**Multiobjective Optimization**

Till now I have seen how clustering is done and why it is done. Also, one of the most prominent clustering algorithm called K means clustering. So here I have tried to understand the concept of multiobjective optimization.

Generally we tend to represent a cluster in a typical form or shape , which generally is a circular shape and outlines. Here the objectives are compactness and separation . Compactness as in , within a cluster the objects must be closely and compactly placed and spaced with respect to the cluster centre and separation which is the distance between each cluster should be more . Hence our primary aim revolves around the fact that we must minimize the compactness and maximize the separation as much as possible.

Understanding the concept of validity indices.

When we talk about clusters so, there must also be a way to determine the quality of the clusters or any of its parameters so as to facilitate further study . In this respect , various validity indices have been proposed evaluate the correctness and goodness of a clustering structure quantitatively . Moreover there are broadly two criteria for evaluation and selection of the optimal clustering from a given set of results of a clustering algorithm: Compactness: Members of each cluster should be as close to each other as possible. Separation: The clusters should be widely spaced from each other. A good clustering obtained using a clustering algorithm should have both high compactness and high separation.

There are a number of validity indices , in this regard , to evaluate the goodness of clustering structure. Two popular ones among them are Pakhira Bandyopadhyay Maulik (PBM) Index and Xie-Beni (XB) Index . The Xie - Beni index focuses on the compactness and separation of clusters Both the methods have predefined formulae which on application gives the goodness of the clustering structures.

Regards

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