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An Implementation on User Centered Website Using Customer Segmentation

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Abstract: ***The days when we ran our company based on assumptions and presuming that all of our consumers had similar demands are long gone. To have high customer retention and increase sales in the rapidly evolving business world of today, we need to know our clients inside and out. Customer segmentation is a tried-and-true strategy for achieving this. Businesses can better utilize their marketing budgets by segmenting their markets. They can also get an advantage over rival enterprises and, most importantly, show that they have a better understanding of their customers' needs and wants. Customer segmentation is the process of grouping your consumers according to shared traits like habits or demographics so you can market to them more successfully. In order to keep customers and make money from them, customer segmentation has become very popular in recent years. In the study that follows, customers of various organizations are categorized according to their behavioral characteristics, such as spending and income. By taking behavioral factors into consideration, these methods are more effective than others. Customers are categorized based on behavioral characteristics using a machine algorithm known as the k-means clustering method. Using such clusters, the business can target certain clients and offer the material to them through advertising campaigns and social media platforms that they are truly interested in.***
Keywords: User Interest, Segmentation, Machine Learning, Data analysis.

I. INTRODUCTION

Now a days Customer segmentation became very popular method for dividing company's customers for retaining customers and making profit out of them, in the following study customers of different of organizations are classified on the basis of their behavioral characteristics such as spending and income, by taking behavioral aspects into consideration makes these methods an efficient one as compares to others. For this classification a machine algorithm named as k-means clustering algorithm is used and based on the behavioral characteristic's customers are classified. Formed clusters help the company to target individual customers and advertise the content to them through marketing campaigns and social media sites which they are really interested in.

Breaking the target audience down into smaller segments is one of the most important tasks a marketer can do in order to increase the likelihood of having a successful marketing strategy. Now a days businesses are targeting the wrong customers. Failing to see any return on investment (ROI) can be a real drag. This system divides customers of different organizations and are classified on the basis of their behavioral characteristics such as spending and income, by taking behavioral aspects into consideration makes these methods an efficient one as compared to others. The product or service we are offering is great, in fact, we're doing all the right things. Optimizing our website for SEO, posting regular content, sending email campaigns to our database, and keeping active on social media pages, advertising online. But still no profits. Our system will divide customers
into groups that reflect similarity among customers in each group. It will help to increase sales through personalized content tailored to the respective segment.

II. RELATED WORK

The coincident monthly peak contribution (CMPC), a novel statistic that measures how much each customer contributes to the system's peak demand, has been proposed [1]. Specify and outline the procedures that can be used to create a behavioral-based segmentation model that distinguishes African credit cardholders based on their purchasing data [2].

The regularized k-means clustering approach with L1-norm for independent case should be expanded to the elastic net penalty clustering method with an emphasis on correlated variables [3].

To put out a unified data mining strategy for assessing and defining client profiles in video on demand (VoD) services [4].

By the use of a sophisticated clustering technique to identify various donor segments, features of online donors in Taiwan were investigated [5].

Define and describe the steps that can be taken to build a behavioral-based segmentation model that differentiates African credit cardholders based on their purchases data [6].

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III. PROPOSED METHODOLOGY

Customer Segmentation Customer segmentation is the process by which you divide your customers up based on common characteristics – such as demographics or behaviors, so you can market to those customers more effectively. There are different factors of segmentation that should be given careful consideration. Customer segmentation can be broken down into two types:
The process of understanding who customers are typically focuses on demographics. This will include factors such as:

1) Age
2) Geography
3) Urbanization – are they city or rural?
4) Income
5) Relationship status
6) Family
7) Job type Segmenting customers based on what they do you can also segment customers based on how much they spend (share of wallet), how often, and what products (this allows you to see how much you can increase spend). This is more behavior focused.

