IMPLEMENTATION OF DATA MINING USING ASSOCIATION RULE METHOD FOR DETERMINATION OF FABRICS PRODUCTION AT CV. MAKMUR ABADI

Muhammad Auliya

Informatics Engineering – Indonesia Computer University
Jl. Dipati Ukur 112-114 Bandung
E-mail : micha.auliya@gmail.com

ABSTRACT

CV. Makmur Abadi is a company engaged in the textile industry. At this time to produce CV. Makmur Abadi cloth only utilize transaction data only for producing fabrics in-stock runs out or the lot purchased. Often times the fabric is not high sales are experiencing a shortage of stock at the time wanted to buy along with the fabric of the most widely purchased so buyers feel disappointed.

Data mining is a technique to dig a hidden information from a set of data. For that data mining is used to get information producing cloth. As for one of the data mining method used in this research is a method of association rule. Association rule is one of the techniques of data mining to find relationships between variables that exist within a data transaction. Algorithm for association rule used is fp-growth algorithm i.e. use the structure tree to get frequent itemset.

Based on the results of the analysis and testing of the system as well as interviews has done previously, that the system data mining association rule that has been built has production recommendations can provide the appropriate fabric with a pattern of habitual customers in buying fabric.

Keywords **:** *frequent itemset, data mining, association rule, fp-growth, production*

1. INTRODUCTION

CV. Makmur Abadi is a company that has been established since 1982 until. CV. Makmur Abadi is a company engaged in the textile industry in particular to manufacture cloth. Until recently the CV. Makmur Abadi has been serving the transaction involving the sale of 71 marks of fabric.

Based on the results of the interviews that have been conducted are obtained information that the current utilization of the existing sales transaction data is used only for the purposes of the archives as well as to undertake the creation of reports for the company and used for other purposes such as for the production, only goods produced was his stock of consumable goods or most widely purchased. If manufacture based on in-stock items are out of stock or on the highest selling then the fabrics will be produced, whereas in fact the fabric with the highest sales ever have a relationship with other fabrics that are frequently purchased simultaneously, but in terms of sales is not high. So often times the fabric is not high sales are experiencing a shortage of stock at the time wanted to buy along with the fabric of the most widely purchased so buyers feel disappointed.

To overcome these problems the parties CV. Makmur Abadi can be viewed on the transaction of sale although there are fabrics that sales are not high. But there is a pattern that can be used as a way to manufacture cloth, where that every customer has a connectedness in buying fabrics based on the pattern of the fabric.

Therefore, to resolve the issue, then he had to do a"**Implementation Of Data Mining Using Association Rule Method Fof Determination Of Fabrics Production At CV. Makmur Abadi**" in order to facilitate the lasting Prosperous CV parties in determining the production of fabric that fits a pattern of habitual customers in buying fabric.

2. CONTENT OF THE RESEARCH

2.1Base of Theory

2.1.1 Data Mining

Data mining is the process of digging a series of added value in the form of information that had been unknown manually from a database by extracting patterns from the data with the aim to manipulate of the data to be information that more value, which is obtained by extracting and recognizing patterns important or interesting from the data contained in the database.

Data mining is also known as Knowledge Discovery (mining) in databases (KDD), knowledge extraction. In generally, definition of data mining can be meaning as follow [8] :

1. The process of discovery of interesting patterns from data stored in high numbers.
2. The extraction of the information useful or interesting (non-trivial, implicit, previously unknown potensian usefulness) patterns or knowledge from data stored in high numbers.

3. Exploration of automatic or semi-automatic analysis of the data in a high number to looking for meaningful patterns and rules.

2.1.2 Stages Of Data Mining

Stages in conducting data mining one of which is the preprocessing of data. The steps are as follows :

1. **Data Cleaning** : filling or replacing the missing values, smoothing noisy data, identifying and eliminating improper data, and solve the problem of data inconsistensi.
2. **Data Integration** : combine multiple files into a single database and to obtain a large data source.
3. **Data Transformation** : normalization and aggregation of data.

