Chapter 9
Customer Segmentation Using K-Means Algorithm

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ABSTRACT

In this research paper, authors explore the application of the K-means algorithm and the elbow method in customer segmentation using machine learning techniques. The algorithm is applied to a customer dataset and effectiveness of the resulting customer segments is evaluated. The performance of K-means with other clustering techniques is compare and the impact of different input parameters on the segmentation results is studied. The findings of this study can help businesses to improve their marketing strategies by targeting specific customer segments with customized marketing campaigns.

DOI: 10.4018/979-8-3693-8442-8.ch009

INTRODUCTION

Customer segmentation is the subdivision of a business customer base into groups called customer segments such that each customer segment consists of customers who share similar market characteristics. This segmentation is based on factors that can directly or indirectly influence market or business such as products preferences or expectations, locations, behaviours and so on. The importance of customer segmentation include, inter alia, the ability of a business to customise market programs that will be suitable for each of its customer segments; business decision support in terms of risky situation such as credit relationship with its customers; identification of products associated with each segments and how to manage the forces of demand and supply; unravelling some latent dependencies and associations amongst customers, amongst products, or between customers and products which the business may not be aware of; ability to predict customer defection, and which customers are most likely to defect; and raising further market research questions as well as providing directions to finding the solutions (Chinedu Pascal Ezenkwu, Simeon Ozuomba, Constance kalu, 2015).

Customer segmentation is one of the application of data mining which helps to segment the customers with similar patterns into similar clusters hence, making easier for the business to handle the large customer base. This segmentation can directly or indirectly influence the marketing strategy as it opens many new paths to discover like for which segment the product will be good, customising the marketing plans according to the each segment, providing discounts for a specific segment, and decipher the customer and object relationship which has been previously unknown to the company. Customer segmentation allows companies to visualise what actually the customers are buying which will prompt the companies to better serve their customers resulting in customer satisfaction, it also allows the companies to find who their target customers are and improvise their marketing tactics to generate more revenues from them (Tushar Kansal, Suraj Bahuguna, Vishal Singh, Tanupriya Choudhury,2018).

Clustering has proven efficient in discovering subtle but tactical patterns or relationships buried within a repository of unlabelled datasets. This form of learning is classified under unsupervised learning. Clustering algorithms include k-Means algorithm, k-Nearest Neighbour algorithm, Self-Organising Map (SOM) and so on. These algorithms, without any knowledge of the dataset beforehand, are capable of identifying clusters therein by repeated comparisons of the input patterns until the stable clusters in the training examples are achieved based on the clustering criterion or criteria. Each cluster contains data points that have very close similarities but differ considerably from data points of other clusters(Chinedu Pascal Ezenkwu, Simeon Ozuomba, Constance kalu,2015).