# Implementation of The Apriori Algorithm in Managing Stock Items at Drl.Rumahan Retail

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## ABSTRACT

Drl.Rumahan is a retail store that sells a variety of motorcycle lamp modifications. Drl.Rumahan is still struggling with determining stock levels and understanding customer purchases. Additionally, they are not utilizing transaction data as a valuable information source. Without leveraging this data, Drl.Rumahan will fall behind its business competitors and lose customers because the products they seek are unavailable. This situation will inevitably become a significant problem if it continues. This study aims to utilize sales transaction data as valuable information and identify customer purchasing patterns from the sales transaction data. The algorithm used is the Apriori algorithm to identify purchasing patterns from the transaction data set. The results of this study identified the three highest rules: if someone buys a pass beam switch, they will buy a shroud with a support value of 5.8% and a confidence value of 47.6%; if someone buys a shroud, they will buy a pass beam switch with a support value of 5.8% and a confidence value of 45.5%; and if someone buys a shroud, they will buy a relay with a support value of 5.2% and a confidence value of 40.9%. These results can inform business strategy decisions by increasing the inventory of products that form rules and serve as a guide for promotional product packages for products that have rules above the minimum support and minimum confidence.

**Keywords**: Apriori Algorithm; Data Mining; RapidMiner; Retail

## 1. INTRODUCTION

The development of information technology and the need for fast, accurate and relevant information are increasing. Information is needed to add insight, update knowledge, and as material for opinion. Even information can be used as a basic material in making decisions for a company in determining its sales or business strategy. Especially in the retail business, the current state of the retail industry makes competition fiercer than ever. The retail sector has not been able to handle problems that often have an impact on business due to its rapid growth, especially in the management of stock items and the most popular products. Knowing the most popular patterns is very important to pay attention to because it can affect revenue and the success of sales strategies.

Drl.Rumahan is one of the retailers engaged in the automotive sector in the sales and modification services of motorcycle lights, and custom lamp variations such as alis, devil eyes, biled, and the like. Every day this retail occurs an increase in sales transaction data which will cause the storage of a very large amount of product sales transaction data. In most cases, the data pertaining to the huge sales transactions are only stored and used for archives, not adequately exploited. Although it is possible to dig deeper into the huge sales transaction data that can generate useful information. Retailers are unable to manually process and analyze the huge volume of sales transactions.

Another problem is not knowing what products are most often purchased by consumers and some types of goods that are overstocked or out of stock because the demand for these goods is very high. Items that are most in demand often experience a shortage of stock while items that are less in demand actually experience excess stock. Not knowing the purchasing patterns of the most popular products makes it difficult for retailers to manage stock effectively and efficiently. This leads to decreased customer satisfaction and potential financial losses for the retailer.

Since consumer product purchasing patterns are reflected in the huge amount of sales transaction data, this information can be collected through the data mining process by looking for interrelationships between products in the sales transaction data. Because Data Mining is a series of processes to add and search for information that has not been known manually from a database. The resulting information is obtained by extracting and identifying important patterns from the data contained in the database. Data mining is used for research in large databases so it is often called

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Knowladge Discovery Databases (Zega & Fauzi, 2023).

In Data Mining there are many methods and algorithms, one of which is the Apriori Algorithm, because the Apriori Algorithm is a type of association rule in data mining. This algorithm aims to find Itemset combinations that have a certain frequency value in accordance with the criteria or minimum support and confidence specified (Farah Dewi Ramadani et al., 2024).

The Apriori algorithm has two parameters, namely support and confidence to generate rules to get association relationships between products, association rules are a mechanism for calculating the support and confidence of an item relationship. An association rule is said to be valid if the support value is greater than the minimum support and also the confidence value is greater than the minimum confidence. This Apriori algorithm will be suitable to be applied when there are several item relationships to be analyzed. One of them that can be applied is in the field of retail sales (Elischa Febrivani et al., 2021) (Tarigan et al., 2022) (Saputra et al., 2023).

