

Investigating of Geometrical and asymptotical properties of multivariate data in High-Dimensional Space

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Abstract:

Hyperspectral data provide abundant information about objects. The increased dimensionality of such hyperspectral data greatly enhances the data information content but it arises various problems for conventional data analyzing techniques. Some researches investigated Geometrical, statistical and asymptotical properties of data in high dimensional space, but they less consider on some aspect of this space like angular spectral. In this paper some behaviors of data from geometry point of view are investigated. As we know when dimensionality increases the amount of volume increases and concentrates in the corners. Consequently the distance between classes monotonically increases but the amount of spectral angle between classes does not increase as much as distances between classes. This point reveals some interested properties of hyperdimensional space which lead to illustrate the implication of data analysis and gives some directions to define new criteria for discriminant analysis.