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## An Improved DBSCAN, a Density-Based Clustering Algorithm: A Comprehensive Review

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**Abstract:** A popular clustering method, the DBSCAN (Density-Based Spatial Clustering of Applications with Noise) algorithm is well-known for its capacity to identify clusters of any shape and for successfully differentiating noise in datasets. Its fundamental mechanism depends on two parameters: MinPts, the smallest number of points needed to produce a dense zone, and epsilon ( $\varepsilon$ ), which specifies the neighborhood radius. Because of these characteristics, DBSCAN is very helpful for a wide range of real-world applications, including anomaly detection, picture recognition, and spatial data analysis. Notwithstanding these advantages, DBSCAN's performance deteriorates in some situations, particularly when dealing with high-dimensional datasets and situations where cluster densities differ greatly.

To overcome the aforementioned drawbacks of the conventional technique, we introduce Improved DBSCAN, an improved version of DBSCAN, in this study. Our approach's main innovation is the dynamic density threshold method we introduced. In contrast to typical DBSCAN, which employs a fixed and global  $\varepsilon$  value for every point, our approach calculates a local density threshold for every dataset region. Because the global  $\varepsilon$  parameter in the original DBSCAN is so stiff, clusters with different densities—which are frequently misrepresented or merged—can be handled more effectively by the algorithm thanks to this adaptive approach.

Keywords: Density based Algorithm, Clustering Algorithm, DBSCAN, Noise