## 2. LITERATURE REVIEW

A sporting goods online store on Lazada, experienced a significant drop in sales from February to May 2023, with approximately 43% of inventory items unsold. This research uses the Apriori algorithm in data mining analysis of sales transactions on the Elite Sport e-commerce platform, with a focus on facilitating product purchasing decisions. Primary data from 120 transactions in May 2023 were processed using Microsoft Excel. The results of data mining calculations using the Apriori algorithm with RapidMiner Software, product sales transaction data at Elite Sport, with a minimum support limit of 30% and a minimum confidence of 60%, successfully formed as many as 11 rules (rules) that reveal patterns of product combinations that are often purchased together (Nurislah et al., 2024).

Product sales at CIRCLE'K have not utilized data mining algorithms that can help analyze transaction data to optimize sales and can also reduce the number of remaining products that are not purchased by buyers. To avoid the occurrence of the remaining types of products that are less popular and find out which types of products are selling well, the Apriori Algorithm is needed. Apriori Algorithm can find out this based on transaction data that occurs. This research analyzes transaction data using data mining with the Apriori Algorithm method, using this algorithm it can be seen the relationship between one item and another item, so that it can develop a strategy for marketing products based on the relationship between items. The final result of this research is known to be 7 association rules based on previously determined parameters, namely the minimum support value of 50% and the minimum confidence of 60% (Arinal & Melani, 2023).

Sibucin_id MSME, located in Ciamis, West Java, focuses on selling snacks such as Basreng, Kripik Kaca, Cimol, Batagor Kering, and so on. Its operations are limited to a production and inventory warehouse with no physical store, sales are conducted online. By only storing transaction data as archives, sales planning is less optimized. This research uses transaction data to apply association pattern analysis with Apriori Algorithm to provide specific suggestions in optimizing sales planning. From data processing by applying a minimum support value of 5% and a minimum confidence value of 10%. The final result of this research effectively identifies products that are often purchased together by consumers, resulting in six association rules (Hanani et al., 2024).

Retail businesses already use Point of Sale (PoS) technology, where all transactions are recapitulated in a system database. The data stored in the database can be processed to increase sales. By knowing the association of sales data, the application can provide product recommendations that allow customers to buy these product recommendations. The purpose of this research is to find out the association patterns found in a store that has implemented PoS technology. If the association pattern forms a relevant product relationship and brings more profit, the proposed method will be applied to the store application. The Apriori algorithm can find product relationship patterns between one or more items in a dataset. It's just that Apriori Algorithm has a weakness in performance. The application of the Apriori Algorithm can slow down transaction access, so it needs a deeper study of the usefulness of this association pattern. In this study, the association pattern is analyzed whether it has an effect on increasing sales. The results of this study obtained an average association with the highest confidence value occurring in March, which is 0.61 with a minimum support value of 0.003 (Ashari et al., 2022).

The XYZ Store is a type of clothing business that decides which items of clothing will be stored in the warehouse. However, because currently all sales and purchases at the XYZ Store are still handled manually, with sales data recorded in a notebook. Product sales data will continue to grow due to sales every day, so that the collection of data continues to increase and accumulate. To facilitate data processing, a new data processing method is needed, namely data mining which can provide strategic and accurate information, including the Apriori Algorithm. The results of this

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study are the results of association rules analysis using a minimum support value of 0.8 and a minimum confidence of 1.0, found several significant patterns (Rizkiyani & Anwar, 2023).

In this research, Drl.Rumahan retail sales transaction data engaged in the sale of motorcycle headlight accessories is used by setting a minimum support of 5% and a minimum confidence of 40%. Previous research has shown various applications of the algorithm. Apriori algorithm in different contexts to optimize sales and identify product purchase patterns. For example, a sporting goods online store in Lazada experienced a significant decline in sales, and research using the Apriori algorithm successfully uncovered patterns of product combinations that are often purchased together (Nurislah et al., 2024). At CIRCLE'K, the application of Apriori Algorithm helped develop a product marketing strategy based on the relationship between items by generating 7 association rules (Arinal & Melani, 2023). In addition, Sibucin_id SMEs that sell snacks online utilize Apriori Algorithm to provide specific suggestions for sales planning, resulting in six association rules (Hanani et al., 2024). Retail businesses that already use Point of Sale (PoS) technology use Apriori Algorithm to find out product relationship patterns, with results showing significant associations despite weaknesses in algorithm performance (Ashari et al., 2022). Finally, XYZ Store which still handles sales manually used Apriori Algorithm to provide strategic information and found several significant patterns (Rizkiyani & Anwar, 2023).

