CHAPTER 6

CONCLUSION AND FUTUREWORK

This chapter summarizes the conclusions of this research and gives a clear vision of future direction which can be taken further.

6.1 CONCLUSION

In this research, the feasibility of using CSA, CS-PSO and MO-CS-PSO clustering algorithms to improve the clustering process are discussed. The following observations are made for proposed algorithms.

The CSA algorithm effectively computes the fitness values and compares these values with K-means, Fuzzy C-Means, Fuzzy PSO and Genetic K-means algorithms by computing the average values. The average fitness values obtained for the wine, blood-transfusion, breast cancer-Wisconsin and space datasets are 16721.93, 295006.5, 72582276, and 155.4592 respectively.

The performance of hybrid CS-PSO algorithm is evaluated using wine, iris, blood transfusion and zoo datasets. The cluster centroids and fitness values are computed for every datasets and its performance is compared with those of Cuckoo Search (CS), Fuzzy C-means (FCM), Fuzzy-PSO, Genetic-K means and K-means clustering. The simulation results show that the new method carries out better results than the Cuckoo Search (CS), Fuzzy C-means (FCM), Fuzzy-PSO, Genetic-K means and K-means. It increases the computational efficiency by optimizing the algorithm. Thus reducing the computational time.
A combination of multi-objective clustering and hybrid optimization technique known as MO-CS-PSO and it utilize the two objectives such as cluster validity index (I-index) and stability. Initially, the cuckoo and PSO optimization algorithm calculates the I-index values for each nest and particle for every bootstrap samples generated from the database. Based on the fitness of the nest and particles of every bootstrap samples, the stability fitness of the solution is calculated.

The new merge table is generated based on the collection of best solutions from cuckoo operator and PSO operator. The best solution is selected from the merge table by selecting the first solution of the merge table after the position of solutions is arranged based on the fitness value of the solutions. The merge table is also supplied to the cuckoo operator and PSO operator for the next iteration process.

The new solution is placed as best solution only if the fitness of the new solution dominates the existing one. Finally, the experimentation analysis is carried out to evaluate the feasibility of the proposed approach in medical data as well as other informatics related datasets. The new MO-CS-PSO algorithm is tested on several data sets, and its performance is compared with Genetic-K means, cuckoo search, and Fuzzy-PSO.

The simulation results showed that the new method carries out better results than the Cuckoo search (4.70%), Genetic-K means (5.70%) and Fuzzy-PSO (3.48%).
6.2 FUTURE SCOPE

In this research, the numbers of clusters are known while solving the clustering problems. Therefore, to create new revolutionary algorithm to perform automatic clustering without any prior knowledge of a number of clusters.

Most of the Multi Objective clustering approaches to cluster two objectives so, in future to consider more than two objectives for clustering and also to use multi-objective clustering for multi-class label clustering problems. A self-adaptive scheme can be implemented to analyze the computational performance based on sampling interval reduction.

It would be interesting to apply the algorithm on other publically available dataset from uci learning repository and check the universality of the algorithm. The proposed approach can be used to solve different optimization problems and different task of data mining like classification. Third, meta-learning techniques can be an interesting future direction.