



MALL CUSTOMER SEGMENTATION

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Abstract—Think about the scenario when you are seeking to forecast the marketing performance of a particular product. Customers could be categorized into many groups based on how they behave in the market. Recognize that our five senses cannot possibly process the tremendous amount of information that is available. Algorithms for machine learning and processing power will be used. One of the many important uses of unsupervised learning is customer segmentation. Make use of clustering algorithms (K- means, Agglomerative, and Mean Shift) to pinpoint client segments where the potential user base is most likely to be. As a result, groupings of customers are created based on shared traits like gender, age, and spending habits. Age and gender-related trends can also be found using K-means clustering. Examine their yearly revenue and after that, expense totals. Compared to the existing model, which makes use of Mini Batch K-means, the results from the projected model are more accurate.

Keywords: clustering, algorithms, segmentation.

I. INTRODUCTION

Establishing, nurturing, and managing successful long-term customer relationships has always required organisations to have access to the information necessary to manage client connections. Recognizing consumers as an organization's primary asset is becoming more and more important in the modern era. Customer development, maintenance, and acquisition strategies are being rapidly funded by organizations. Business intelligence is essential for empowering companies to use technical expertise to enhance outreach and consumer education initiatives. Through the application of clustering techniques, customers with equivalent means are grouped together. The marketing team uses customer segmentation to pinpoint and highlight several client groups that have unique purchasing patterns and thought processes.

The identification of clients with a variety of preferences, expectations, desires, and needs is facilitated by customer segmentation. In addition to other qualities. To enable the marketing team to develop a unified marketing plan, customer segmentation's core purpose is to group customers with similar interests. From vast amounts of unstructured and raw data, clustering is an iterative process for extracting knowledge. Clustering is a kind of exploratory data mining in many areas, including machine learning, classification, and pattern recognition.

II. LITERATURE REVIEW

Decision-makers take into account a range of characteristics when segmenting clients [1]. The most fundamental and often utilized demographic segmentation parameters are age, gender, family, education level, and income. Socio-cultural, regional, psychographic, and behavioural variables are some of the additional key segmentation criteria that are used.

[2] Gave a summary of different clustering algorithms divided into partitioning, hierarchical, density, grid-based, and model-based algorithms which is also taking into account of Big Data features including size, noise, dimensionality, algorithm calculations, and cluster structure.

[3] A number of data mining strategies for identifying subgroups, clustering, and customer segmentation were investigated. The models enabled a highly personalized clothes producer (e-tailor) to better understand consumer preferences by creating six market groupings and 49 regulations. Due to the complexity and flaws of these clustering DM techniques, more advancement in methodology.

[4] Used clustering techniques, a key component of CRM, to examine the necessity of client segmentation. The two most widely used clustering techniques, hierarchical K-Means and hierarchical clustering, were compared for advantages and disadvantages. By merging the aforementioned two methods with the potential to perform better than the individual ideas, the idea of creating a hybrid strategy is finally addressed. Fuzzy c-means and genetic algorithms were used in conjunction to cluster the consumers of the steel sector

[5]. Two clusters of customers were created using the LRFM variables (length, recency, frequency, and monetary value) approach.

III. METHODOLOGY

• Clustering

Clustering is the most widely used methods for examining data and understanding the data structure. It may be viewed as the work of discovering the subgroups throughout the full dataset. The data are grouped with other members of the same subgroup. A cluster is a collection of gathered data points due to certain commonalities. Clustering is a technique used in market basket analysis to divide customers into groups based on their behavior.

• Clustering algorithm k mean

The K Means clustering method is the most widely used and fundamental machine learning technique, which uses an iterative procedure to attempt and split the dataset into various "k" numbers of separate, non-overlapping subgroups, with each data point belonging to just one sub group.

• Elbow approach

The elbow approach is a tool for examining the clusters created from our dataset and aids in determining the correct number of ideal clusters in the dataset. This helps establish the precise number of optimal clusters in our sample. This approach shows that the optimal number of clusters for our dataset is six.