These studies confirm the importance of applying Apriori algorithm in various contexts to optimize sales and identify product purchase patterns. Although parameters such as minimum support and confidence values vary, each study successfully discovered association rules that can be used for more effective marketing strategies.

## 3. METHOD

**Types of Data**

The data used in this study are quantitative data:

**Quantitative Data**

The type of data that can be measured or calculated directly and is in the form of numbers, in the form of information or explanations said with numbers. In this case, the Quantitative Data data that will be used in testing is transaction data, sales at Drl.Rumahan.

**Data Used**

The data used in this study are sales transaction data for the period 02/01/2024 - 30/04/2024 or the last 4 months of data. This data is obtained from Drl.Rumahan sales transactions which contain attributes, transaction date, transaction number, product.

Table 1
The Dataset Used

| transaction_id | transaction_date | product |
|---|---|---|
| 0001 | 02/01/2024 | modul, devil rgb, lampu senja, saklar hazard |
| 0002 | 02/02/2024 | flasher, saklar revo, lampu speedometer, mika headlamp |
| 0003 | 02/03/2024 | alis, devil eye, saklar 2 pin, sein superbright |
| 0004 | 02/04/2024 | saklar pcx, breket, devil eye rgb, flasher |
| 0005 | 02/01/2024 | shroud, alis rgb, lampu sein, saklar pass beam |
| 0006 | 03/01/2024 | alis,devil eye,saklar 2 pin |
| 0007 | 03/01/2024 | devil eye,alis,saklar 2 pin |
| ------------- | ------------ | -------------- |
| 0198 | 30/04/2024 | breket, saklar vixion, devil |

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| | | eye rgb, alis |
|---|---|---|
| 0199 | 30/04/2024 | devil rgb, lampu sein, saklar 2 pin, modul |
| 0200 | 30/04/2024 | alis rgb, flasher, sein superbright, saklar hazard |

In this research, the method that will be used is the market basket analysis method with the Apriori Algorithm for processing sales transaction data. The Apriori algorithm was chosen and used because one of its advantages is easy to understand and implement. Apriori algorithm is an algorithm that can be used to apply market basket analysis to find association rules that satisfy support and confidence limits (Gumilang, 2021). Apriori algorithm is most famous for finding high frequency patterns. High Frequency Patterns are patterns of item patterns in the database that have a frequency and support above the minimum support. In the Apriori Algorithm there are two parameters, namely minimum support and minimum confidence.  There are several steps in using the Apriori Algorithm,

1. High Frequency Pattern Analysis
2. Itemset Combination Formation
3. Formation of Association Rules
4. Testing with Lift Ratio

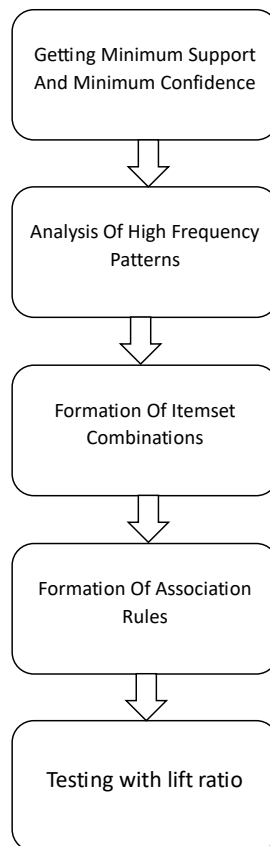Here is the flow of the Apriori Algorithm:



Fig 1. Methods Used

1. Determine the Minimum Support and Minimum Confidence that will be used as the threshold for testing

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2.  High Frequency Pattern Analysis to determine the number of products that meet the minimum support.
3.  Formation of Itemset Combinations that pass the minimum support then become rules
4.  Formation of Association Rules resulting from combinations that pass minimum support and minimum confidence
5.  Testing and Validation with Lift Ratio to ensure dependency between positively correlated products >1

