Sales Information System On The Liemo'sTrophy Cup Using Apriori Algorithm

(Sistem Informasi Penjualan Piala Liemo'S Trophy Menggunakan Algoritma Apriori)

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Abstract-,The Liemo'S Trophy trophy shop was pioneered in early 1996 until 2022. Currently, we can see the rapid development of business in the field of trophy sales, with many trophy shops that have been opened. Therefore Liemo'S Trophy trophy shop must take steps forward to achieve high sales strategy by its competitors. The rapid development of information technology and information systems in the era of globalization, makes information can be obtained easily and quickly, one of which is the business field in the era of globalization, there are many information systems that provide convenience and good service for users of information system services, because information systems is the key in the development of an information technology. Like the Liemo's Trophy Cup shop, it sells various kinds of trophies, medals, plaques, and sells spare parts and trophy needs including figures and various other accessories, but this shop still processes data manually so that sellers will find it difficult to manage sales data. Creating a sales information system using a web-based Apriori Algorithm is expected to get a sales strategy and can be widely used in the sales process to increase the marketing of goods widely through online sites.

Keywords: A Priori Algorithm; Association Rules; Trophy Shop Sales Information System.

*Abstract-,*Toko piala Liemo'S Trophy ini di rintis pada awal tahun 1996 hingga tahun 2022. Saat ini perkembangan usaha di bidang penjualan piala yang semakin pesat dapat kita lihat dengan banyaknya toko piala yang sudah banyak di buka. Oleh karena itu toko piala Liemo'S Trophy harus mengambil langkah-langkah maju untuk mencapai strategi penjualan yang tinggi oleh para pesaingnya. Pesatnya perkembangan teknologi informasi dan sistem informasi di era globalisasi, membuat suatu informasi dapat diperoleh dengan mudah dan cepat, sudah banyak sistem informasi yang memberikan kemudahan serta pelayanan yang baik bagi pengguna layanan sistem informasi, dikarenakan sistem informasi merupakan kunci dalam berkembangnya sebuah teknologi informasi. Seperti pada toko Piala Liemo's Trophy ini menjual berbagai macam piala, medali, plakat, serta menjual spare part dan kebutuhan piala diantaranya figur dan berbagai aksesoris lainnya, namun toko ini masih melakukan pengolahan data secara manual sehingga penjual akan kesulitan untuk mengelola data penjualan. Membuat sistem informasi penjualan menggunakan Algoritma Apriori berbasis web ini diharapkan mendapat strategi penjualan dan dapat dimanfaatkan secara luas dalam proses penjualan untuk peningkatan pemasaran barang secara luas melalui situs online.

Kata Kunci : Algoritma Apriori; Aturan Asosiasi; Sistem Informasi Penjualan Toko Piala.

I. INTRODUCTION

The Liemo'S Trophy trophy shop was pioneered in early 1996 until 2022. The rapid development of information technology and information systems in the era of globalization, makes information can be obtained easily and quickly, one of which is the business field in the era of globalization, there are many information systems that provide convenience and good service for users of information system services, because information systems are the key in the development of an information technology. An information system is needed to support the business activities of an organization, therefore the presence of an information system is very necessary, as a meansor media to support business, which is usually called a support service, in supporting the sale of a store or organization. One example of this facility or media is a Web Information System that makes it easy for shop owners to manage sales transaction data online and computerized.

Sales is the process of buying and selling goods/products from the seller to the buyer with the aim of making a profit and satisfying all the needs and desires of the buyer in order to achieve sustainable benefits for both the seller and the buyer. With this, the seller knows the information in order to minimize losses in a shop/supermarket. As in the Liemo's Trophy Cup shop, it sells various kinds of trophies, medals, plaques, and sells spare parts and trophy needs including figures and various other accessories, but this shop still does data processing manually so that sellers will find it difficult to manage sales data. Creating a sales information system using the Apriori Algorithm can be widely used in the sales process.

The a priori algorithm can be used in the sales process, by providing a relationship between sales data, in this case to find out what items are best selling and what items are less desirable. So that the consumer buying patterns will be obtained to find out what items are the best-sold and the least-sold, which is useful for knowing the amount of stock that must be considered. The store can use this information to take appropriate business actions, in this case the information can be taken into consideration to determine the next sales strategy.

II. LITERATUR REVIEW

A. Understanding Data Mining

Data mining is the process of finding patterns in the data that is processed and becomes the result of important information. Data mining can predict things that will happen by returning data and patterns in the data which will be investigated further.

In data mining there are several processes, namely:

1) Description

Description aims to describe or explain patterns that appearrepeatedly in the data and turn them into appropriate rules.

2) Estimated

Estimation is a method that can estimate population values by using sample values, but it is more numeric than categorical.

3) Prediction

Prediction is the process of estimating based on future values

4) Classification

Classification is a way of grouping to find a function todistinguish data with certain characteristics into classes.

5) Clustering

Clustering is grouping data into several clusters or certain groups into appropriate objects so that the data in one cluster has a similar level of similarity.

6) Association

Association is to find several attributes that exist at one time. Tofind two or more of several attributes.

