

## Single and Multi-objective Data Clustering

### **Abstract:**

Clustering is an unsupervised pattern classification technique that is used for partitioning a given data set into homogeneous groups based on some similarity/dissimilarity metric. There are several single objective clustering algorithms available and popular in the literature including K-Mean and FCM. Although both K-Mean and FCM are very popular algorithms, they may get stuck to local optima depending on the choice of initial cluster centers. The lecture is divided into two parts, where in the first part, we will demonstrate how metaheuristic techniques can be used to solve the problem of K-Mean and FCM. Result will be demonstrated for pixel classification of satellite images.

In the second part of the lecture we will discuss more on multi-objective clustering, in which multiple objective functions are simultaneously optimized. Selecting one solution from the set of Pareto Optimal solutions is always a critical issue. We will also discuss how machine learning techniques like Support Vector Machine (SVM) can be used for combining the Pareto Optimal solutions to evolve with a better solution. The result will be demonstrated for classification of Micro Array Gene expression Data.