**Method Testing**

In this study the authors used a supporting application, namely RapidMiner in their testing. The RapidMiner application is an open source software application. RapidMiner is one application that is suitable for use in testing Data Mining analysis. The first sales transaction data is calculated using excel manually with the Apriori Algorithm formula, then transformed into tabular form, which will then be tested in RapidMiner. RapidMiner is software for data processing. By using data mining principles and algorithms, RapidMiner extracts patterns from large data sets by combining statistical, artificial intelligence and database methods (Irnanda et al., 2021). The use of the RapidMiner application to build models without the need to create programs because all the data processing tools needed to process data are available in the form of operators (Ismiyana Putri & Yudhi Putra, 2023).



Fig 2. RapidMiner Studio

### 4. RESULT

The results of RapidMiner testing show that there are 3 rules that are above the minimum support of 5%.

1.  If someone buys a saklar pass beam, they will buy a shroud with a support value of 5.8% and a confidence of 47.6%.
2.  If someone buys a shroud, they will buy a saklar pass beam with a support value of 5.8% and a confidence of 45.5%.
3.  If someone buys a shroud, they will buy a relay with a support value of 5.2% and a confidence of 40.9%.

The three rules can be used as useful information for DRL.Rumahan as decision making in simultaneous purchasing patterns and also stock management for DRL.Rumahan that retailers must provide more stock for products that have high association rules, following the test results.

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**AssociationRules**

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Association Rules
[breket] --> [flasher] (confidence: 0.400)
[sein superbright] --> [saklar 2 pin] (confidence: 0.400)
[shroud, saklar pass beam] --> [alis rgb] (confidence: 0.400)
[shroud] --> [relay] (confidence: 0.409)
[devil eye rgb] --> [flasher] (confidence: 0.412)
[saklar pcx] --> [flasher] (confidence: 0.412)
[saklar] --> [devil eye] (confidence: 0.417)
[saklar] --> [devil eye, relay] (confidence: 0.417)
[biled] --> [devil eye] (confidence: 0.429)
[flasher, devil eye rgb] --> [breket] (confidence: 0.429)
[saklar 2 pin, lampu speedometer] --> [modul] (confidence: 0.429)
[biled] --> [devil eye, relay] (confidence: 0.429)
[biled] --> [devil eye, saklar] (confidence: 0.429)
[biled] --> [relay, shroud] (confidence: 0.429)
[biled] --> [shroud, saklar] (confidence: 0.429)
[biled] --> [devil eye, relay, saklar] (confidence: 0.429)
[biled] --> [relay, shroud, saklar] (confidence: 0.429)
[mika headlamp] --> [breket] (confidence: 0.444)
[mika headlamp] --> [flasher, breket] (confidence: 0.444)
[relay, saklar] --> [biled] (confidence: 0.444)
[shroud] --> [saklar pass beam] (confidence: 0.455)
[saklar pass beam] --> [shroud] (confidence: 0.476)
[d2 laser] --> [alis] (confidence: 0.500)
[d2 laser] --> [saklar] (confidence: 0.500)
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Fig 3. RapidMiner Testing Results

## DISCUSSIONS

**High Frequency Pattern Analysis**

At the high frequency pattern analysis stage is the process of identifying patterns that often appear or have a high frequency in the data set. In the context of this research, high-frequency patterns to find items with the most occurrences to be used as rules and the formation of item sets. In Apriori Algorithm itemsets that meet the minimum support will pass to the next iteration until there are no more itemsets that meet the minimum support. In this study the minimum support is 5% and the minimum confidence is 40%. In standard, the greater the minimum support and minimum confidence, the smaller or even no patterns will be formed, on the contrary, if the smaller the minimum support and minimum confidence, the more rules are formed but irrelevant all based only on business decisions.

**Calculation Of Apriori Method**

In the process of forming itemsets below, the author uses a description of passing using green means passing the requirement.

