

Animal Migration Optimization: A Survey

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Abstract— A new swarm intelligent algorithm, called as Animal Migration Optimization (AMO). This paper discusses brief introduction of few optimization techniques. Optimization techniques used for finding optimal solutions. The efficiency of AMO is not appropriate due to its execution time. The efficiency of animal migration optimization algorithm (AMO)is increase by using few benchmark functions and which show the animal migration algorithm performance and it's working in order to confirm the presentation of AMO including four benchmark functions – Sum, Ackley, Baele and Rosenbrock are employed. The benchmark functions which are considered as standard functions increase the efficiency and minimize the time.

Keywords— Animal Migration Optimization, Cuckoo Search, Firefly Algorithm, Ant Bee Colony, Particle Swarm Optimization, Bat Algorithm.

I. INTRODUCTION

Data mining is a procedure to extract interesting, implicit, previously unknown and potentially useful knowledge or patterns from data in large databases. It is single of those latest technologies with potential to support or help organizations on the very vital processed data in their respective warehouse of data [1]. In current time Optimization issue perform a significant role in both type industrial application fields and the technical research world. At the time of the last decade, learning from nature system, numerous computational approaches planned to solve optimization issues [2][3].

Animals generally migrate between wintering and reproduction habitats. Animal's tour seasonally next to exact routes and shift to areas which are seasonally helpful to them as of the inbuilt requirements of the group. Particle swarm algorithm, suggested through Eberhart and also Kennedy in the 1995, was stimulated through the social performance of fish school or bird flocking [4][5].

Animal migration algorithm (AMO) is a innovative bioinspired intellectual optimization algorithm by simulate animal migration performance proposed by Xiangtao li in 2013. AMO simulates the prevalent migration occurrence in animal kingdom, through the position change, individual replacement, and finding the optimal solution progressively. A good experimental result on many optimizing difficulty has been obtain by AMO.

II. OPTIMIZATION TECHNIQUE

In recent years, many optimizing technique have been developed on the basis of animal behavior phenomena. Such as Firefly algorithm (FA)[6] , Cuckoo search (CS) [7], Artificial bee colony (ABC) [8] ,Bat algorithm (BA) [9].

A. Firefly Algorithm (FA)

It's a Meta heuristic algorithm. Algorithm is motivated by activities of fireflies . To magnetize other fireflies is the main aim of firefly's flash. Xin-She Yang considered the firefly optimization by following factors: a) .Every fireflies are of same gender or say single gender b). Level of brightness of fireflies make them attractive according to brightness, It means among various fireflies, the lesser bright firefly will magnetize (and thus move) to the higher bright firefly c). In rest of the cases when there is no firefly brighter than a given firefly [6].

B. Cuckoo search (CS)

It is another algorithm of optimization which is given by Xin-She Yang and Suash Deb in 2009. It was dully motivated by the offspring parasitism of cuckoo species. This is done by lay their respective eggs in another host birds' nest. Out of all host birds, some could hold straight divergence with the pushy cuckoos. Some out of all cuckoo species have become part in the way that female of species of parasitic cuckoos are very particular in the imitation especially in various colors and pattern of their eggs of crowd species which are chosen. Out of so available optimization method this Cuckoo Search proposed such behavior works of breeding at almost of all spaces [7].

C. Artificial Bee Colony (ABC)

This is a population-based optimization algorithm that imitates the food foraging activities of swarm of honey Bees. In this algorithm, a sort of locality search joint with random search is perform and can be old for both functional optimization and combinational optimization [8].

D. Bat Algorithm (BA)

It is again very effective optimization based on a meta heuristic search method which is innovated by Xin She Yang in 2010. An echolocation deed of micro bat is responsible for this algorithm. This is with changeable pulse emission with loudness. We can be summarize adulation of echolocation as below: Where we can believe that practical bat flies randomly (velocity veil), which is at position x_i (which we can consider as solution). This is always considering along varying frequency at any it step of process [9].

III. ANIMAL MIGRATION MODEL

The key scheme is implemented by means of concentric “zones” around each animal. In the section of repulsion, the focal animal will look for to reserve itself from its neighbors to avoid collision.

The algorithm of animal migration separated into two parts.

- 1) Animal migration process
- 2) Animal updating process.

During this time increase of animal population calculate by algorithm how animals are efficient by probabilistic method.

- 1) Animal Migration Process.

During the animal migration process, an animal should follow three rules:

- (1) Avoid collisions through your neighbors;
- (2) Move in a similar direction as your neighbors; and
- (3) Stay close to the your neighbors.

