Journal of Information Technology application in Education, Economy, Health and Agriculture
Vol. 01, No. 01, Februari 2024, pp. 23~28
ISSN: xxx-xxxx, DOI: -

Analysys of Consumer Buying Behavior of Goods and Services Using The Naïve Bayes Method and Clustering Study in The Computer Service Shop

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Article Info

Article history:

Received January 02th 2024
Revised January 28th 2024
Accepted February 14th 2024

Keywords:

Web Intelligent
Data Mining
Naïve Bayes
Clustering
Segments

ABSTRACT

Based on the observation results at Anik Komputer as a company providing computer, printer, and other device services, online sales results have a significant influence on revenue generation. Therefore, it is necessary to know the most significant factors that influence consumers to buy goods and services online. This study aims to identify factors that influence purchasing decisions, evaluate consumer behavior patterns, and propose strategic steps based on web intelligent. The analysis method uses Data Mining with the Naïve Bayes and Clustering algorithms. The results of this study indicate that the factors that influence purchasing decisions at Anik Komputer are price, customer reviews, and stock availability. Customer segmentation based on purchasing patterns through Clustering analysis produces three main segments, namely loyal customers (30% of total customers) who contribute the most to total sales of 40%, price sensitive customers (50% of total customers) who contribute 45% to sales, and new customers (20% of total customers) who contribute 15% to sales. This analysis provides deeper insight into consumer behavior that can be applied in intelligent web-based marketing strategies to increase the effectiveness and efficiency of online sales.

1. INTRODUCTION

[3]In the digital era, online sales transactions are one of the main pillars of business growth, both in the form of sales of goods and services. At Toko Anik Komputer, as a provider of computer, printer, and other device services, the success of online sales is greatly influenced by the company's ability to understand consumer purchasing behavior. Knowing the factors that drive purchasing decisions is a strategic step that not only helps increase sales but also strengthens competitiveness in the market. The main obstacle faced is the difficulty in identifying the most significant factors that influence consumers to buy goods and services online. In addition, without a deep understanding, promotions and marketing can be less effective, so that the potential for sales growth is hampered. [4]

There are two types of sales, namely sales of services and sales of goods. From the data obtained, sellers need to know what factors influence consumers in purchasing goods and services online, and what

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steps can be taken to increase online sales. Data-based strategic steps are needed to overcome this, including through technological approaches such as Web Intelligence and Data Mining[5]. Web Intelligence technology provides the opportunity to utilize user interaction data on websites and social media as analysis material.Meanwhile, Data Mining methods such as the Naïve Bayes and Clustering algorithms allow processing of consumer transaction data to find relevant patterns and generate strategic insights.[6]

Currently, research related to online sales at Anik Komputer has not deeply analyzed the main factors that influence consumer purchasing decisions. In addition, the application of data-based methods such as the Naïve Bayes and Clustering algorithms to analyze purchasing patterns has not been optimally implemented. This creates a research gap that can be filled with a more systematic approach to understanding consumer behavior and improving marketing strategies. Web Intelligence technology provides the opportunity to utilize user interaction data on websites and social media as analysis material. Meanwhile, Data Mining methods such as the Naïve Bayes and Clustering algorithms enable the processing of consumer transaction data to find relevant patterns and generate strategic insights.[7]

The purpose of this study is to identify factors influencing purchasing decisions, evaluate kinsmen's behavioral patterns and propose strategic steps. The method that will be applied in this study is to collect data and then process the existing data using the naive bayes algorithm with a focus on ordering in order to better understand the factors that influence and the steps that can be taken in the problem.[8]

2. METHOD

Data Collection

- Online sales transaction data at Toko Anik Komputer.
- Customer review data (from the store website or other platforms).
- User behavior data on the website, such as frequently visited pages, viewed products, and time spent.

Data Processing

- Naïve Bayes Classification: To analyze the main factors that influence purchasing decisions based on review data and transaction history.
- Clustering Analysis: Grouping customers based on purchasing patterns to find potential market segments.