2.1.3 Assosiation Rule

Association rule is one of the main techniques or procedures in Market Basket Analysis to look for relationships between items in a dataset and display form association rule [10]. Association rule will find a certain pattern to associate the data with other data. To search for association rule from a set of data, the first stage should be done is to find frequent itemset first. Frequent itemset is a set of items that frequently appear together. After all frequent itemset pattern is found, then look for a rule or rules associative linkages that have been determined eligible.

Important whether or not an order of asosiasif can be known with two parameters namely support and confidence. Support (supporting values) is the percentage of the item combination in the database, whereas the confidence (the value of certainty is strong relationships – items in the rules of the Association. In determining an associaiton rule, there is an interestingness measure (measure of the trust) that didaapt of data processing results with certain calculations. Generally there are two sizes, namely:

Support: a measure that indicates how large the degree of dominance of an item/itemset from the entire transaction. This measure determines whether an item/itemset deserves to look for his confidence (i.e., of the whole transaction is, how big is the level of dominance of an item which indicates that an item A and item B is purchased).

Confidence: a measure that shows the relationship between the 2 items are conditionals (i.e., calculating the likelihood of how often the item B was purchased by the customer if the customer bought an item A).

Both this size later is useful in determining the strength of a pattern by comparing the pattern with a minimum value of both these parameters specified by the user. When a pattern meets both the minimum pre-set parameters, so the pattern can be termed as interesting rule or strong rule. The basic methodology of analysis of the Association is divided into two stages [10]:

1. Analysis of high-frequency pattern

   This stage is looking combinations of items that qualify for a minimum value of support in the database. The value of support an item obtained by the following formula.

   $$\text{Support (A)} = \left(\frac{\text{Jumlah transaksi mengandung A}}{\text{Total Transaksi}}\right) \text{x } 100\% \quad (1)$$

   While the value of support 2 items obtained from the following formula:

   $$\text{Support (A,B)} = \left(\frac{\text{Jumlah transaksi mengandung A dan B}}{\text{Total Transaksi}}\right) \text{x } 100\% \quad (2)$$

2. The establishment of rules of the Association

   After all the high-frequency pattern is found, then look for a fairly strong association rule dependency between items.

   In the antecedent (the predecessor) and consequent (followers) and the minimum eligible for associative rules confidence A → B.

   An itemset is the set of existing items in the itemset, and i I. The frequency of the itemset is an itemset has a frequency of occurrence is more than the minimum value allowed.

   The value of the confidence of the rule A → B is obtained from the following formula.

   $$\text{Confidence} = \frac{\text{Jumlah transaksi yang mengandung A dan B}}{\text{Jumlah transaksi yang mengandung A}} \text{ x } 100\% \quad (3)$$

2.1.4 FP-Growth Algorithm

2.1.4.1 The Meaning Of Algorithms FP-Growth

Fp-growth algorithm is an alternative algorithm that is quite effective to search for the set of data that appears most often (frequent itemset) in a large data sets. Fp-growth algorithm is the algorithm of association rules are quite often used. Fp-growth algorithm was developed from the a priori algorithms. A priori algorithm generates the combination very much so it is very inefficient.

Fp-growth algorithm is one of the solutions of the a priori algorithm takes a very long time because of having to do the matching pattern repeatedly. While in the process of fp-growth algorithm, there are many advantages which proved to be very efficient because the mapping data or only performed scans the database twice to build up the structure of the "tree". Thus, fp-growth algorithm also known as fp-tree algorithm. By using fp-tree structure, fp-growth algorithm can directly extract frequent itemset of fp-tree that has been formed. Fp-grwth method can be divided into 3 main stages as follows [11] :

1. The stage of the stirring *conditional pattern base*. Conditionals Pattern Base is a database that contains a path prefix and suffix pattern. Generation conditinal pattern base obtained through FP-Tree which had been built before.
2. The stage of the stirring *Conditional FP-Tree*
   At this stage, support the count of every item on every base pattern added conditionals, and each item has a number of support count greater than or equal to the minimum support count ξ conditionals will be raised with the FP-Tree.
3. The search Stage *frequent itemset*

If conditionals FP-Tree is a single-path (single path), then frequent itemset obtained by doing a combination of items for any conditionals FP-Tree. If not a single path, then FP-Growth generation is performed recursively.

