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Procedia Computer Science 92 (2016) 136 – 141

Procedia Computer Science

2nd International Conference on Intelligent Computing, Communication & Convergence

(ICCC-2016)

Srikanta Patnaik, Editor in Chief

Conference Organized by Interscience Institute of Management and Technology

Bhubaneswar, Odisha, India

An Efficient And Scalable Density-Based Clustering Algorithm For Normalize Data

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Abstract

Data clustering is a method of putting same data object into group. A clustering rule does partitions of a data set into many groups supported the principle of maximizing the intra-class similarity and minimizing the inter-class similarity. Finding clusters in object, particularly high dimensional object, is difficult when the clusters are different shapes, sizes, and densities, and when data contains noise and outliers. This paper provides a new clustering algorithm for normalized data set and proven that our new planned clustering approach work efficiently when dataset are normalized.
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Peer-review under responsibility of the Organizing Committee of ICCC 2016

Keyword: Density based Clustering Algorithm, Computational complexity.

1. Introduction

Clustering is most typically used and a lot of powerful unsupervised learning technique in data processing [1]. It is helpful method that aims to arrange the input data set in to a collection of finite range of semantically consistent group with respect to some similarity . These algorithms will be roughly classified into seven classes, particularly Hierarchical algorithms, Density-based algorithms, Partitional algorithms, Graph-based algorithms, combinational algorithms, Grid-based algorithms , and Model-based algorithms [2]. Several issues related with use of these clustering mechanism are describe in [20]. Among these varieties of algorithms , Density-based

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Peer-review under responsibility of the Organizing Committee of ICCC 2016
doi:10.1016/j.procs.2016.07.336

algorithms are measure renowned for his or her easy explanation and therefore the relative straightforward implementation. Another two vital benefits of this algorithms are measure it is able of discovering clusters of various shapes and different size even in outlier data set and it does not need users to specify the amount of clusters. The purposed Density-based algorithms are distinguishing dense regions that are measure separated by low-density regions. DBSCAN provides high-quality performance but it depends on two specified parameters, r and MinPts [3]. It is time consuming for looking the closest neighbors of every object is unbearable within the cluster expansion and choosing different beginning points outcome in quite different consequences. Thus our objective is improved DBSCAN rule and projected a new DBSCAN rule for normalized dataset. Data normalization is method for linear transformation of data to a particular range.

The rest paper is organized as follows. Section 2 gives a summary of related work and described the traditional DBSCAN in detail. In Section 3, we present our improved clustering algorithm for normalized data based on Influence Space in detail. Finally, Section 4 concludes the paper and gives some future research.

2. Related Works

The documented DBSCAN algorithm is widely employed in applications such as social science[21, 22], anomaly detection[23, 24], biomedical image analysis[25] and spectroscopy. where it's needed to spot outliers and characterize clusters having impulsive shapes [4]. The main disadvantage of DBSCAN is that the high complexity within the neighborhood query for every object to construct the similarity matrix. DBSCAN algorithm cluster a low dimensional area whereas its performance degrades when managing with high-dimensional and large-scale information sets [5]. During this section, we have a tendency to first summary the most plan of DBSCAN then we have a tendency to discuss our planned DBSCAN algorithm for normalized information.

The DBSCAN Algorithm

DBSCAN is a good Density-based clustering rule initially for spatial catalog systems owing to its capability of checking out clusters with discretionary shapes. There are two major parameters in DBSCAN which are needed to be fixed, r and MinPts in which r represents the radius of a vicinity from the observing degree and MinPts suggests that the minimum variety of information degrees contained in such a vicinity. Suppose we tend to measure a given data set of n degrees Dataset ={ y1, y2,…,yn}. In DBSCAN, three completely dissimilar relationships between any two different degrees are measure outlined as follows:

2.1 Directly density reachable:A degree q is directly densible reachable from a degree p if q belong to Nr(p) and Nr(p) >=MinPts, where Nr(p)={q| distance (p,q)<=r}. Values of distance (p, q) are different with various distance functions

2.2 Density reachable: A degree q is density reachable to a degree p with regard to r and MinPts, if there is a series of degrees q1,…,qn, q1 = p, qn = q, such that qi+1 is directly density- reachable from qi with regard to r and MinPts, for1<=i<=n, qi belong to Dataset.

2.3 Density connected: A degree q is density connected to a degree p with regard to r and MinPts if there is a degree m belong to Dataset such that both q and p are density reachable from m with respect to r and MinPts.

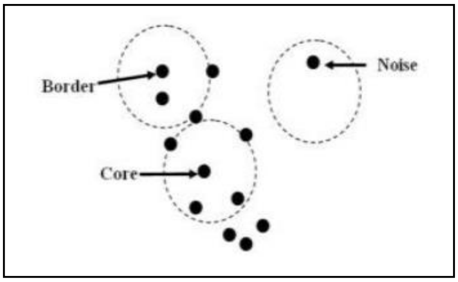

Fig. 1.Ouliers, Border and Core degree

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