Multi Class Classification Using Holistic Non-Unique Clustering ISSN 1751-3030

Author:
Ramesh Chandra Bagadi, Data Scientist
INSOFE (International School Of Engineering), Hyderabad, India.
rameshcbagadi@uwalumni.com +91 9440032711

Technical Note

Abstract

In this research technical Note the author have presented a novel method to find all Possible Clusters given a set of M points in N Space.

Theory

Given M number of points $\bar{x}_i \in R^N$, $i = 1 \; to \; M$, each belonging to R^N, we first find the Proximity Matrix P_{ij} for each (M number of) point with each of all (M Number of points) points, inclusive of itself. The Proximity can be found using Euclidean distance or using the concept stated in [1]. We now find the *Proximity Full Contrast Ratio* $\delta_{\frac{Min}{Max}} = \frac{Min(P_{ij})}{Max(P_{ij})} \; with \; only \; those \; values \; of \; P_{ij} \neq 0$. Now, we now compute the distance $d = \pm r\left(\delta_{\frac{Min}{Max}}\right)$.

Now, we consider any point $\bar{x}_i \in R^N$ and find all points (inclusive of $\bar{x}_i$) that have at least one neighbouring point within the distance $d = \pm r\left(\delta_{\frac{Min}{Max}}\right)$, considered among themselves. We say that all such points form one Cluster each for each value of $r = 1,2,3,4,5,...$ with $Max(r)$ gotten such that $Max(P_{ij}) = Max(r)\left(\delta_{\frac{Min}{Max}}\right)$.

Similarly, we repeat the analysis in the above paragraph for each point $\bar{x}_i$.

Advantages

This theory can be used for multi class classification, wherein an entity of concern may belong to more than one class.

References

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