2.1.5 *FP-Tree*

FP-Tree is a compressed data storage structure. FP-tree is constructed by mapping each transaction data into any particular trajectory in the fp-tree. Because in every transaction that is mapped, there may be transactions that have the same item, then the course allows to override each other. The more the data transactions that have the same item, then the process of compression with the fp-tree data structures more effective. Advantages of fp-tree is only require twice the scan data transactions proved to be very efficient [12].

2.2 Analisis Of Problem

Examples of cases which are described in this section later using fp-growth algorithm for frequent pattern seeking. As for the stages of the machining process fp-growth algorithm in this research are as follows :

1. The Data used are the result of data preprocessing and ready to be used in the process of data mining.

Tabel 1 Inisialisasi Item

Item	*Inisialisasi*	Item	*Inisialisasi*	Item	*Inisialisasi*
CCN 1005 A	0	DF 210 B	21	QAK 731 B	42
CCN 1005 B	1	DF 205 A	22	QAK 732	43
CCN 1005 C	2	DF 205 B	23	LEC 210 A	44
CCN 1005 D	3	OTN 400 A	24	LEC 210 B	45
CCN 1005 E	4	OTN 400 B	25	CHM 905 A	46
CCN 1005 F	5	OTN 401 A	26	CHM 905 B	47
CD 396 A	6	OTN 401 B	27	CHM 905 C	48
CD 396 B	7	OTN 405	28	KD 829 A	49
CD 386 A	8	MY 330 A	29	KD 829 B	50
CD 386 B	9	MY 330 B	30	KD 830 A	51
CD 382 A	10	MY 324 A	31	KD 830 B	52
CD 382 B	11	MY 324 B	32	YR 326	53
CD 394 A	12	MY 328 A	33	NS 405	54
CD 394 B	13	MY 328 B	34	NS 403	55
CD 395 B	14	SU 52 A	35	NS 401	56
CD 395 A	15	SU 52 B	36	UR 386 B	57
DF 204 A	16	QAK 701 A	37	UR 386 A	58
DF 204 B	17	QAK 701 B	38	UR 386 C	59
DF 207 A	18	QAK 720 A	39	UR 386 D	60
DF 207 B	19	QAK 720 B	40	IX 218	61
DF 210 A	20	QAK 731 A	41	KL 268 A	62
KL 268 B	63	GN 072	65	FE 104 B	67
KL 427	64	FE 104 A	66	FE 202 A	68
FE 202 B	69	JPS 011	70		

