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Use of Moth Flame Optimization for improvement in wireless communication systems

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Abstract- **Wireless communication networks are progressively more complex. Cell site architectures and infrastructure have evolved over five generations of technology. The quantity of traffic they support is overwhelming. Base station and microwave antenna technologies have evolved to contest the amplified usage demand. The many problems of wireless communication system required the use of optimization techniques. Different optimization techniques are used over the time. The moth flame optimization technique is a proven successful technique for optimization. This technique is successfully used in different area of wireless communication system.**

Keywords- **Wireless communication system, Evolutionary technique, MFO etc.**

I. INTRODUCTION

Wireless communication technology are playing very important role in the world today. Initially, the wireless systems were mainly designed for voice communication and other. Today, higher data rates of 300Mbps (down link) and 75Mbps (uplink) are possible. Wireless communication techniques have gained popularity because of their ease of use and mobility. The following fig. 1 shows the block diagram of wireless communication system.

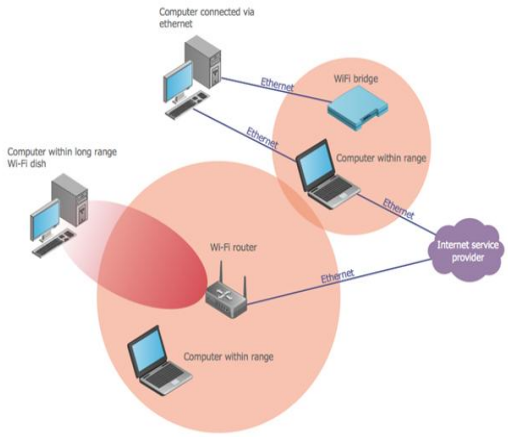

Fig. 1 Basic block wireless communication system

Optimization is an algorithm to finding best positive solutions for various problems. The ratio of problems must increase, over last few researches, and the requirement of a new optimization method is necessary as compare to previous. The mathematics optimizations method are use to be only tools in optimizes the some problems arises in upcoming for other optimization technique. Most of them are like, Moth Flame Optimization based algorithm that requires a proper solution in search space. That's why they known as MFO method, which is now a day's famous technique to solve equations. The selected, re-produced, of all stochastic behaviors in which it assist and neglect negative value which is reliable in mathematically operations. Together the values of functions are much more efficient from previous functions, and then outcome populations must improve.

1. Moth Flame Optimization (Mfo)

It is an optimization based on the routing mechanism of the moth which is a type of butterfly towards the moon using the moon light. The moth moves towards the destination in an exceedingly line once the destination is much away whereas an equivalent performs the spiral motion once destination is nearer. However, the rule implements the marginally modifies behavior to avoid the native minima. The rule uses the searching likewise as exploitation search to urge Associate in nursing optimized answer.

Moth flies by compare fix angles with relevance moon, a really economical methodology to travel far-flung distances in an exceedingly forward path Fig.2 shows models of reverse orientations. we all know that the moon so much high range, and only one way to move in one direction. Similar technique conjointly doable from person. simply assume that moon may be a side and an individual wished to travel east. If person keep the moon his left aspect whereas walk, they have to run in opposite path. we tend to see that the moths can flying spirally around lights.

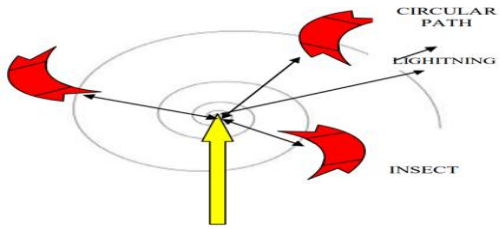

Fig. 2Basic Moth Flame Optimization

II. RELATED WORK

Researchers explored Moth Flame Optimization and PSO in different domains of wireless communication systems.
In [1] author proposed Moth-Flame Optimization (MFO) Based Clustering Algorithm for VANETs is proposed by YASIR ALI SHAH, and all the communications are accomplished by the CHs, i.e., inter-cluster and the intra-cluster communications. This paper a novel Clustering Algorithm centered on Moth-Flame Optimization for VANETs is anticipated. These papers use various popular optimization algorithms such as multi objective particle swarm optimization, clustering algorithm based on ant colony optimization for VANETs, and comprehensive learning particle swarm optimization. The conclude results show illustrate the effectiveness and flexibility of the methodology which makes it the finest among the algorithm for utilizing in VANETs clustering scenario.

