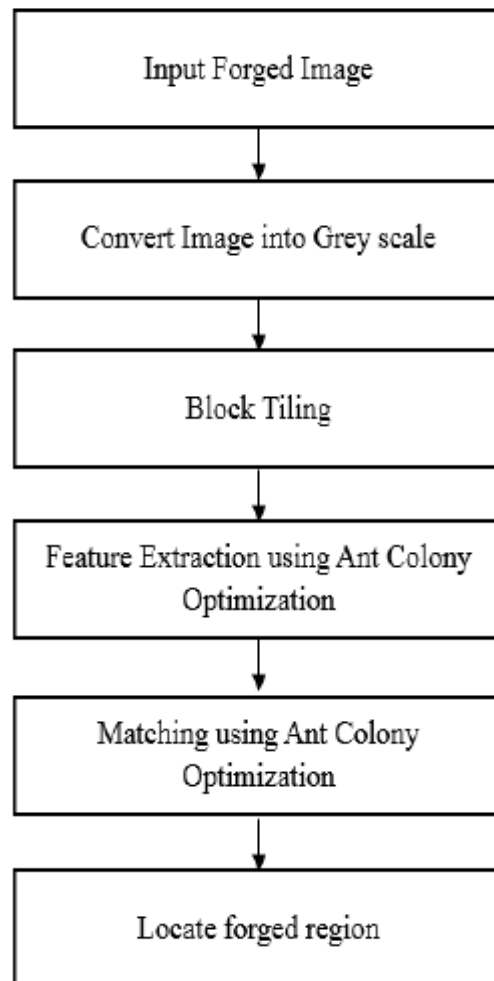
**Yong-Dal Shin et.al. [10]** In this paper, creator proposed quick investigation strategy for copy-move forgery image. Another straightforward hunt calculation utilizing a half square size for copy-moved forgery image discovery is proposed. Proposed calculation decreased computational complexity more than regular calculations. In this creator didn't utilize 8x8 pixel piece comprehensive pursuit technique and recurrence calculation to decrease computational complexity.

**Devanshi Chauhana et.al. [11]** One of the issues in image forensics is to check the validness of image. This can be exceptionally imperative errand when images are used as a confirmation which causes change in judgment like, for the case in a courtroom. In this creators has done a study on various Keypoint based duplicate move forgery detection strategies with various parameters.

**E. Ardizzone et.al. [12]** In this paper creators displayed an exceptionally novel half and half approach, which thinks about triangles rather than contrasting pieces or single focuses. Intrigue focuses are extricated from the picture and questions are demonstrated as an arrangement of associated triangles utilizing these focuses. Triangles are coordinated by their shapes, their substance, and the neighborhood includes vectors removed onto the vertices of the triangles. Proposed strategy is intended to be hearty to geometric transformations. Results were contrasted and a piece coordinating strategy and a point-based technique.

**Chi-Man Pun et.al. [13]** In this paper creators proposed a novel copy-move forgery detection conspire to utilize versatile over division and highlight point coordinating. The proposed plot coordinates both block-based and Keypoint-based forgery detection strategies. To begin with, the proposed versatile over division calculation sections the host picture into nonoverlapping 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.

### III.METHODOLOGY

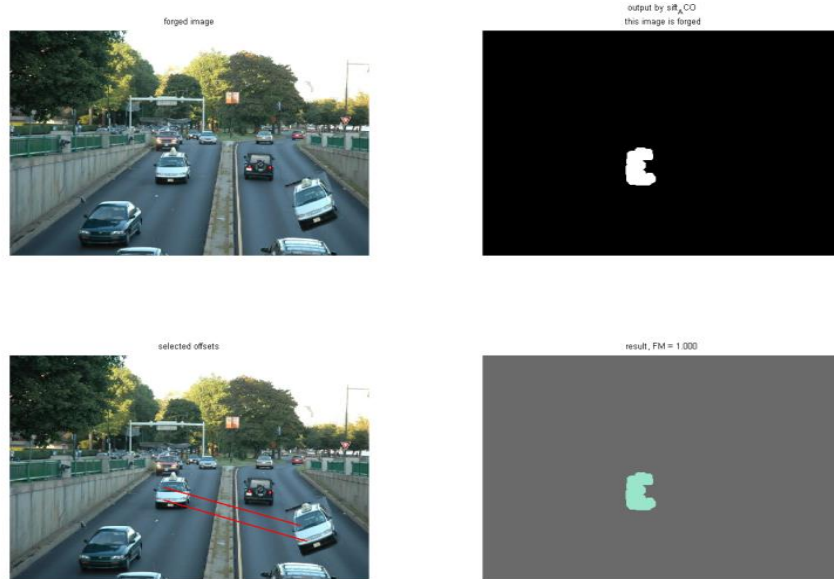


In this design methodology firstly image is converted into overlapping blocks after converting into grey scale, then features are extracted using Ant colony Optimization, then matching will be performed using Ant Colony Optimization and at last forged regions are marked. Steps are as following:

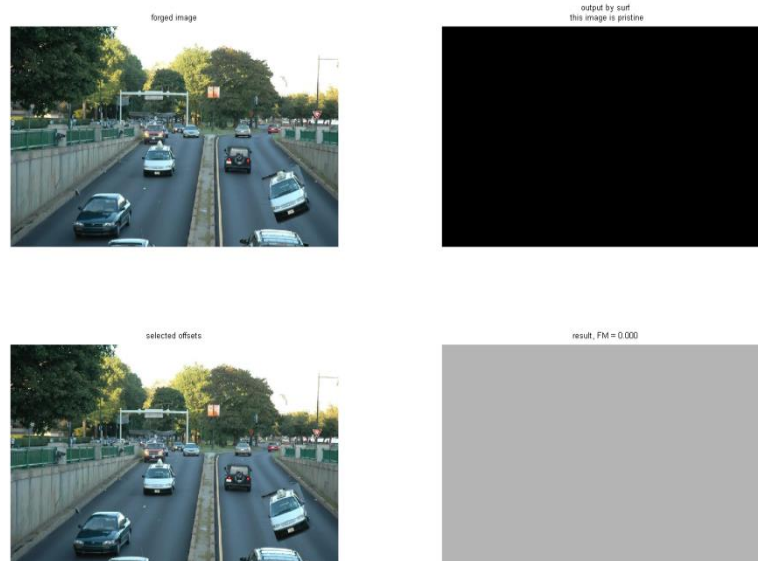
1. Take a colored forged image as input.
2. Convert image into Grey Scale.
3. Divide greyscale image into overlapping blocks.
4. Store these blocks into a metrics.
5. Extract feature vectors using Ant colony Optimization.
6. Match similar feature vectors using Ant Colony Optimization.
7. Initialize ants.
8. Evaluate results and update pheromone values.
9. Check if exit criteria met.
10. If yes give final detected forged regions, else initialize new ants.

## IV. RESULTS

### 1. Detection:



**Fig4.1: Analysis of SIFT ACO features Detection**



**Fig 4.2: Analysis of SuRF features Detection**

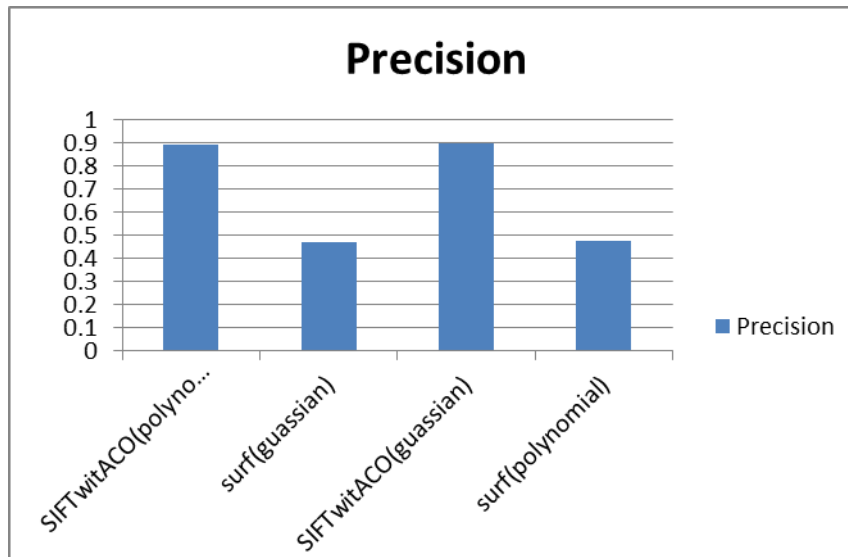
Above given figure 1 and figure 2 show the experiment on two types of feature SIFT with ACO and SURF feature but results show SURF features not able to detect forgery part in the image but ACO optimization features detect.

**Table 4.1 Precision of different classifier:**

**Table 4.1 Precision of different classifier:**

Classifier	Precision
SIFT with ACO(polynomial)	0.8917
surf(Gaussian)	0.4714
SIFTwith ACO(Gaussian)	0.9
surf(polynomial)	0.4737

**Figure 4.3 Precision Graphs of different classifier:**



**Table 4.2 Accuracy of different classifier:**

classifier	Accuracy
SIFT with ACO(polynomial)	0.8896
surf(Gaussian)	0.6153
SIFT with ACO(Gaussian)	0.8979
surf(polynomial)	0.6193