Breaking this down even furthr, behavior can vary and you might want to look to separate as follows:

a) Basket size
b) Share of wallet
c) Tenure (how long they stay with you)
d) Long Term loyalty (a function of share of wallet and tenure)

IV. SYSTEM IMPLEMENTATION

A. User Interface



Registration Page

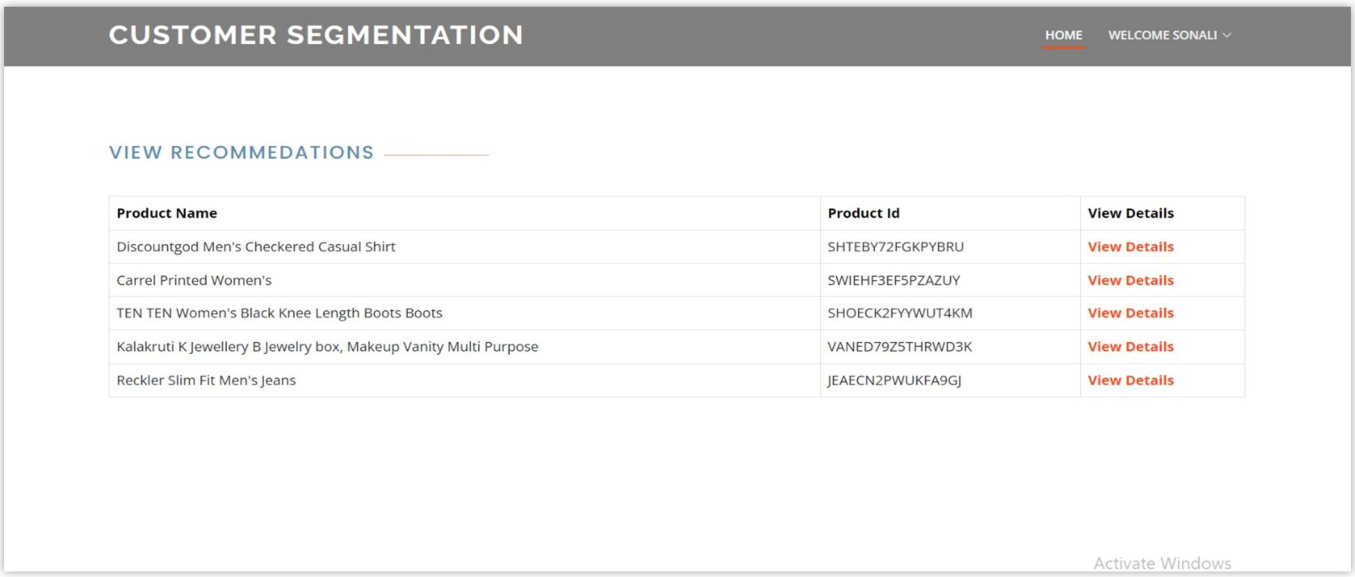


Login Page

1) *Home:* This button would redirect the user to the home page of the website. This page contains the file picker to allow user to select local video files, upload button and the live detection button.
2) *About:* This button would redirect the user to the about page of your website. This page contains information about the working of the system and its use cases.
3) *User:* This button would redirect the user to product page . The products are shown on the basis of age of the customers.
4) *Admin:* It manages the system and its users to ensure that the website or web application is functioning properly, delivering a positive user experience, and maintaining the security of the system.

B. Recommendation of Products

After successful login the products are shown on the basis of age.



Recommended Products

1) Dataset Description

Our dataset contains previous customers personal and transactional records who have used our website to shop for products. It contains columns like product name, product ID, category tree, transaction ID, customer details, price etc.
Our dataset contains nearly thousand rows as this website is basically used by small businesses.

2) Dataset Connection

Connecting to a database using Java involves several steps.

a) First we need to Load the JDBC driver for the database we want to connect to.
b) After loading driver we create a connection string that includes the URL, username, and password for your database.
c) Then we use the Driver Manager class to establish a connection to the database
d) After performing above 3 steps we have DB connection. Once we have a connection, we can use it to execute SQL statements.
e) When we are done executing statements, we need to close the connection.