Integration and Analysis

- Combining the results of Naïve Bayes analysis with Clustering to provide insights into customer segments that are most responsive to certain promotions.
- Identifying the relationship between user behavior on the website and purchasing decisions.

Strategy Development

- Developing recommendations for more effective marketing strategies, such as personalized promotions, product bundling, or discounts based on customer segments.

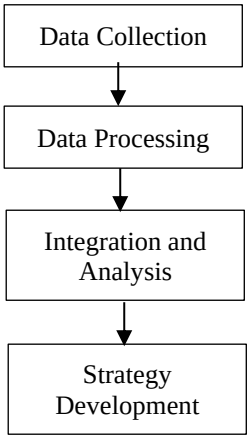


Figure 1. Research Method

3. RESULTS AND DISCUSSION

Data Collection

1. Online Sales Transaction Data

ID	Date	Customer	Products purchased	Qity	Price (Rp)	Payment Method	Transaction Status	Customer Segmentation
TR 001	01-11-2024	Alma	Laptop Asus A415	1	7,500,000	Transfer	Selesai	Loyal
TR 002	02-11-2024	Leo	Printer Canon IP 2770	1	800.000	Trasfer	Selesai	Sensitif Harga
TR 003	03 - 11-2024	Dion	Keyboard	1	50.000	Qris	Selesai	Baru
TR 004	04 -11-2024	Azka	CCTV Ezviz	1	650.000	Transfer	Selesai	Loyal
TR 005	05 –11-2024	Arie	RAM DDR 4	1	370.000	Transfer	Selesai	Sensitif Harga
TR 006	07-12-2024	Atha	Power Supply	1	150.00	Transfer	Selesai	Loyal

2. Review Customer Data on Google Riview

ID	Date	Customer	Rating(1-5)	Comment	Store Response
UL001	01 -12-2024	Lion	5	the best services especially for laptop, Friendly service,don't hesitate to get service here 🔥	Thakyou SIr
UL002	02 -12-2024	Doni	5	Satisfactory service with advice / input from technicians	Thakyou SIr
UL003	03-12-2024	Didit	4	The service is friendly and definitely safe when handled by expert	Thakyou SIr
UL004	04 -12-2024	Deni	5	CCTV is very good, suitable, good installation, friendly...	Thakyou SIr
UL005	05 -12-2024	Fahrul	5	friendly, trustworthy and fast response service	Thakyou SIr

The results of the Naïve Bayes algorithm show that the three main factors that influence purchasing decisions are price, customer reviews, and stock availability.

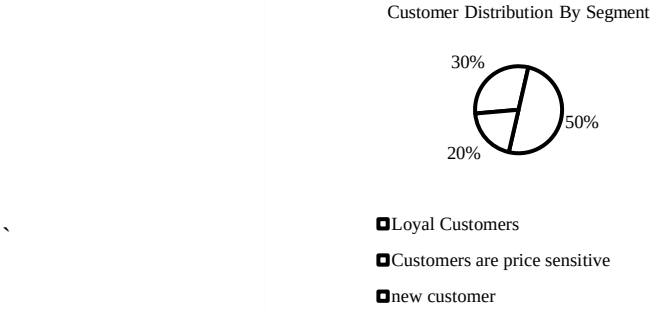
Table.1 Distribution of Customer Segments Based on Purchase Patterns (Clustering Results of 100 Customers in November - December)

Customer	Information	Number Of	Number Of	Contribution to

Segment		Customers (%)	Customers	Total Sales (%)
Loyal Customers	Frequent transactions with high purchase values	30%	30	40%
Price Sensitive Customers	Responsive to discounts/promotions	50%	50	45%
New Customers	First transaction or rare purchase	20%	20	15%

Number of Customers (People):

