

Comparative Analysis of Optimization Techniques in Blind Decomposition

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ABSTRACT: Image processing are today widely used in all fields. In this paper we can improve visibility of image to solving nonlinear, global optimization problems. The nature inspired BAT, Cuckoo Search and PSO optimization algorithms are presented. This paper present the comparison of BAT, PSO and Cuckoo search in the obtained PSNR and MSE on the blur images characteristics, chosen optimization criteria, dimension of the search space and its parameters. In this paper Metaheuristic technique are used for giving the local as well as global solution.

KEYWORDS: BAT, PSO, image quality, Image Classification, CS

I. INTRODUCTION

The blur satellite image is very important from information point of view. The identification of information must be visible and as a hurry as it possible. It is challenging task for human being to detect and recognize. Alternative to this metaheuristic technique is used for give global best solution. The environmental conditions such as rain, fog and temperature variation affect of blur image. Despite this problem, the problem due to pose, scale, lack of priori information, position in image plane, viewing angle are the challenge in blur image. Several algorithms have been developed for recognition [1]. The development of recognition algorithm for such a variable feature could be the toughest task. There is not much work has been done for infrared imaging based target recognition. The time variability of feature, human intervention in selecting those features and random surrounding condition of object is the biggest challenge and problem in recognition. One such technique that is widely used in the literature is deep learning method of this. The metaheuristic technique is the example of such problem [2].

II. RELATED WORK

Two nature-inspired algorithms: BAT and Cuckoo search are used for classifying the blur images. Cause are use nature-inspired algorithms over established algorithms is their excellent capability of searching path and give low calculation or complex search space. These algorithms have been modified accord the making suitable for the process of image classification [3].

A. BAT Algorithm

The Bat Algorithm was developed by Yang in 2010 and it is inspired from the bats movement strategy, using the echolocation to find distances, being able to distinguish the prey in the direction of they move [1]. Fig. 1 shows the modified BAT flowchart explain the entire steps of the image classification [4].

B. Cuckoo Search Algorithm

Cuckoo search (CS) was developed by Xin-she Yang and Suash Deb and is inspired by the brood parasitism of cuckoo species. Fig. 2 shows the modified Cuckoo search flowchart explain the entire step of the image classification [5].

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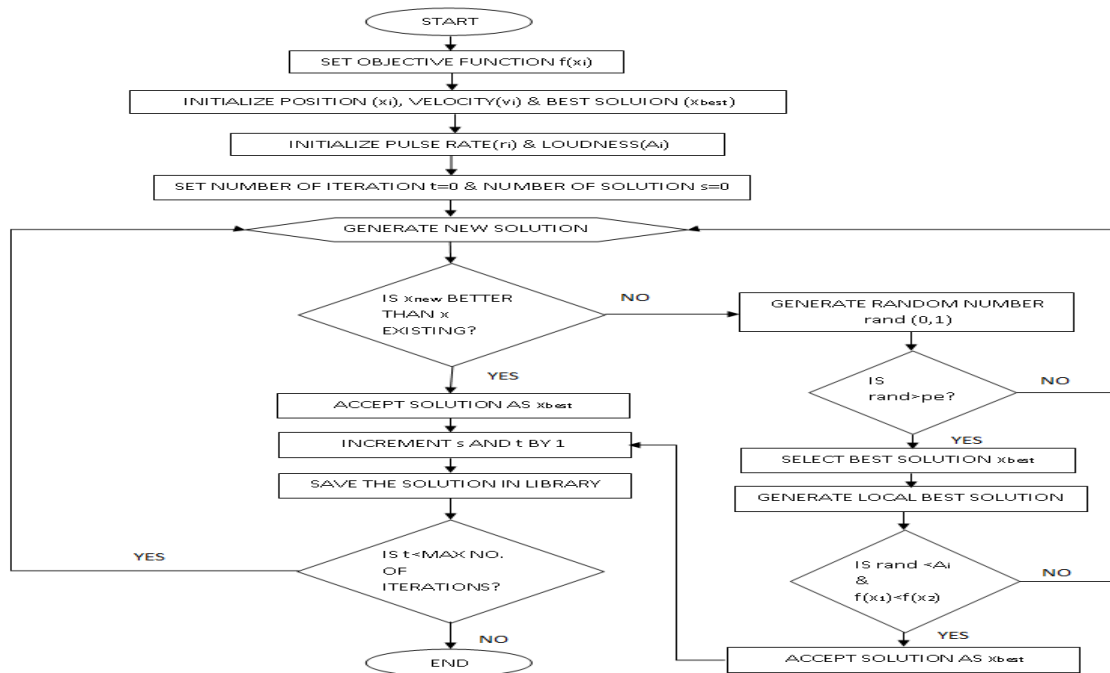