1. Formation of 1 Itemsets

The process of forming 1 itemset is done by setting the minimum support, in this study the minimum support determined is 5%. This means that if the product whose support is above 5% will pass the minimum support, otherwise those below 5% do not pass or do not meet the candidates for two itemsets, the following is the formula for calculating 1 itemset:

Support A $\quad : \dfrac{Number\ of\ Transactions\ A}{Total\ Transactions} \times 100\%$ (1)

Example

Support Modul $\quad : \dfrac{28}{172} \times 100 \quad = 16{,}28\%$

Table 2
Formation of 1 Itemsets

| No | Item | Jumlah | Support |
|----|------|--------|---------|
| 1 | Modul | 28 | 16,28% |
| 2 | Devil eye rgb | 41 | 23,84% |
| 3 | Lampu senja | 19 | 11,05% |
| 4 | Saklar hazard | 28 | 16,28% |
| 5 | Flasher | 46 | 26,74% |

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| 6 | Saklar revo | 16 | 9,30% |
|---|---|---|---|
| 7 | Lampu speedometer | 16 | 9,30% |
| 8 | Mika headlamp | 10 | 5,81% |
| 9 | Alis | 38 | 22,09% |
| 10 | Devil eye | 80 | 46,51% |
| ------- | -------- | ----- | ------ |
| 33 | Lem butyl | 1 | 0,58% |
| 34 | Senja 2in1 | 14 | 8,14% |

In Table 2 is the calculation / formation of 1 itemset with a minimum support of 5% with the formula of the number of Module transactions by the number (28) of items then divided by the total transactions by the total transactions (172) then multiplied by 100%.

2. Formation of 2 Itemsets

The following is the formation of a combination of 2 itemsets that pass from 1 itemset at the previous minimum support of 5%, 2 itemsets will be formed from the results of calculating 1 itemset, here is the formula for 2 itemsets:

Support A and B : $\frac{Number\ of\ Transactions\ A\ and\ B}{Total\ Transactions} \times 100\%$ (2)

Example:
Support Modul & Devil eye rgb : $\frac{12}{172} \times 100 = 6,98\%$

Table 3
Formation of 2 Itemsets

| No | Item 1 | Item 2 | Jumlah | Support |
|---|---|---|---|---|
| 1 | Modul | Devil eye rgb | 12 | 6,98% |
| 2 | Modul | Lampu senja | 3 | 1,74% |
| 3 | Modul | Saklar hazard | 4 | 2,33% |
| 4 | Modul | Flasher | 3 | 1,74% |
| 5 | Modul | Saklar revo | 3 | 1,74% |
| 6 | Modul | Lampu speedometer | 5 | 2,91% |
| 7 | Modul | Mika headlamp | 0 | 0,00% |
| 8 | Modul | Alis | 2 | 1,16% |
| 9 | Modul | Devil eye | 1 | 0,58% |
| 10 | Modul | Saklar 2 pin | 11 | 6,40% |
| ---- | ----- | ------- | ------ | ----- |
| 297 | Mika smoke | Senja 2in1 | 1 | 0,58% |
| 298 | Lampu kolong | Sein aftermarket | 3 | 1,74% |
| 299 | Lampu kolong | Senja 2in1 | 3 | 1,74% |
| 300 | Sein aftermarket | Senja 2in1 | 0 | 0,00% |

In Table 3 is the calculation of 2 itemsets with the equation formula of the total transaction Modul -> Devil eye rgb (12) divided by the total transaction (172) then multiplied by 100%.

3. Formation of 3 Itemsets

The results of the calculation of 2 itemsets will be formed 3 itemsets from 2 itemsets that pass the minimum support of 5%, then a combination of 3 itemsets will be formed with the following formula

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Support A, B and C $: \frac{Number\ of\ Transactions\ A, B, and\ C}{Total\ Transactions} \times 100\%$ (3)

Example:

Modul Support, Devil eye rgb, saklar 2 pin $: \frac{8}{172} \times 100 = 4,65\%$

Table 4
Formation of 3 Itemset

| No | Item 1 | Item 2 | Item 3 | Jumlah | Support |
|---|---|---|---|---|---|
| 1 | Modul | Devil eye rgb | Saklar 2 pin | 8 | 4,65% |
| 2 | Modul | Devil eye rgb | Flasher | 1 | 0,58% |
| 3 | Modul | Flasher | Breket | 0 | 0,00% |
| 4 | Modul | Devil eye rgb | Breket | 1 | 0,58% |
| 5 | Flasher | Devil eye rgb | Devil eye rgb | 4 | 2,33% |
| 6 | Modul | Alis | Devil eye | 0 | 0,00% |
| 7 | Modul | Alis | Devil eye | 0 | 0,00% |
| 8 | Modul | Devil eye rgb | Devil eye | 0 | 0,00% |
| 9 | Alis | Devil eye rgb | Saklar 2 pin | 0 | 0,00% |
| 10 | Modul | Devil eye | Saklar 2 pin | 0 | 0,00% |
| -- | --------- | ----------- | -------- | ------ | ----- |
| 83 | Shroud | Relay | Saklar | 3 | 1,74% |
| 84 | Shroud | Saklar pass beam | Saklar | 0 | 0,00% |
| 85 | Relay | Saklar pass beam | Saklar | 0 | 0,00% |

Table 4 is the result of calculating 3 itemsets, with the equation formula Modul, Devil eye rgb->Saklar 2 pin with the number of transactions (8) divided by the total transactions (172) then multiplied by 100%.

4. Formation of Association Rules

Association rule mining is a data mining technique to find rules for a combination of items. One of the stages of association analysis that attracts the attention of many researchers to produce efficient algorithms is high-frequency pattern analysis (Winarti et al., 2021). Association rule mining is a procedure for obtaining relationships between items in a dataset. It starts by finding frequent itemsets, namely itemsets that often appear based on the minimum support set (Bagus Almahenzar & Arie Wahyu Wijayanto, 2022).After finding a high-frequency pattern that passes the minimum support of 5%, a combination of 2 itemsets that pass the minimum support of 5% is formed, then the formation of association rules that meet the minimum confidence will be carried out. The minimum confidence determined in this study is 40%, here is the formula for minimum confidence:

Confidence $: \frac{Number\ of\ Transactions\ A\ and\ B}{Number\ of\ Transactions\ A} \times 100\%$ (4)

Example:

Confidence $: \frac{6,98\%}{16,28\%} \times 100\% = 42,86\%$

Table 5
Formation of Association Rules

| No | Asosiasi | Support A&B | Support A | Confidence |
|---|---|---|---|---|
| 1 | Modul –> devil eye rgb | 6,98% | 16,28% | 42,86% |
| 2 | Devil eye rgb –> modul | 6,98% | 23,84% | 29,27% |
| 3 | Modul –> saklar 2 pin | 6,40% | 16,28% | 39,29% |
| 4 | Saklar 2 pin –> modul | 6,40% | 27,33% | 23,40% |
| 5 | Devil eye rgb –> flasher | 6,40% | 23,40% | 26,83% |
| 6 | Flasher –> devil eye rgb | 6,40% | 26,74% | 23,91% |
| 7 | Devil eye rgb –> saklar 2 pin | 9,30% | 23,84% | 39,02% |
| 8 | Saklar 2 pin –> devil eye rgb | 6,40% | 27,33% | 34,04% |

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| 9 | Flasher –> breket | 6,40% | 26,74% | 23,91% |
|---|---|---|---|---|
| 10 | Breket –> flasher | 5,23% | 17,44% | 36,67% |
| 11 | Alis –> devil eye | 5,23% | 22,09% | 23,68% |
| 12 | Devil eye –> alis | 7,56% | 46,51% | 11,25% |
| 13 | Devil eye –> saklar 2 pin | 7,56% | 46,51% | 16,25% |
| 14 | Saklar 2 pin –> devil eye | 7,56% | 27,33% | 27,66% |
| 15 | Devil eye –> relay | 5,81% | 46,51% | 12,50% |
| 16 | Relay –> devil eye | 5,81% | 15,70% | 37,04% |
| 17 | Shroud –> saklar pass beam | 5.23% | 12,21% | 42,86% |
| 18 | Saklar pass beam –> shroud | 5.23% | 11,63% | 45,00% |
| 19 | Shroud –> relay | 5.23% | 12,21% | 42,86% |
| 20 | Relay –> shroud | 5,23% | 15,70% | 33,33% |
| 21 | Relay –> saklar | 5,23% | 15,70% | 33,33% |
| 22 | Saklar –> relay | 5,23% | 80,81% | 6,47% |

In Table 5 is the calculation of confidence with the equation formula Modul -> Devil eye rgb with the number of transactions (6.98%) and divided by the number of Module transactions (16.28) then multiplied by 100%.