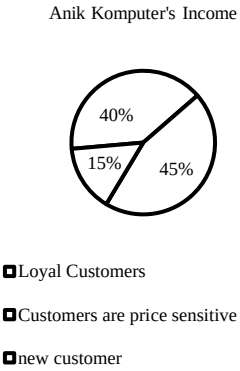
- Loyal Customers: 30%×100=30
- Price Sensitive Customers: 50%×100= 50
- New Customers: 20%×100=20



The clustering results show three main customer segments:

- Loyal Customer Segment: Customers who frequently purchase products or services with high total purchases.
- Price Sensitive Customer Segment: Customers who are responsive to special discounts or promotions.
- New Customer Segment: Customers who are new to transactions or make sporadic purchases.

From this analysis, it was found that loyal customers contributed 40% to the store's total revenue, while price sensitive customers contributed 45%, and new customers around 15%.



3.1. Customer Segmentation Based on Purchasing Patterns

From the Clustering results, three main customer segments were found:

- Loyal Customers (30% of total customers) contributed the most to total sales, which was 40%. They are customers who frequently make purchases with high transaction values.

- Price Sensitive Customers (50% of total customers) contributed 45% to sales. They are very responsive to discounts and promotions, indicating that pricing strategies can be more effective in reaching this segment.
- New Customers (20% of total customers) contributed 15% to sales. Although their contribution is smaller, this segment is very important because they can develop into loyal customers after getting a positive experience.

3.2. Implications for Marketing Strategy

Based on the results of the Naïve Bayes and Clustering analysis, several strategic steps that can be taken to increase sales include:

- Personalized Promotions and Discounts: Provide special offers tailored to customer segmentation, especially for price-sensitive customers who are responsive to promotions.
- Loyalty Programs: Offer incentives to loyal customers such as discounts or gifts to increase customer retention and encourage repeat purchases.
- Improved User Experience on the Website: Optimize the website with more complete information and attractive visuals to increase conversions, especially for customers who are more likely to buy after seeing clear product photos and reviews.
- Improved Customer Service: Respond to customer complaints quickly and improve delivery quality, which has a major impact on consumer purchasing decisions. This is important to maintain customer satisfaction and reduce the potential for purchase cancellations due to delivery or service quality issues.

3.3 Potential Implementation of Web Intelligence

The implementation of Web Intelligence in Anik Komputer Store provides an opportunity to improve customer experience and store competitiveness[9]. By utilizing user interaction data on websites and social platforms, such as frequently visited pages, viewed products, and visit duration, the store can create a more efficient recommendation system. This system will recommend products to customers based on their preferences, increasing the likelihood of purchase[10]. In addition, Web Intelligence allows for the collection of customer feedback that can be analyzed to better understand their needs, guiding the store in designing more accurate and personalized marketing strategies.

3.3.1 Recommendation System

- Product Recommendations Based on Reviews: Products with positive reviews are more often recommended.
- Recommendations Based on Purchase History: The system can provide discounts or bundles based on products that are frequently purchased together.

3.3.2 Strategic Recommendations

Based on the analysis results, several proposed strategies include:

- Promotion Personalization: Providing special offers based on customer purchase history.
- Loyalty Program: Providing special discounts or gifts for loyal customers.
- Website Optimization: Improving the user interface and speeding up page load times to increase shopping convenience.
- Customer Service Improvement: Prioritizing quick responses to customer complaints or questions

4. CONCLUSION

Based on the naive bayes method and Clustering factors that influence Anik Komputer Store using two main methods in Data Mining and Web Intelligence, namely the Naïve Bayes algorithm and Clustering are price, customer reviews, stock availability

Customer Segmentation Based on Purchase Patterns From the Clustering results, three main customer segments were found:

1. Loyal Customers (30% of total customers) provide the largest contribution to total sales, which is 40%.
2. Price Sensitive Customers (50% of total customers) contribute 45% to sales.
3. New Customers (20% of total customers) contribute 15% to sales.

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