Fig. 1 flow chart of bat

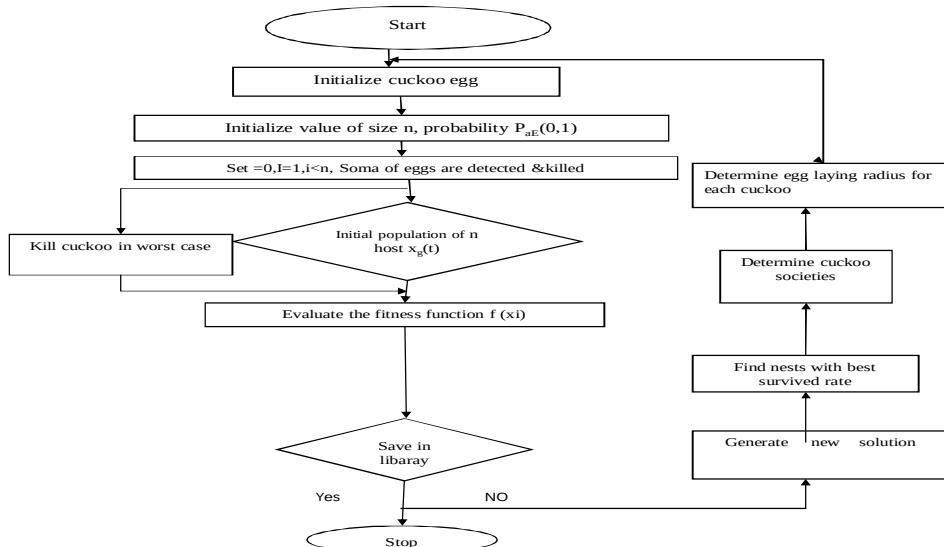


FIG.2 fig. 2 flow chart of cuckoo search

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III. EXPERIMENTAL RESULTS

The program code for BAT, PSO and Cuckoo search to process 200×200 image is written in the MATLAB R2016a. The system has 64 bit, Intel® core™ i5 CPU 650@ 3.20 GHZ processor and 2 GB RAM configuration. To design the comparison window the GUIDE tool are used. All the simulation parameter is given below in Table 4.1., 4.2.

PARAMETER	EXPLANATION	VALUE
S	NUMBER OF BATS	50
MAXIMUM GENERATION	MAXIMUM ITERATION	1000
F _i	RANGE OF FREQUENCY	0 TO 2
R _i	RANGE OF PULSE RATE	0.5
A _i	RANGE OF LOUDNESS VALUE	0.5

TABLE NO.1 PARAMETER OF BAT

PARAMETER	EXPLANATION	VALUE
N	Number Of Nest	50
Maximum Generation	Maximum Iteration	1000
P	Probability	0.25
T	Tolerance	1.0e-0.5

Table no. 2 parameter of cs

A. GREY SCALE

The blur images is convert in grey scale images because it is use to frequently the effect of measuring the intensity of light at each pixel in a single band of the electromagnetic spectrum (e.g. infrared, visible light, ultraviolet, etc.), and it can used to decomposed the color image to black white image. The reason behind to used grey scale is easy to separate the noise in the image [6]. The following fig. 1(b) images are show given below.

B.NOISY IMAGES: To proposed algorithm, we have grey scale image. Now we can add noisy to grey scale image. So, we can add Gaussian noise to grey scale image. The reason behind to add noise in grey scale image are it easy to decomposed the effect of the blueness from the images [7]. This is technique of a smooth blur similar. Now, we get noisy images which show fig.1(c) given below.

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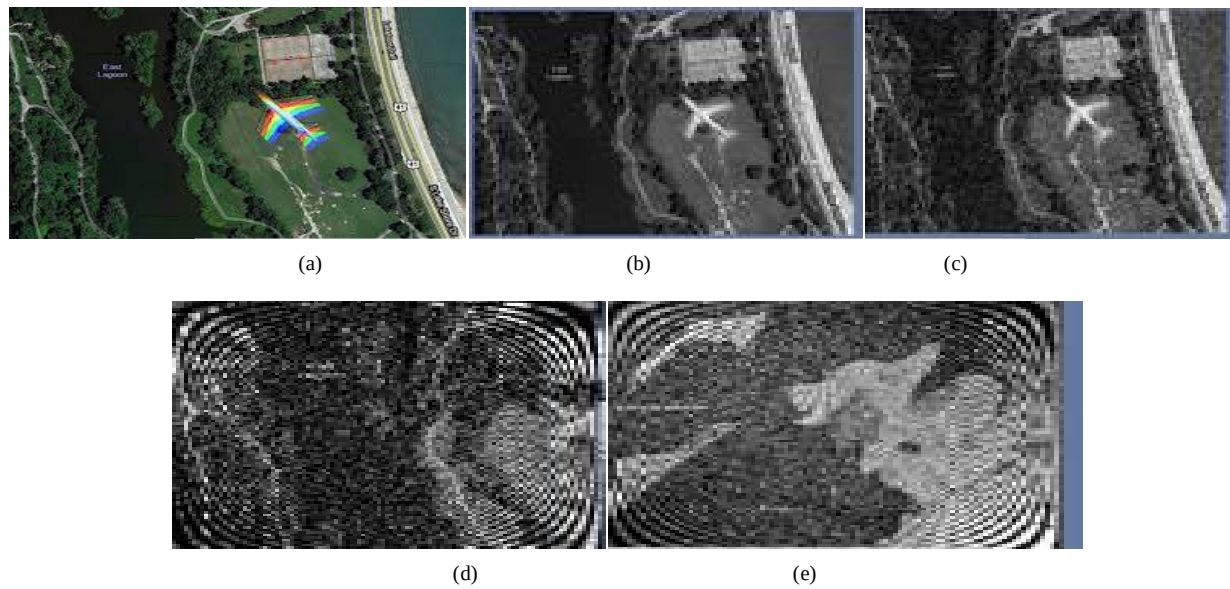