3) Clustering using K-means

Firstly we define the value of k which means how many clusters the dataset needs to be divided in.
The algorithm works by partitioning a dataset into k clusters based on the distance between each data point and the centroid of its assigned cluster.

a) Initialize k centroids randomly.
b) Assign each data point to its nearest centroid, forming k clusters.
c) Recalculate the centroid of each cluster as the mean of all the data points assigned to it.
d) Repeat steps 2 and 3 until the centroids no longer change or a maximum number of iterations is reached.

Here we defined k as 4, and we divided the clusters on the basis of age of customers that previously bought products from customer. The age ranges defined were 0-20, 20-40, 20-60, 0-10. The new user enters the website through the registration page where he provides information like name, address, date of birth, gender, mobile number, email, password. The system takes useful information like age derived from date of birth, gender for customer segmentation. Now based on the previous user's dataset, the products are classified on the basis of various customer segments using K-means clustering. So if a user of age 25 enters the website, the recommendation shown to him will be that from collection of products ranging in the cluster group 20-40 derived from k-means clustering result. Based on that user can select the product of their choice.

4) Association using Apriori Algorithm

After choosing the product from the given list of recommendations, the website is responsible for further suggesting products that can be frequently bought together.

a) *Data Preparation:* The data needs to be transformed into a format that can be used by the Apriori algorithm. This typically involves creating a table where each row represents a unique transaction and each column represents a different item. The entries in the table represent whether or not the item was included in the transaction. Our dataset already contains the transaction and user details so no such modification is required.

b) *Set Minimum Support Threshold:* The minimum support threshold is set based on domain knowledge and/or experimentation. For example, if 5% of transactions contain both items A and B, then the support threshold for the itemset {A, B} might be set at 5%.

c) *Generate Frequent Item Sets:* The Apriori algorithm is used to generate frequent itemsets that meet the minimum support threshold. For example, if the support threshold is set at 5%, the algorithm might find that the itemsets {milk}, {bread}, and {milk, bread} are all frequent.

d) *Generate Association Rules:* Once the frequent itemsets have been identified, association rules can be generated. For example, if the confidence threshold is set at 50%, the algorithm might generate the rule {milk} -> {bread}, indicating that customers who buy milk are likely to buy bread as well.

e) *Prune Redundant Rules:* Once the association rules have been generated, any rules that are redundant can be pruned. For example, if there are two rules with the same antecedent and different consequents, the rule with the higher confidence can be retained and the other rule can be discarded.

f) *Interpret the Results:* Finally, the association rules can be interpreted to gain insights into customer purchase patterns. For example, if the rule {milk} -> {bread} has a high confidence, it suggests that customers who buy milk are likely to buy bread as well. This information can be used to inform marketing strategies, such as placing milk and bread in close proximity in the store or offering a discount for customers who buy both items together.

V. OPEN ISSUES

Many businesses today operate online, therefore internet marketing is necessary to maintain clients. Nevertheless, because of this, businesses should treat all of their customers similarly and use similar marketing strategies. Customer segmentation is growing in popularity and has emerged as an effective technique to address this issue because marketing strategies are not very effective and actually irritate customers by ignoring their individuality.

Customer segmentation is the process of categorizing a company's consumers based on behavioral (such as the sorts of products they order and their annual income) and demographic (such as age, gender, and marital status) characteristics. Behavioral factors are a better technique for consumer segmentation since they focus on individuality and allow for accurate segmentation, whereas demographic characteristics do not because customers of the same age groups may have distinct interests. The suggested system targets the ideal clients to accelerate business growth. The project's objective is to boost sales by creating individualized content that is relevant to each segment.