Table 2. Results Of Initial Data Preparation

No	NoFaktur	Item	Inisialisasi
1	1500245	OTN 400 A, OTN 400 B, DF 204 B, DF 210 B, CCN 1005 A, CCN 1005 B, CCN 1005 F	24, 25, 17, 21, 0, 1, 5
2	1500246	CCN 1005 B, CCN 1005 F, CCN 1005 A, SU 52 B	1, 5, 0, 36
3	1500247	JPS 011, CCN 1005 B, CCN 1005 F, DF 204 B, DF 204 A	70, 1, 5, 17, 16
4	1500248	CHM 905 B, CHM 905 A, CD 396 B, CD 386 B, CD 396 A, OTN 400 B, OTN 401 A, DF 204 A, DF 204 B, DF 207 B	47, 46, 7, 9, 6, 25, 26, 16, 17, 19
5	1500249	QAK 701 A, QAK 701 B, QAK 731	37, 38, 45
6	1500250	SU 52 B, SU 52 A, CCN 1005 F	36, 35, 5
7	1500251	FE 104 B, FE 104 A, NS 403, LEC 210 B, LEC 210 A	67, 66, 55, 45, 44
8	1500252	CHM 905 A, LEC 210 A, LEC 210 B	46, 44, 45
9	1500253	CD 396 B, CD 386 B, SU 52 A, SU 52 B	7, 9, 35, 36
10	1500254	DF 204 B, DF 207 B, CCN 1005 F, CCN 1005 A, QAK 731 B, QAK 720 B, QAK 701 A	17, 19, 5, 0, 38, 40, 37
11	1500255	OTN 400 A, OTN 401 A, OTN 401 B, KD 829 A, KD 829 B, DF 204 A	24, 26, 27, 49, 16, 16
12	1500256	MY 330 A, MY 330 B, CHM 905 B, CHM 905 A	29, 30, 47, 46
13	1500257	LEC 210 B, LEC 210 A, CCN 1005 F, CCN 1005 B, CCN 1005 D, CCN 1005 A	45, 44, 5, 1, 3, 0
14	1500258	YR 326, CD 396 B, CD 396 B, CHM 905 B, CHM 905 A	53, 7, 9, 47, 46
15	1500259	SU 52 A, CD 396 B, CD 396 A	35, 7, 6
16	1500260	DF 204 A, DF 207 B, DF 204 B, QAK 731 B, QAK 720 B, OTN 405, OTN 401 B, LEC 210 B	16, 19, 17, 38, 40, 28, 27, 45
17	1500261	GN 072, OTN 401 A, OTN 400 B, OTN 401 B	65, 26, 25, 27
18	1500262	CD 396 A, CD 386 B, SU 52 B	6, 9, 36
19	1500263	SU 52 B, SU 52 A	36, 35
20	1500264	CCN 1005 A, CCN 1005 D, CCN 1005 F, MY 330 B, SU 52 B	0, 3, 5, 30, 36
21	1500265	JPS 011, DF 204 A, NS 405, NS 401, NS 403	70, 16, 54, 56, 55
22	1500266	KL 268 A, KL 268 B, GN 072	62, 63, 65
23	1500267	FE 104 B, YR 326, UR 386 B	67, 53, 57
24	1500268	OTN 400 A, OTN 401 B, OTN 401 A, IX 218	24, 27, 26, 61
25	1500269	CD 386 B, KD 829 A, NS 405, NS 401, NS 403, GN 072	9, 49, 55, 54, 56, 65
26	1500270	OTN 400 A, OTN 401 B, OTN 400 B, CCN 1005 A, CCN 1005 F	24, 27, 25, 0, 5
27	1500271	CD 386 B, CD 386 A, CD 396 A, CHM 905 A	9, 6, 46
28	1500272	NS 401, JPS 011	54, 70
29	1500274	DF 204 A, DF 204 B, DF 210 B	16, 17, 21
30	1500275	QAK 701 A, OTN 405, DF 207 B	37, 28, 19

2. Scan the transaction data to know the support count each item with a minimum support 3 of 10% of the transaction amount, items that do not comply will be eliminated.

Table 3 Frequency Of Occurrence Item Cleaning Results

Item	*Support Count*	Item	*Support Count*
0	6	36	6
1	4	37	3
5	8	38	3
6	4	44	3
7	4	45	4
9	6	46	5
16	6	47	3
17	6	54	3
19	4	55	3
24	4	65	3
25	4	70	3
26	4		
27	5		
35	4		

3. Sort by support from the largest to the smallest count.

Table 4 Sorting Results

Item	*Support Count*	*Priority*	Item	*Support Count*	*Priority*
5	8	1	37	3	18
0	6	2	38	3	19
9	6	3	44	3	20
16	6	4	47	3	21
17	6	5	54	3	22
36	6	6	55	3	23
27	5	7	65	3	24
46	5	8	70	3	25
1	4	9			
6	4	10			
7	4	11			
19	4	12			
24	4	13			
25	4	14			
26	4	15			
35	4	16			
45	4	17			

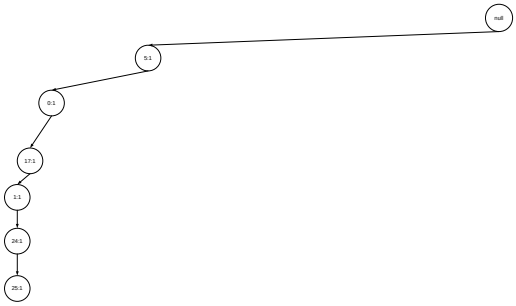
4 Sort by priority based on transaction data.