In [2] author proposed algorithm for solving real challenging constrained engineering optimization problems. The application of the MFO algorithm to large engineering problems is strongly limited by computational cost. In this paper comparative analysis of MFO technique expresses the optimum functional value in term of accuracy and standard deviation over rest of well-known constraint optimization method. Several constrained benchmark function of engineering problems have been calculated and gained solutions were compared with other recognized algorithms. Simulation result of several constrained problems proves that it is also an effective method in solving challenging problems with unknown search space.

In [3] author proposed Lévy-Flight Moth-Flame for function optimization and engineering design problems. The fancy insects are trapped in a spiral path around artificial lights. Aiming at the phenomenon that MFO algorithm has slow convergence and low precision, an improved version of MFO algorithm based on Levy-flight strategy, which is named as LMFO, is proposed. Levy-flight can increase the diversity of the population against premature convergence and make the algorithm jump out of local optimum more effectively. This paper also considers solving two classical engineering problems by using the LMFO algorithm. The high level of exploration and exploitation of this algorithm were the motivations for this study. With both techniques combined, LMFO can balance exploration and exploitation and effectively solve complex problems and real-world engineering problems. Moth-flame optimization algorithm is a new meta heuristic optimization method, which is proposed by [4] author and based on the simulation of the behavior of moths for their special navigation methods in night. They utilize a mechanism know as transverse orientation for navigation. In this methodology, a moth flies by maintaining a set angle with respect to the moon, which may be a very effective mechanism for travelling long distance in a straight path because the moon is far away from the moth.

This mechanism guarantees that moths fly along straight line in night. It usually observes that moths fly spirally around the lights. In fact, moths are tricked by artificial lights and show such behaviors. Since such light is extremely close to the moon, hence, maintaining a similar angle to the light source causes a spiral fly path of moths. In the MFO algorithm rule, the set of moths in a matrix M. For all the moths, there's associate array OM for storing the corresponding fitness values. For the flames, it is also assumed that there is an array OF for storing the corresponding fitness values.

In [5] author proposed the modified moth flam optimization for terrorism prediction. Moth-flame Optimization method is one of the newest bio inspired optimization method in which the main inspiration of this optimizer is the navigation method of moths in nature called transverse orientation. Moths fly in night by maintaining a fixed angle with respect to the moon, a very effective mechanism for travelling in a straight line for long distances. These papers use various popular optimization algorithms such as Moth Flame Optimizer, Ant Lion Optimizer (ALO) algorithm, Grey Wolf Optimization (GWO) algorithm, Particle Swarm Optimization (PSO) and Genetic Algorithm (GA) with another well known classifier as K-nearest neighbor. Simulation results of the proposed modified of MFO provide very promising and competitive performance in reaching global minima, as well as prove good performance of MFO2, MFO3 and an advance over the original MFO algorithm with high stability .

This paper optimized open shortest path first algorithm based on moth flame optimization is proposed by [6] author , and based on the simulation of the Open Shortest Path First (OSPF) algorithm using moth flame optimization. The moth flame optimization depicts the routing behavior of the moth. Each node position is considered as the moth position and routing behavior of moth is used to select the optimized path. The optimized OSPF method is analyzed in terms of delay and energy consumption and compared with the existing OSPF as well as modified open shortest path first algorithm. The

simulation results show a wide difference among the traditional approaches and the proposed one and prove as novel in the reduction of delay and energy consumption, thus giving enhanced performance of networks.

This paper presented such issues to detect network anomalous. The detection rates might be increased due to quantitative features inclusion. Parameters and evolution processes are discussed in details. They have introduced issues which used evolution theory to information evolution in order to filter the traffic data and thus reduce the complexity [7].

Federico Boccardi, et al. gives different multiple antenna techniques introduced in LTE Advanced. Inspite of describing the technical facts of the adopted solutions, author approach the difficulty starting from the design targets and the antenna deployments prioritized by the operators. Then author present the main enabling solutions introduced for downlink and uplink transmissions, and thus, assess the performance of these solutions in unusual scenarios [8].

III. CONCLUSION

Performance is most prime demand in of communication system and in day to day increasing complexity of communication scheme made it as difficult task to design accurate device for it. Several optimization techniques are used for this purpose other than MFO is shown it suitable for this purpose due to simplicity and fast convergence rate.

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