7) *Association Rules*

Association rules are procedures for finding relationships between items in a specified dataset. Association rules have two stages, namely:

1. To find the most frequent combination in an itemset.
2. To define condition and result (for conditional association rule)

There are three sizes that are usually used in associationrules, namely:

a. Support

A measure that shows how big the level of dominance of an item or itemset from the whole transaction.

b. Confidence

A measure that shows the relationship between two itemsconditionally.

c. Improvement

A measure that indicates the likelihood of two items beingpurchased simultaneously

B. Stages of Data Mining Research

The stages of data mining research that the author uses are CRISP-DM (Cross Industry Standard Process Model For Data Mining) Wikipedia (2020). In a data mining project, there is a cycle which is divided into 6 phases including business understanding, data understanding, data processing, modeling, evaluation, deployment.

[figure 1 about here.]

C. Apriori Algorithm Method

A priori algorithm is a method to find the pattern of relationship between one or more items in a dataset. A priori algorithms are widely used in transaction data or commonly called market baskets, for example a supermarket has a market basket, with the a priori algorithm, the supermarket owner can find out the buying

pattern of a consumer, if a consumer buys an item of trophies, wooden plaques, there is a 50% chance he will buying a graduation plaque item, this pattern is very significant given the transaction dataso far. The application of sales transaction data analysis using the Apriori Algorithm has a process flow including the process of determining the value of support and confidence, the dataset iteration process, the process of making association rules, displaying the results of the analysis.

[figure 2 about here.]

III. RESEARCH METHODOLOGY

A. A Priori Algorithm

In designing the sales information system on the web-based liemo's trophy, it is hoped that it will make it easier for shop owners to process transaction data easily with a computerized system. With this system created, minimize losses to the store and improve the sales strategy that is expected for business continuity to be achieved. In this system using a context diagram diagram which is a picture of a big circle that can represent all processes contained in a system. Is the highest level in the DFD and is usually numbered 0 (zero). All external entities shown in the context diagram and the main data flowsto the system.

[figure 3 about here.]

B. Manual Calculation Process

Support is used to measure the popularity of an itemset. In calculating support there is a formula used, namely:

$$\text{Support} = \text{frequent item} \ / \ \text{jumlah seluruh transaksi}$$

C. The process of counting the iteration to 1

The way to calculate support is in the table above the trophymat sold 2 pieces in the transaction and the number of sales transaction lists is 22 means:

Support value:

2 / 22 = 9.09% (tatakan piala muncul dalam 9.09% transaksi).

Dihasilkan nilai support = 9.09%

D. The process of calculating the 2nd iteration

After finding the results in the first iteration, then calculating the second iteration is carried out if there are sales of more than one transaction for the same item. by looking at the list of sales transactions above. In this 2nd iteration, look for itemsets that appear simultaneously in 1 transaction, in this 2nd iteration there are 2 itemsets that appear simultaneously in a transaction, namely raised letters and trophies. In the 2nd iteration, support is

generated:

2 / 22 = 9.09% (huruf timbul, piala muncul dalam 9.09% transaksi).

Dihasilkan nilai support = 9.09%

E. The process of calculating confidence

Confidence is a probability that is also a possibility. In calculating confidence there is a formula to find confidence, namely:

confidence $(x \rightarrow y) = \text{support} (x \cup y) / \text{support} (x)$.

After finding the result of the raised letter to the trophy is 9.09% asthe AUB support value and the raised letter as the A support value, the confidence value will be searched with the formula:

$$\text{confidence} = \text{support AUB} / \text{support A}$$

Calculation result $\rightarrow$ 9.09% / 9.09% = 100%

then the confidence for buyers to buy embossed letters and trophies has a 100% chance of being bought.

IV. RESULTS AND DISCUSSION

A. System analysis

The Sales Information System in the Liemo's Trophy Cup is a web-based system designed using the Apriori Algorithm to facilitate computerized processing of sales transaction data.

B. Liemo's . Trophy Shop Sales Information System

DFD Level 1 is a description of the description of the process context diagram that describes the processes that occur in the Trophy Sales Information System.

[figure 4 about here.]

DFD Level 2 Data Input Process is a description of the explanation of the sales transaction data input process in the analysis process and the sales data editing process which is less than the minimum value of support and confidence.

[figure 5 about here.]

DFD Level 2 Calculation Process The process describes the results of the a priori algorithm calculations with the k-candidate creation process and the deletion of data that is less than the support and confidence values so that the results of the a priori algorithm calculations are obtained.

[figure 6 about here.]

The transaction table contains information about the data id, date and item used to perform the calculation process.

[tabel 1 about here.]

The Add Sales Data display is an admin or user view to add store sales transaction data to search for what items are the best selling at the same time.

[figure 7 about here.]

Display Start Algorithm is the sale of transaction data that will be realized using a priori algorithm.

[figure 8 about here.]

Retrieving Transaction Datasets is retrieval of sales transaction data that will be grouped according to the same date and day to find out the best-selling items sold at the same time.

[figure 9 about here.]

