Chapter 4
Comparative Analysis Implementation of Queuing Songs in Players Using Audio Clustering Algorithm

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ABSTRACT

This chapter compares the toughness of k-means, DBSCAN, and adaptive clustering algorithms for grouping data points into distinct clusters. The k-means algorithm is a widely used method that is easy to implement and efficient. The DBSCAN algorithm is a density-based method that is well-suited for datasets with clusters of varying densities, but it can be sensitive to the choice of parameters. In order to determine the ideal number of clusters within a dataset, adaptive clustering algorithms dynamically alter the number of clusters during the clustering process. The production of these algorithms is evaluated on a variety of datasets, and the results are compared in terms of accuracy and efficiency. According to the chapter's conclusion, each method has advantages and disadvantages of its own, and the ideal approach to apply will vary depending on the particular dataset and the objectives of the study.

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1. INTRODUCTION

While the term didn't exist, the idea of multimedia could be taken back to when the 19th-century composer Richard Wagner believed in the concept of Gesamtkunstwerk, meaning 'total artwork.' In modern times, a multimedia device can be an electronic device, such as a smartphone, a videogame system, or a computer (Joachims, 1998). Multimedia presentations are presentations featuring multiple types of media. The different types of media can include videos, animations, and audio. Music is played in public and private areas, highlighted at festivals, rock concerts, and orchestra performances, and heard incidentally as part of a score or soundtrack to a film, TV show, opera, or video game (Bonnin & Jannach, 2014; Assi, et al., 2018; Density-based algorithm for clustering data – MATLAB, 2021).

A typical data analysis method used to locate groups or clusters within a dataset is cluster analysis. Data points in a cluster are more similar to one another than those in other clusters, and these groups are frequently based on the similarity of data points within the dataset (Rabiner & Juang, 1993).

One of the key applications for cluster analysis is market segmentation. By grouping customers into distinct clusters based on their characteristics and behavior, businesses can tailor their marketing efforts to better appeal to each group (Derindere Köseoğlu, et al., 2022). For example, a retail store might use cluster analysis to identify groups of customers who are likely to be interested in different products or services. By targeting these groups with specific marketing campaigns, the store can increase its sales and improve customer satisfaction (Ead, & Abbassy, 2021).

Another application of cluster analysis is in customer profiling. Businesses can create detailed profiles of each group by grouping customers into distinct clusters based on their characteristics and behavior. This can help businesses better understand their customers, predict their needs and preferences, and design products and services that better meet those needs (Abbassy & Mohamed, 2016). For example, a financial services company might use cluster analysis to identify groups of customers who are likely to be interested in different financial products, such as savings accounts, credit cards, or investments. By creating profiles of these groups, the company can design products and services that better meet their needs and preferences (Ead & Abbassy, 2022).

Another common application of cluster analysis is in social network analysis. By analyzing the connections between individuals in a social network, researchers can identify groups or clusters within the network. These groups can be based on the similarity of individuals within the network or on the strength of their connections. By understanding the structure of these groups, researchers can gain insight into the dynamics of the network and identify key individuals or groups who play a significant role in the network (Kumar, et al., 2022).

In conclusion, cluster analysis is a powerful data analysis technique that has a wide range of applications. This technique can help businesses and researchers better understand their data and make more informed decisions, whether used for market segmentation, customer profiling, or social network analysis. By grouping data points into distinct clusters, cluster analysis allows us to identify patterns and trends within a dataset and can provide valuable insights into the structure and behavior of the data.

2. TERMINOLOGY

In the context of clustering, various expressions, and ideas are frequently employed. Among the most significant ones are:

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