The idea of restricted neighborhood of an individual is described through the topological ring use. For effortlessness, we set the neighborhood length to be five for each individual dimension. The neighborhood topology is stationary and is described on the site of indices of vectors. If the animal index is j , then its neighborhood consists of the animal having indices $j - 2, j - 1, j, j + 1, j + 2$, if the animal index is 1, the neighborhood consists of animal having indices $NP - 1, NP, 1, 2, 3$, and so forth. Once the neighborhood's topology formed, we pick one neighbor erratically and also position update of the individual according to this neighbor, as can be seen in the following formula:

$$X_{i,G+1} = X_{j,G} + \delta \cdot (X_{neighborhood,G} - X_{j,G})$$

Where is the neighborhood present position, δ is produced by using a random number generator controlled through a Gaussian distribution, is the current position of the i th individual, and is the novel position of i th individual.

- 2) Population Updating Process.

In the population updating process, the algorithm simulates how some animals depart the group and some join in the new population. Individuals will be replaced by some new animals with a probability Pa . The probability is used according to the quality of the fitness. We sort fitness in descending order, so the probability of the individual with best fitness is $1/NP$ and the individual with worst fitness, by contrast, is 1, and the process can be shown in Algorithm 1. In Algorithm 1, $r1, r2 \in [1, \dots]$ are randomly chosen integers, $r1 \neq r2 \neq i$. After producing the new solution, it will be evaluated and compared with the, and we choose the individual with a better objective fitness:

$$X_i = \begin{cases} X_i, & \text{if } f(x_i) \text{ is better than } f(x_{i,G+1}), \\ X_{i,G+1} & \text{otherwise} \end{cases}$$

IV. LITERATURE SURVEY

MingzhiMa in 2014 author introduce a new enhanced AMO for clustering analysis. IAMO is used for solving many clustering problems and real life data sets. The algorithm perform better than that of the k -means, PSO, CPSO, ABC, CAB, It increase the search ability of AMO. This improves the defect of K-mean. It doesn't define a proper unified radius of living area's needs [10].

Yi Cao in 2013 author present an opposition based animal migration optimization algorithm. For population initialization it use opposition based learning algorithm. It enlarge the search space, accelerate convergence rate and improve search ability [11].

Li X in 2013 author introduce cuckoo search algorithm. The cuckoo search algorithm is an effective global optimization problem. In this paper author use a new search strategy based on orthogonal learning to enhance the exploitation ability to the basic cuckoo search algorithm. It is successfully applied to a wide range of real world optimization problems. Performance of this algorithm is affected due to the scaling factor[12].

Dervis karaboga in 2012 introduce artificial bee colony programming (ABCP).. The proposed way is very feasible and robust on considered test problem of symbolic regression. There are numerous issue residual as the scopes of further studies such as different algorithm in clustering and comparing the result of ABC algorithm to the result of those algorithm [13].

Shouyi Wang in 2011 author defines that a few type of errors are detectable in advance; data mining methods can be used for early detection of these numerical typing errors. Author used multichannel electroencephalogram (EEG) recordings for quantitative analysis of detecting errors along with two basic data mining techniques i.e. LDA and SVM.

Without processing information about 80% error can be detected. Using data mining methods it is likely to proactively foresee keystrokes with errors based on EEG recordings. The only disadvantage is that study is based on limited data pool, it maybe not produce result in generalized form [14].

Mahdi Esmaeili in the 2010 author obtainable there is a huge number of variables and objectives involved in aerospace engineering optimization which cannot be ignored, so only multi-objective optimization can deal with it efficiently and proposed technique to use data mining approaches for aerospace engineering optimization procedure. The advantage of using these techniques is that less variables decrease the effective cost of optimization. Here simple variable reduction tool and some data mining techniques are applied for getting desired results. BF Tree and J48 algorithms require fewer variables while LAD Tree algorithm utilizes at least 7 variables to classify data set[15].

DominikFisch in 2014 author initiate novel fusing classifiers way at the level of categorization rules parameters the two different new methods to fuse probabilistic generative classifiers (CMM) into one. Multinomial distributions for categorical input and multivariate normal distributions are the main foundation of this technique. The basic advantage of this fusion is to hyper distributions all over the fusion process used components used in online training [16].

JianlinXu, in 2013 to pick up the security status of mobile app author suggest a method for mobile apps depend on data mining and cloud computing to filter out malware apps from mobile app markets and also present prototype system is mob safe. Mob safe combined the static and dynamic analysis methods are SAAF and ASEF to guess the total time needed to calculate all the apps stored in one mobile app market [17].

NeelamadhabPadhya in 2012 the author explains about the two data mining applications i.e. generic applications and domain specific applications. It is observed that no generic application is fully generic. There are limitations of generic applications of data mining. Domain and data, context parameters and aim of data mining try to influence the data mining decisions. Domain specific applications create additional accurate outcomes which are over 90% and these are more specific for data mining. It is difficult to design such mining system which works for any domain dynamically [18].

V. CONCLUSION

AMO is a heuristic optimization algorithm motivated by the behavior of animal migration found in major groups of

animal and it's a ubiquitous behavior, for example birds, mammals, fish, reptiles, amphibians, insects, and crustaceans. This paper increases the efficiency of AMO. To evaluate AMO we use four benchmark functions. These functions enhance the efficiency of AMO

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