**Figure 4.4 Accuracy Graphs of different classifier:**

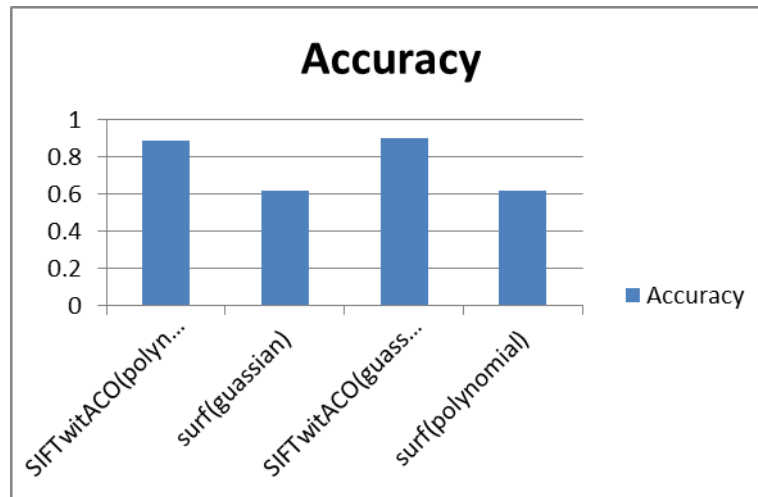
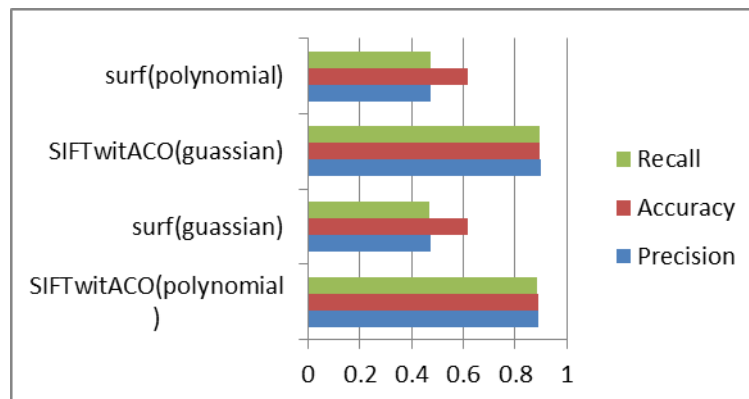


Table 4.3 Recall of different classifier:

Table 4.4 Comparison between parameters (Precision, Accuracy, Recall) of different classifiers:

classifier	Precision	Accuracy	Recall
SIFT with ACO(polynomial)	0.8917	0.8896	0.888
surf(Gaussian)	0.4714	0.6153	0.4703
SIFTwith ACO(guassian)	0.9	0.8979	0.8963
surf(polynomial)	0.4737	0.6193	0.4726

Figure 4.6 Comparison Graph between parameters (Precision, Accuracy, Recall) of different classifiers:



## REFERENCES

- [1] Babak Mahdian, Stanislav Saic, "Detection of copy-move forgery using a method based on blur moment invariants", Forensic Science International, an international journal dedicated to the applications of medicine and science in the administration of justice, Vol.171 No.2-3, Sep.2007, pp. 181-189.
- [2] Bolun Chen , Ling Chen , Yixin Chen, "Efficient ant colony optimization for image feature selection", Volume 93, Elsevier- Special issue on Machine Learning in Intelligent Image Processing, Issue 6, June 2013, pp. 1566–1576.
- [3] Gagandeep Kaur, Dr. Maitreyee Dutta, "Digital Image Forgery: A Survey", International Journal of Computer Science Research & Technology (IJCSRT), Vol. 1 Issue 6, Nov. 2013, pp.1-7.
- [4] Guzin Ulutas, Mustafa Ulutas, "Image forgery detection using Color Coherence Vector", Electronics, Computer and Computation (ICECCO), Nov. 2013, pp. 107 – 110.

- [5] Osamah M. Al-Qershi and Khoo Bee Ee, "Passive Detection of Copy-Move Forgery in Digital Images: State-of-the-art" Forensic Science International, Volume 231, Issue 1, Sep 2013, pp. 284-295.
- [6] Beste Ustubioglu, Guzin Ulutas ., Mustafa Ulutas, Vasif V. Nabiyevev," 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
- [7] Bolun Chen , Ling Chen , Yixin Chen, "Efficient ant colony optimization for image feature selection", Volume 93, Elsevier - Special issue on Machine Learning in Intelligent Image Processing, Issue 6, June 2013, pp. 1566–1576.
- [8] 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.
- [9] Shi Wenchang, Zhao Fei, Qin Bo, Liang Bin, "Improving image copy-move forgery detection with particle swarm optimization techniques", IEEE-China Communications, Volume 13 , Issue, 1 , Jan 2016, pp. 139 – 149.
- [10] Yong-Dal Shin, "Fast Exploration of Copy-Move Forgery Image" Advanced Science and Technology Letters, Vol.123 (ISA 2016), pp.1-5.
- [11] Devanshi Chauhana, Dipali Kasatb, Sanjeev Jainc, Vilas Thakared, "Survey On Keypoint-Based Copy-move Forgery Detection Methods On Image", Elsevier –International Conference on Computational Modeling and Security (CMS 2016), pp. 206 – 212.
- [12] E. Ardizzone, A. Bruno, and G. Mazzola” Copy-Move Forgery Detection by Matching Triangles of Keypoints”, IEEE Transactions on Information Forensics and Security, Volume 10 , Issue 10 , Oct. 2015,pp 2084 – 2094.
- [13] Chi-Man Pun, Xiao-Chen Yuanand Xiu-Li Bi, "Image Forgery Detection Using Adaptive Over-Segmentation and Feature Point Matching", IEEE Transactions on Information Forensics and Security, Volume 10 , Issue 8, Aug. 2015, pp. 1705 – 1716.