5. Validation with Lift Ratio

Lift Ratio is a measure (parameter) to determine the strength of the association rule that has been formed from the support and confidence values (Harpa Erasmus Simanjuntak & Windarto, 2020). Lift Ratio is a good way to see whether an association rule is strong or not. The way this method works is to divide the confidence by the expected confidence. Lift Ratio can be calculated by comparing the confidence with the expected confidence (Elvira Munanda & Siti Monalisa, 2021). Testing with the lift ratio is done to find out how valid the relationship between rules is, if the lift ratio is above 1 then the dependence of A and B is positive, otherwise if it is below 1 then the dependence between items is negative. The following is the formula for the lift ratio:

$$\text{Lift Ratio} : \frac{Confidence\ (A,B)}{Benchmark\ Confidence\ (A,B)} \tag{5}$$

Example:

$$\text{Lift Ratio} : \frac{Modul\ -> Devil\ eye\ rgb}{Devil\ eye\ rgb} = \frac{42,86\%}{23.84\%} = 1.80$$

Tabel 6
Lift Ratio Validation Testing Results

| No | Asosiasi | Support | Confidence | Lift Ratio |
|---|---|---|---|---|
| 1 | Modul –> devil eye rgb | 6,98% | 42,86% | 1,80 |
| 2 | Shroud –> saklar pass beam | 5,23% | 42,86% | 3,69 |
| 3 | Saklar pass beam –> shroud | 5,23% | 45,00% | 3,69 |
| 4 | Shroud –> relay | 5,23% | 42,86% | 2,73 |

Table 6 is a calculation of the Lift Ratio validation test, with the equation Modul -> Devil eye rgb as confidence A & B (42.86%) divided by confidence B, which is Devil eye rgb (23.84%).

## 5. CONCLUSION

The results of utilizing sales transaction data on Drl.Rumahan produce rules that meet the minimum support and confidence and lift ratio above> 1 where these results can be used as business guidelines and business decisions later for Drl.Rumahan to increase the inventory of the most purchased products together, it can also be used for future business strategies in seeing consumer desires. Utilization of data mining technology, especially the Apriori Algorithm, can be used to identify consumer purchasing patterns and association relationships between products at Drl.Rumahan retail. Apriori Algorithm helps in finding itemsets that often appear together in transactions, which can then be used to develop sales strategies such as bundling promotions, product arrangement, and product recommendations. By applying Apriori Algorithm, Drl.Rumahan retail can better understand consumer behavior and make smarter business decisions from the information obtained, here are the purchase patterns that meet the minimum support and minimum

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confidence: If someone buys a saklar pass beam, they will buy a shroud with a support value of 5.8% and a confidence of 47.6%. If someone buys a shroud, they will buy a saklar pass beam with a support value of 5.8% and a confidence of 45.5%. If someone buys a shroud, they will buy a relay with a support value of 5.2% and Confidence 40.9%. Products that have high rules can be used as a reference for retailers in particular to be used as a business strategy to be implemented later from the results of the rules obtained. For future research, it is recommended to explore the use of other data mining algorithms such as FP-Growth or eclat algorithm to compare their effectiveness with Apriori algorithm in identifying product purchase patterns. In addition, research can be conducted using larger and more diverse data to get more comprehensive and applicable results in various types of retail businesses. The use of more advanced technologies such as machine learning and predictive analysis can also be considered to improve accuracy and efficiency in processing sales transaction data. Further research can also focus on analyzing the impact of implementing the Apriori algorithm on increasing sales and customer satisfaction in the long-term.

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