Fig. 1. Blind decomposed (a) original image (b) Grey scale image (c) Noisy image (d) &(e) DCT image

C.DCT (Discrete Cosine Transform:

Now, we have noise image to detect this noisy the filter is required. In this proposed algorithm DCT filter are used to decompose the images [8]. Several of the compression methods utilize for noise suppression as well. Applying DCT will also degrade the edges since the edge pixels represent high frequency components in spatial domain. Encoding an image in DCT domain with less number of codes gives compression as well as noise reduction. But, if it is encoded with a high compression ratio, then the edges and fine details of the image will get lost [9]. On the other hand, if it is coded with a very low compression ratio, then the noise components will also be retained and hence our purpose of noise filtration will not be served [10].

The simulation results of proposed algorithm with the BAT and Cuckoo search algorithm are compared. For a fair comparison of results, the search process is terminated before the maximum number of iterations is attained. The main parameters used for these approaches are as follows: the population for all the algorithms is the same; that is 50, and all these algorithms will terminate after being executed 1000 times. For CS, the control parameter $Pa = 0.25$. for BAT range of pulse rate= $0.5, =0.5$. The general information of images is shown in Fig 2.

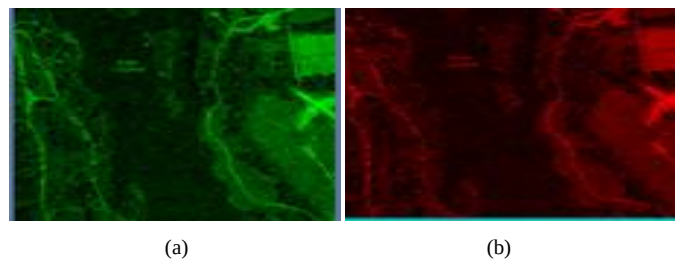


Fig. 2 Blind decomposed (a) BAT algorithm image (b) CS algorithm image

On analysis the data, it was observed that the BAT algorithm has higher value for PSNR and lower value for MSE on comparison with PSO, Cuckoo search. The comparative behaviour of the three algorithms in shown in fig. no. 3 (a),(b)below:-

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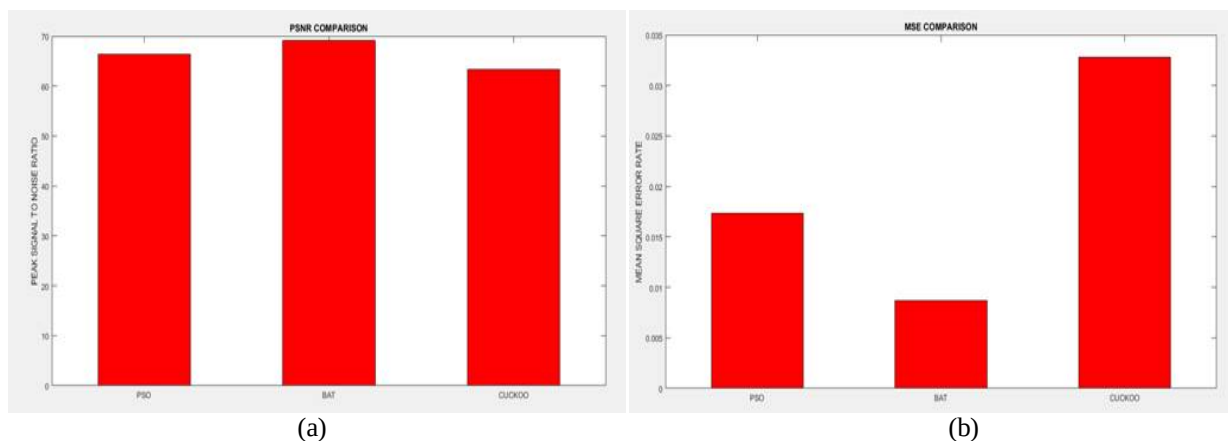


Fig. 3 Blind decomposed (a) PSNR (b) MSE

V. CONCLUSION

Nature-inspired algorithms are well-organized in image classification and can be successfully used in the field of blur images. BAT is giving very good PSNR and MSE an results. But BAT has better results according to the CS it has smaller PSNER value. Thus, it can be concluded that nature inspired algorithms are an alternating way of image classification different from the traditional classifiers that has been used till now. These algorithms have an advantage of using the search space efficiently and therefore have a bright future scope in the all field.

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