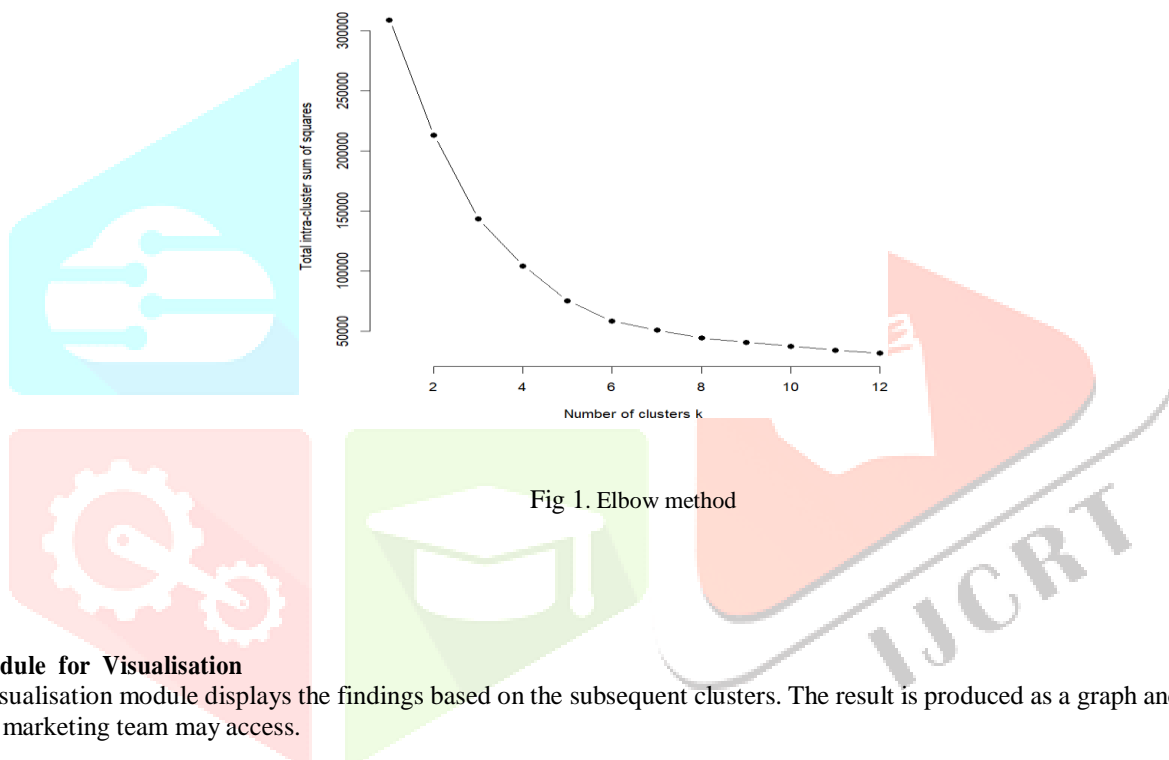


Fig 1. Elbow method

• Module for Visualisation

The visualisation module displays the findings based on the subsequent clusters. The result is produced as a graph and stored as an image that the marketing team may access.

IV. ADVANTAGES

- By adopting segmentation, businesses may better understand the needs and preferences of their customers.
- Companies that comprehend the needs and interests of their clients may provide more personalized experiences.
- Segmentation aids firms in better resource management by focusing on the most crucial client segments and reducing wasteful spending on less lucrative groups.
- By developing focused strategies and providing individualized experiences, businesses may differentiate themselves from competitors and get a competitive edge in the market.

V. LIMITATIONS

- Customer segmentation can be a difficult process that requires a lot of resources like time, money, data analysis, expertise.
- Segmentation could be costly.
- Biases, including prejudices and assumptions, may affect segmentation, leading to inaccurate findings and failed marketing strategies.

VI. CUSTOMER SEGMENTATION RESULTS

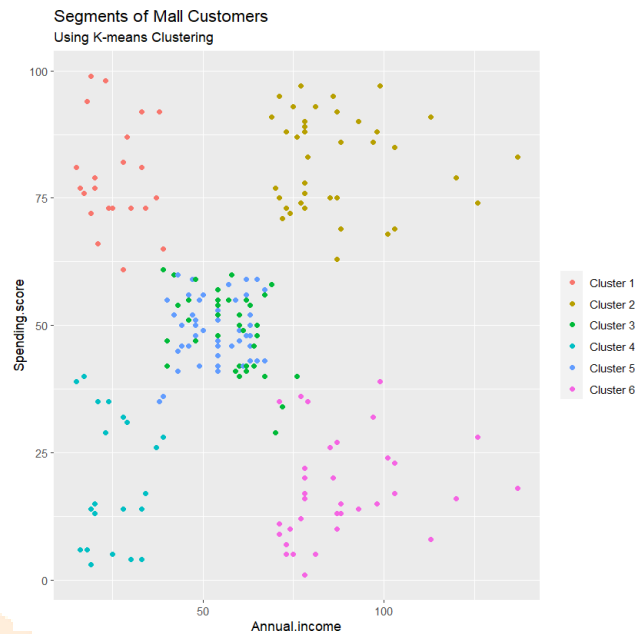


Fig 2. Customer segmentation results

- Cluster 1 (Red Color) represents earning less but spending more
- Cluster 2 (brown Color) represents earning highland also spending high [Target customers]
- Cluster 3 (Green Color) represents average in terms of earning and spending
- Cluster 4 (cyan Color) represents spending less as well as earning less
- Cluster 5 (blue Color) represents average in terms of earning and spending
- Cluster 6 (magenta Color) represents earning more but spending less

Stimulus: The marketing team presses the K-Means execution button. Response: The results are generated in the form of a graph and stored as image. With clusters K=6.

VII. CONCLUSION

We've began by pre-processing the data. We then used clustering methods. Following a comparison of different clustering models, we chose K-Means as the first model. Following that, we separated the data into six groups since it's simple to predict client behaviour using these clusters. But each of the clusters has its own unique features.

VIII. REFERENCES

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