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Analysis of Customer Behavior in online Shopping

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Abstract:
Nowadays, most people are using online shopping for buying products. The modern techniques replaced our old model of shopping completely with lot of improvements and by enhancing customer satisfaction which provides round a clock service without any time considerations. This manner of purchasing is known as business-to-consumer online shopping. The main theme of this project is to analyze the behavior of such people who are interested in doing online shopping and spending their time by searching for different needs. However, The changes in the marketing style and growing technology made people adapt to online shopping. This analysis is useful for sales improvement of products.

Keywords: Online shopping, Maximum sold product, e-commerce, Future Sales.

Introduction

The internet plays a major role in our lives. By the rapid growth of internet usage, people are habituated to fulfill their requirements in virtual mode. Shopping is an important and necessary activity in everyone's life. In the past, people used to do their shopping by visiting the nearest stores which was a time-consuming process and cost ineffective. To overcome all these, online shopping was introduced. By the features of online shopping, people are mostly attracted to it. Marketing is an ability that induces and provides customer satisfaction in shopping. The traditional approaches of marketing are replaced with modern technologies where the buyer and seller meet in virtual mode. In this growing demand of online shopping, it is necessary to know the behavior or mindset of customers frequently.

All the e-commerce websites provide promo codes as offers for improving the sales profit by providing more customer satisfaction but most people don't know about it and some customers won't show their interest in using promo codes. Online shopping has many things to consider like the area where the product sales are high, which company product has more sales. The e-commerce websites should be dynamic and able to handle multiple requests of customers. These e-commerce websites are mostly used by the people but there are few, who are not interested in doing their shopping online. Here, analyzing the customer behavior is very important in online shopping for improvement of sales.

Generally purchasing behavior of the customer can be classified based on the factors like count of items has been purchased more, Usage of promo codes, Age of the customer, Frequency of shopping, Profession of the customer and according to the seasons. The study of consumer behavior is trending now. It is interesting concept that evolves around the reasons for the consumer in selecting the specific product which satisfies their need. Many standard associations considered consumer behavior as dynamic process.

Companies also use the Internet to supply, join and distribute statistics and merchandise. Customers uses the

Internet in such a lot of approaches not handiest for buying the products, but also to compare product structures, charges, warranties and transport services. Many specialists are advantageous about the future of online advertising commercial enterprise.

Related Work

In 2019, a paper by Dr. M. Raja Rajeswari and N. Hema was published. By using a database from a browsing online store related to online buying, the authors of this paper examined consumer behavior in online purchases. They used the database to mine the data, and they ran specialized queries to retrieve the information. It took a few green strategies to identify common object groups and determine useful styles. This type of pattern is discovered using association rule mining, which also streamlines commercial decisionmaking processes. The Apriori algorithm and association rule mining are used to analyze consumer behavior. The tactics that might help in the creation of such a sample are discussed in the paper. One of the main information mining tools has been considered to be the association rule.

A study was published in 2018 by M.N. Saroja, S. Kannan, and K.R. Bhaskaran. In order to investigate a customer's purchases, several speculative checks were done in this article. In the beginning, the purchases were evaluated by classifying them according to gender and by looking at which institution of people bought more goods. Additionally, it tells which demographic favors discounts and promo codes as well as the kinds of goods they favor most. Which save has superior product sales, and the whole country has the highest sales? By using three modules, specifically statistics pre-processing, analysis, and prediction, type algorithms with three modules should be used to examine the facts in order to increase product revenue. The suggested gadget goes over the method and methods for reading the data. How the chosen functions impact the purchasing behavior is shown in the Implementation Results segment using

graphs. The final stage gives the work that can be completed on the research's findings and future plans.

In research published in 2018, Muqaddas Gull and Arshi Pervaiz stated that purchasing is an activity done to alter mood. Everyone is interested in online shopping these days instead of visiting the store. Each guy or woman has a different style of behavior and interest. He put forth a plan for analyzing human behavior using various facts mining techniques. Here, datasets from past transactions involving the items and customers are employed, along with techniques like the Apriori set of rules, association rule mining for analyzing customer behavior, and AIS, SETM, and FP-increase for pattern recognition. The Apriori technique, which is used to link together various products like A4B and B4A, has the effect of generating trust and support. The output taken into account when determining the common objects set is subjected to association rule mining.