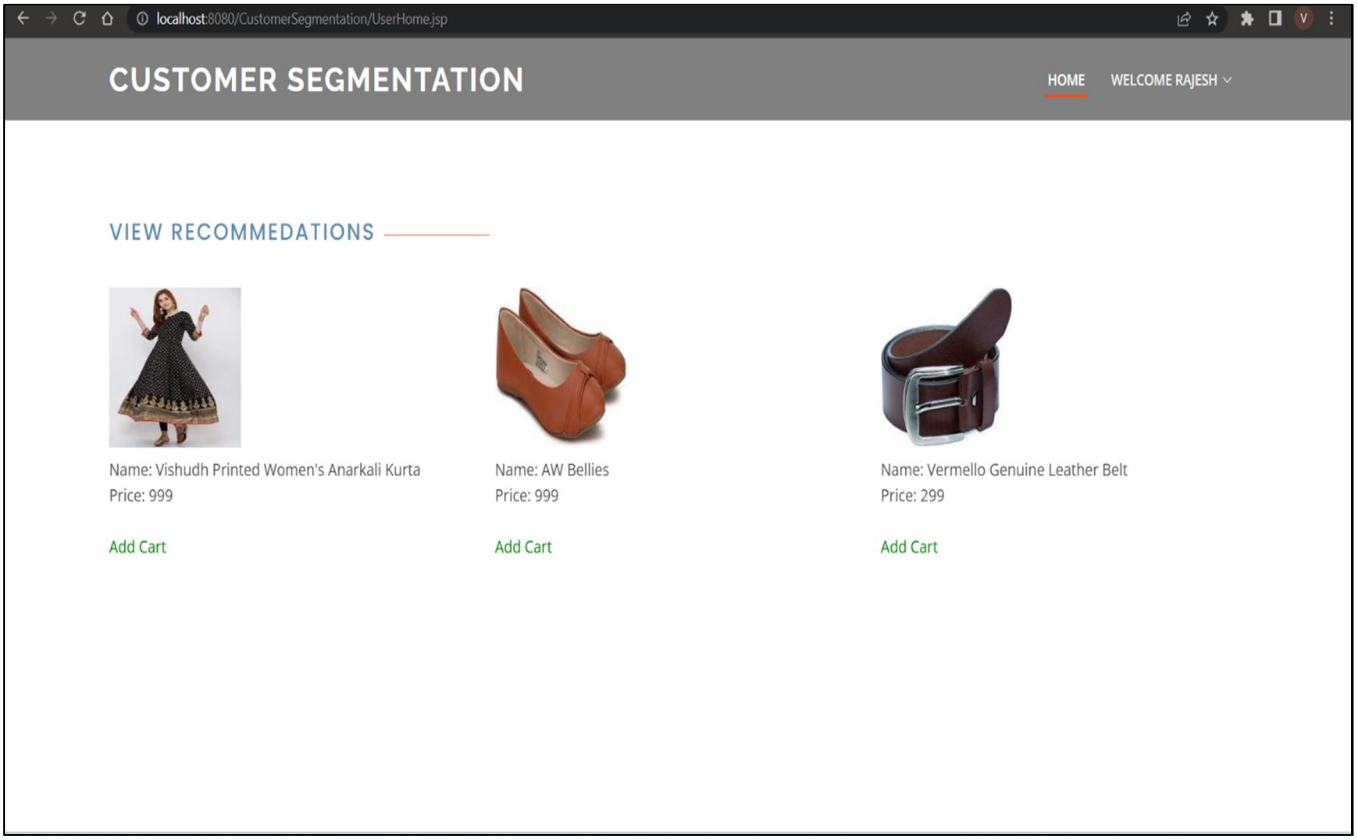
VI. FUTURE SCOPE

Customer segmentation is the process of dividing customers into groups based on specific characteristics such as demographics, behavior, and purchasing patterns. The practice of customer segmentation has been around for decades and has become a vital part of marketing strategy. Looking into the future, there are several trends and developments that are likely to impact the scope of customer segmentation:

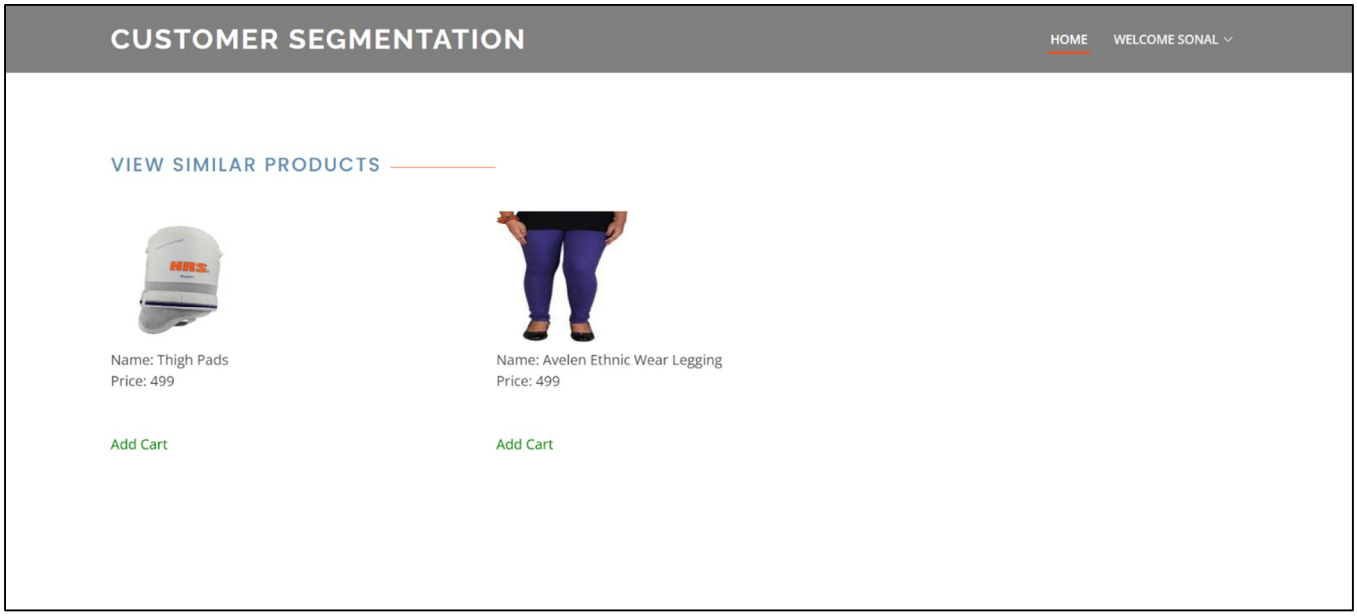
1) *Advancements in Technology:* Technology is rapidly evolving, and new tools and platforms are emerging that can help companies collect, analyze and interpret customer data more effectively. This includes the use of machine learning and artificial intelligence, which can help companies identify patterns and insights that would be difficult or impossible to discern with traditional methods.
2) *Personalization:* With the rise of personalization, customers expect tailored experiences that meet their unique needs and preferences. Customer segmentation can help companies create personalized experiences by understanding customer behavior and preferences, and tailoring their products and services accordingly.
3) *Customer Journey Mapping:* Understanding the customer journey is becoming increasingly important for companies. By mapping out the customer journey and identifying touchpoints where customers interact with the company, companies can gain insights into customer behavior and preferences, and use this information to create more targeted marketing campaigns.
4) *Increased Focus on Customer Experience:* Customer experience is becoming a top priority for companies across all industries. Customer segmentation can help companies create a more personalized and engaging customer experience by understanding customer behavior and preferences.
5) *Omni-Channel Marketing:* With the proliferation of digital channels, companies are increasingly adopting an omni-channel approach to marketing. Customer segmentation can help companies create targeted campaigns across multiple channels, and ensure that each customer receives the right message at the right time.

In conclusion, customer segmentation will continue to be a critical part of marketing strategy in the future. As technology evolves and customer expectations change, companies that are able to effectively segment their customers and create personalized experiences will be better positioned to succeed in an increasingly competitive marketplace.

