

## Comparision between KMean PSO and K-mean Ant lion optimization

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**Abstract:-**In this paper comparision between hybrid Kmean with Antlion optimisation and Hybrid K-mean with PSO is done.

**Keywords—** *Ant lion optimisation(ALO), particle Swarm optimisation(PSO)*

### 1 Introduction

#### 1.1 ALO Cluster Head Selection

ALO (Ant Lion Optimisation) is cluster head selection technique . Considering node which is at nearest distance from centroid position and next nearest distance from it using ALO. In this ALO, randomly selection of node(ant) and ant lion is done in the intilisation. Next, calculation of Euclidean distance is done between each pair of sensor nodes, from that the fitness value of ant and ant lion is calculated .The ant lion fitness value sorted to find the best ant lion is named as elite ant lion (cluster head). The figure (1) explains the process of ant lion optimization.[1]

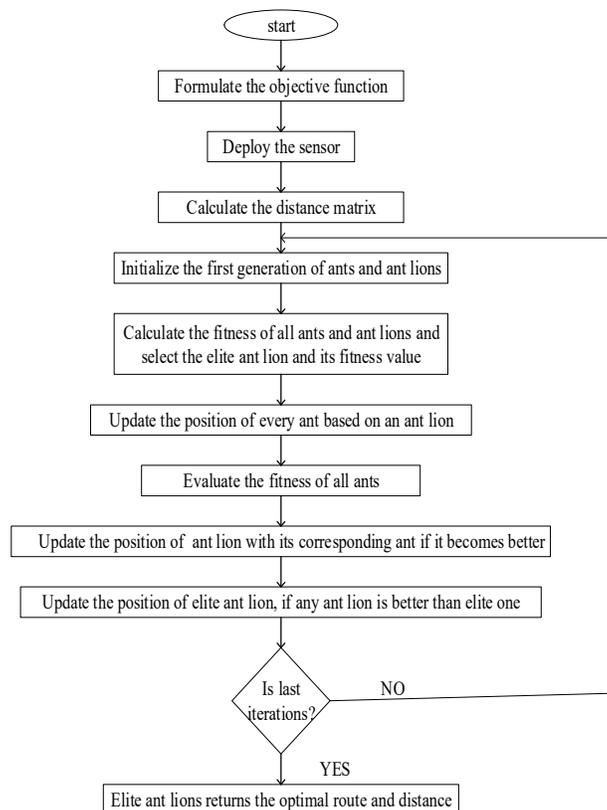


Fig 1:Flow Chart of Ant Lion Optimisation

## 2.K-mean clustering

An unsupervised clustering algorithm is K-mean. It had been used to perform a variety of clustering problems. It was used to divide a network into a number of clusters [12–14]. The algorithm can mainly partition the space of nodes into k clusters based on the distance between an elected CH and the rest of the nodes in the same cluster. The K-means clustering algorithm is shown in Figure 2.

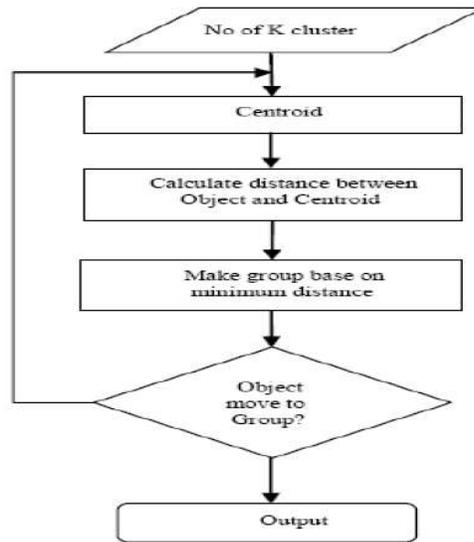


Fig 2:Flowchart Of K-mean

## 3.Particle swarm Optimization(PSO)

A particle swarm is a group of particles, in which each particle is a moving object which can progress through the search space and can be bring to the better positions. Best position is decided by PSO fitness evaluation function. PSO must have a fitness evaluation function to decide the better and best positions. Then the objective is to optimize the fitness function[2-4].

## 4.Hybrid K means and Particle Swarm optimization

- To provide global optimal solution for clustering optimization problem, Hybrid Particle Swarm Optimization (PSO) with K means is done.
- The Particle Swarm optimisation algorithms(PSO) are randomized search and concept of swarm is optimization techniques .In this integrate PSO with K- means algorithm to reach global results while clustering categorical data.
- In PSO-KM algorithm,this PSO algorithm is initially applied to search all space for a global solution. Then K-mean clustering algorithm is used for faster meeting to finish the clustering process.
- Similar to other meta-heuristic algorithms, both basic particle swarm optimization and k means algorithms have some shortcomings: local optima and premature convergence.
- In PSO algorithm initial centroid is fixed as user specified input and this algo used to minimize the inter cluster variance
- **Drawback:**  
This algo doesnot allow choosing the number of clusters, selection of initial centroid, inadequacy with non globular cluster, time complexity is more , not Support more number of objects and converge to sub optimal results. [5-8][15]

### 5. Hybrid K means and Ant Lion optimization

- This is efficient, flexible and robust search processes, performing search in order to provide near optimal solutions of an fitness function in an optimization problem.
- The dependency of the algorithm on the initialization of the centers is a major problem and it's usually gets stuck in local optima.
- To solve this issue, Ant Lion optimization and K-Means be avoided by being trapped in local optimal solutions.
- Hybrid K-means clustering algorithms are to solve clustering issues in WSN, in order to increase the network lifetime.
- ALO algorithms were applied separately to select the optimal cluster head from each cluster obtained by the K-means phase. For instance, if the K-means algorithm partitioned n nodes to m number of clusters, respectively, then the ALOs algorithms will select k cluster heads from the group of nodes.
- As a result we can achieve high energy efficiency and maximum network lifetime. In order to solve the local optima problem, in this proposed paper we hybridize basic ALO and K means. Hybrid algorithms have successfully solved various optimization problems.
- The ALO algorithm is to find the best set of cluster centres by using searching ability according to the assigned number of clusters.
- K-mean and ALO provide high throughput as compare to K mean and PSO
- The ALO algorithm has Outperformed compare to PSO. Hence, the ALO algorithm cluster centroid gives the optimal results, because in every run it selects initial clusters. It can be converted into global optimal solutions.[10-11]

### 6. Conclusion

K-mean Ant lion optimisation has out performed as compare to K-mean PSO

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