In 2011, Chenglu Wang published a study. The ability to speak with people on the other side of the planet, send emails around-the-clock, conduct fact searches, play multiplayer games, and even make purchases online has made the internet a significant part of our daily lives. In the meantime, purchasing goods and services over the internet has become very common. It has become a more well-known method on the global Internet (Bourlakis et al., 2008). Additionally, it offers customers more information and options for evaluating products and prices, as well as more choice, convenience, and ease of online item discovery (Butler and Peppard,1998). Online purchasing has been found to bring modern consumers more joy when they're looking for convenience and speed (Yu and Wu, 2007). However, some buyers still experience anxiety when making purchases online. For instance, the main reason why consumers don't shop online seems to be a lack of acceptance as true with. Before making a purchase, customers might also want to inspect and feel the goods, meet friends,

and obtain more feedback on them. Such factors may have 35 unfavorable effects on a customer's decision to make a purchase online. The theoretical and conceptual foundation of this study demonstrates the differences between offline and online consumer conduct manners. Then we discover a few key motivators that influence customers' decisions to buy or stop using online channels for shopping. We conclude by outlining managerial implications for how online merchants might use this knowledge to make their stores more appealing and draw in more online customers.

In 2019, M. Vidya and P. Selvamani published a piece. Providing buyer contentment, which in turn leads to customer satisfaction, is the art of persuasion in marketing. The emergence of modern technology altered conventional advertising strategies in a digital market via the Internet, where customers and merchants interact. This form of product exchange enhanced revenue for the company and customer pleasure by lowering the impact of middlemen on revenues. Unexpectedly, the discipline of study of consumer behavior has grown. Researching the variables that affect a customer's decision to purchase a product to satisfy a need or requirement is a much bigger idea. The American Marketing Association refers to consumer behavior as "the dynamic Customers' positions in business transactions will no longer be dissociated from a company's ability to survive. Since each customer is unique in their behavior and personality, business owners must be able to identify the patterns or practices that customers use to complete transactions. This also occurs in the retail center X, which has issues with its sales system, such as merchandise running out of stock and unsold merchandise, as well as merchandise that isn't in high demand by customers and the products that are the most popular ones. In order to better serve our customers, we need to assess their transactional behaviors. The evaluation of customer transaction patterns inside the valuable retail X may be done

effectively using the association rule with Apriori set of rules approach. The results of the calculation obtained an average proportion of the fee for direction (33%–40%) and the price for confidence (43%–80%). The outcomes of combining the association rule technique with the Apriori algorithm can assist central retail X owners in formulating product structures and selecting tactical steps to boost sales, along with offering discounts or promotions for specific products.

Background

Today people are showing very much interest on online shopping because they felt it more convenient, pleasant, and time-saving. According to the analysis of the poll, there are numerous elements that influence a consumer's decision to buy things online. Time savings, the best pricing, and convenience have been highlighted as the three most important factors. Before choosing a product and making a decision, people check costs in online retailers and then review all reviews and ratings. Safety concerns are the major obstacle to internet shopping. online shoppers are generally satisfied with the prices, delivery, etc. Online shopping is becoming more popular among people between the ages of 18 and 33 as the internet generation has a greater influence on this generation. Since the majority of online shoppers in this age group are employed and have a range of incomes, they have the independence needed to shop online. The frequency with which people use the internet for online shopping, with some respondents indicating that they only do so once every year, every five months, etc. Because there is less physical activity required of the consumer while ordering and receiving things at their doorsteps, 23 respondents said that internet shopping is a lot simpler method of making purchases. like Jaong.com Due to the convenience of online payments and time savings, internet buyers are more inclined to make purchases. Online shopping aids in comparing products from various online retailers as well as, to a certain extent, comparing products from online retailers and those sold in

physical stores in terms of quality, pricing, etc.

Proposed Work

This project proposes a way to increase the sales of the product for a company in e-commerce websites. The analysis of consumer behavior gives the results of maximum purchasing product by the online customers which indicates the company to improve the production of that item which increases the sales profit. The previous results of this kind of work provided the way to do this by using machine learning algorithm.