VII. RESULTS



Recommended Products



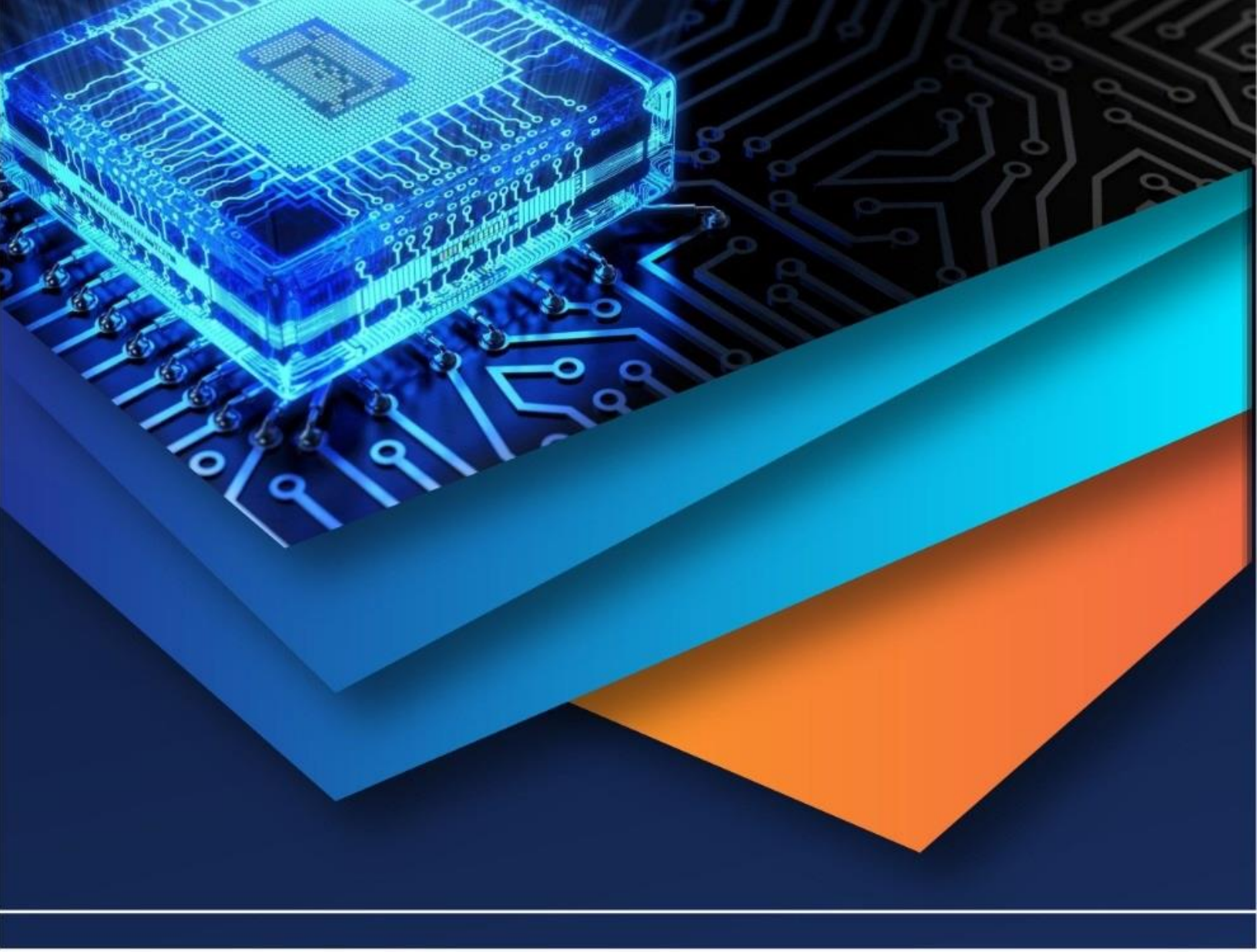
Similar Recommended Products

VIII.CONCLUSION

Several machine learning algorithms will be used in this project to identify the target consumers of companies using various customer segmentation techniques. Based on that analysis, we will propose complementary products to new users on the product's website. This study also demonstrates that segmenting customers based on behavioral characteristics is a better approach for solving the current customer segmentation problem, and the K-means clustering algorithm is identified as a good choice for this approach. Customer segmentation is performed on the company's customer data, and with the help of K-means clustering machine learning algorithm, customers are divided using features like total spending and annual income.

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