Iteration 1 process is calculating the items from support (transactions that contain all items) by scanning the database for 1-itemset, after 1-itemset is obtained, from 1-itemset is it above the minimum support, if it meets the minimum support, 1- the itemset will be a high frequent pattern.

[figure 10 about here.]

Iteration 2 process is a process to get 2-itemset, a combination of the previous k-itemset must be done, then scan the database again to count the items that contain support. The itemset that meets the minimum support will be selected as the high frequent pattern of the candidates.

[figure 11 about here.]

Algorithm results are the results of store sales transaction data that have been realized using the a priori algorithm by finding the results of the data or goods that are best sold at the same time.

[figure 12 about here.]

V. CONCLUSION

The Sales Information System in the Liemo'S Trophy Cup using the Apriori Algorithm can make it easier for shop owners or admins to find out what sales transaction data are the best selling items at the same time to achieve sales strategies and anticipate the lack of items that are most in demand by buyers. It is hoped that this system can make it easier for shop owners or admins to find out which items are sold at the same time, as well as give satisfaction to consumers or buyers to find the items they are looking for because there are already stock items needed by buyers without disappointing due to lack of stock. prepared by the shop.

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LIST OF TABLES

Table 1. Transactions

Field Name	Data Type	Long	Information
Id	Int	11	Primary key
Date	Text	50	Date
Items	Text	50	Goods
Price	Integer	50	Unit price
The amount of goods	Integer	50	Number of items purchased
Total	Integer	50	Total price of goods purchased

LIST OF FIGURES

Figure 1. Crisp-Dm Process
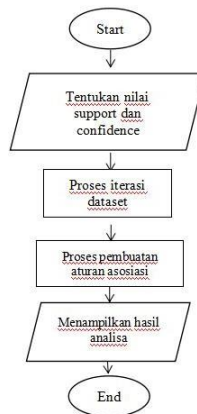
Figure 2. Apriori Algorithm Flowchart
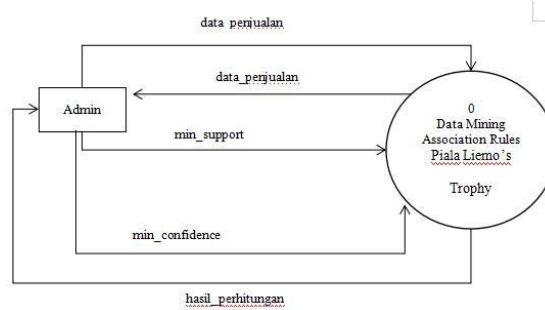
Figure 3. Context Diagram of the Sale of Liemo's Trophy
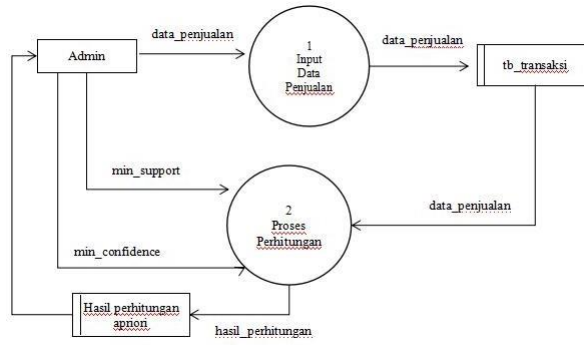
Figure 4. DFD Level 1
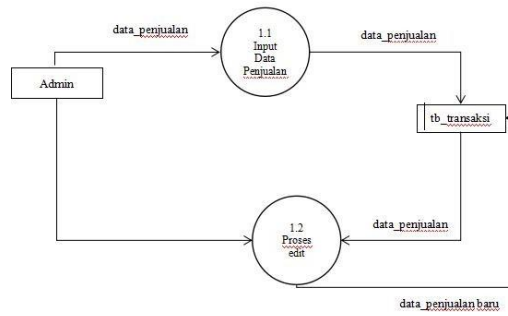
Figure 5. DFD Level 2 For Data Input Process And Edit Process
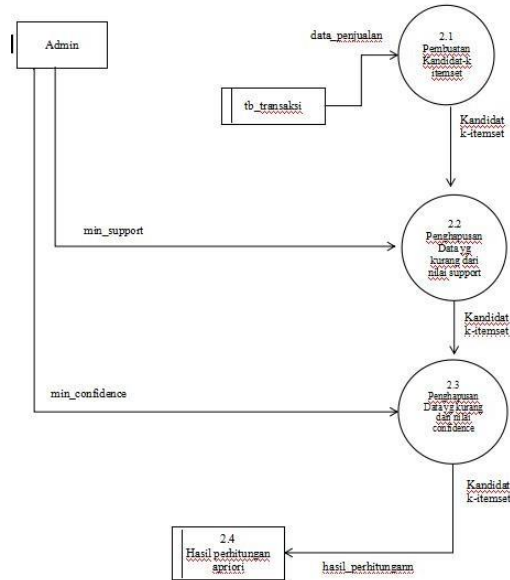
Figure 6. DFD Level 2 For Calculation Process

Figure 7. Display Add Sales Data

Figure 8. Algorithm Start Display

Figure 9. Retrieving Transaction Dataset

Figure 10. Iteration Process 1

Figure 11. Iteration Process 2

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