Methodology

There are several methods that can be used to analyze customer behavior in online shopping and predict the maximum sold product:

Data Collection: Collect data on customer behavior, including browsing and purchase history, demographics, and other relevant information.
Data Pre-processing: Clean and prepare the data for analysis, including dealing with missing values, outliers, and transforming the data into a suitable format for analysis.

Exploratory Data Analysis (EDA): Use visualizations and statistical techniques to understand the patterns and relationships in the data, such as finding the most common product categories, purchasing behavior by time of day, etc.
Customer Segmentation: Segment customers into groups based on their behavior and preferences, such as frequent purchasers, first-time buyers, etc.

Predictive Modeling: Use machine learning algorithms, such as decision trees, random forests, or neural networks, to predict the most likely products to be sold.
Model Validation: Evaluate the performance of the predictive model using metrics such as accuracy, precision, recall, and F1 score, and make improvements as needed.

Deployment: Deploy the predictive model in a production environment to predict the most sold product and provide recommendations to customers.

By following these steps, you can gain insights into customer behavior and predict the maximum sold product in an online shopping setting.
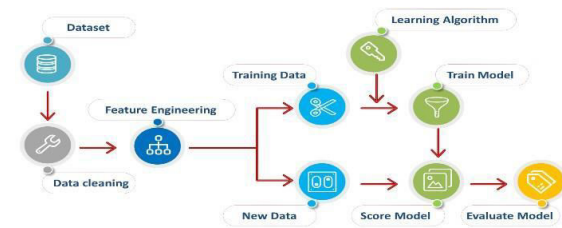
Random Forest Algorithm

Random Forest: This is an ensemble learning algorithm that combines multiple decision trees to improve the accuracy of the predictions.

The Random Forest algorithm is a well-liked option for examining online shopper behaviour and determining the most popular goods. To generate a final forecast, the predictions from all of the decision trees are combined. It works by building a huge number of decision trees, each one constructed from a random subset of the data. When compared to a single decision tree, this method can produce results that are more accurate because it reduces overfitting and catches a wider variety of data patterns.

An overview of how to utilize the Random Forest algorithm to examine online shopper behavior and identify the most popular product is given below:
Data Cleaning and Preparation: Deal with missing values, outliers, and transform the data into a format that is appropriate for analysis.

Engineering relevant aspects from the data, such as demographics, purchase histories, and product categories, that are likely to be connected to consumer behavior.
Model training: Apply the prepared features and data to a Random Forest model. To maximize performance, you

might need to adjust the model's hyper parameters.

Model Evaluation: Assess the model's performance using measures including accuracy, precision, recall, and F1 score, and make any necessary modifications.

Model Deployment: To create predictions based on new data and determine the most popular product, deploy the model in a production setting.

This method of applying the Random Forest algorithm allows you to examine online shopper activity and more accurately determine the product that has sold the most units.

Analyze the Maximum Sold Product

1. Pie charts and bar graphs are used to examine the product category.
2. Using this, we may determine the most popular product sold.

Analyzing the Future Sales

Using a heat map, we assess the correlation between the objects to predict future sales.

Results

The analysis will provide insights into customer behavior, such as the most common product categories, purchasing habits, and factors that influence purchasing decisions. The analysis will identify the maximum sold product based on the prediction from the Random Forest algorithm. The use of a Random Forest algorithm can improve the accuracy of the prediction compared to other methods, as it combines the predictions from multiple decision trees.

Conclusion

In conclusion, the Random Forest algorithm is a powerful tool for analyzing customer behavior in online shopping and predicting the maximum sold product. By combining the predictions from multiple decision trees, the Random Forest algorithm can improve the accuracy and robustness of the predictions compared to using a single decision tree. The algorithm requires careful preparation of the data and feature engineering to ensure that the relevant factors are included in the model. The results of the analysis can provide valuable insights into customer behavior

and support decision-making in areas such as product selection and marketing strategies. The deployment of the model in a production environment can automate the process of predicting the maximum sold product and provide valuable recommendations to customers.

Future Enhancements

The same procedure can be done by using various machine learning algorithms. The accuracy of the model plays an important role in analyzing the customer behavior. future prediction of sales can also be added as a feature to this.

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