Table 5 Results Of Sequencing Data Transactions

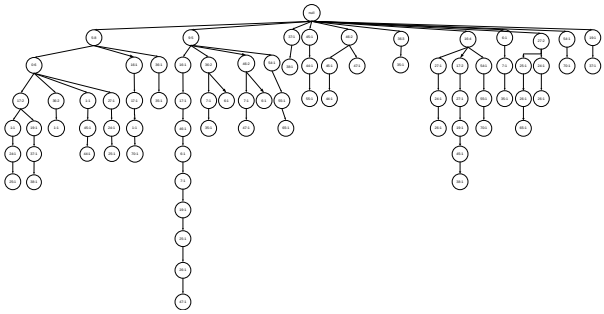
No	NoFaktur	Item	Ordered Item
1	1500245	24, 25, 17, 21, 0, 1, 5	5, 0, 17, 1, 24, 25
2	1500246	1, 5, 0, 36	5, 0, 36, 1
3	1500247	70, 1, 5, 17, 16	5, 17, 16, 1, 70
4	1500248	47, 46, 7, 9, 6, 25, 26, 16, 17, 19	9, 16, 17, 46, 6, 7, 19, 25, 26, 47
5	1500249	37, 38	37, 38
6	1500250	36, 35, 5	5, 36, 35
7	1500251	67, 55, 45, 44	45, 44, 55
8	1500252	46, 44, 45	46, 45, 44
9	1500253	7, 9, 35, 36	9, 36, 7, 35
10	1500254	17, 19, 5, 0, 38, 40, 37	5, 0, 17, 19, 37, 38
11	1500255	24, 26, 27, 49, 16	16, 27, 24, 26
12	1500256	30, 47, 46	46, 47
13	1500257	45, 44, 5, 1, 3, 0	5, 0, 1, 45, 44
14	1500258	53, 7, 9, 47, 46	9, 46, 7, 47
15	1500259	35, 7, 6	6, 7, 35
16	1500260	16, 19, 17, 38, 40, 28, 27, 45	16, 17, 27, 19, 45, 38
17	1500261	65, 26, 25, 27	27, 25, 26, 65
18	1500262	6, 9, 36	9, 36, 6
19	1500263	36, 35	36, 35
20	1500264	0, 3, 5, 30, 36	5, 0, 36
21	1500265	70, 16, 54, 56, 55	16, 54, 55, 70
22	1500266	65	
23	1500267	67, 53	
24	1500268	24, 27, 26	27, 24, 26
25	1500269	9, 49, 55, 54, 56, 65	9, 54, 55, 65
26	1500270	24, 27, 25, 0, 5	5, 0, 27, 24, 25
27	1500271	9, 6, 46	9, 46, 6
28	1500272	54, 70	54, 70

5 Do the making of fp-tree

1. For transactions with NoFaktur 1500245 :5, 0, 17, 1, 24, 25.



Picture 1 *Fp-Tree* After the reading NoFaktur 1500245



Picture 2 *Fp-Tree* After the reading entire NoFaktur

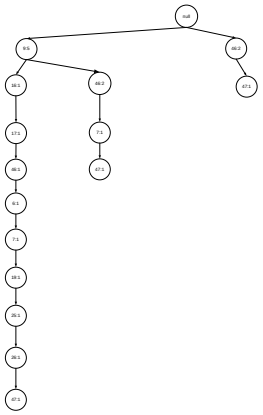
6 Stage of stirring *Conditional Pattern Base*

Table 6 *Conditional Pattern Base*

Item	*Conditional Pattern Base*	Item	*Conditional Pattern Base*
70	{5, 16, 17, 1:1} {16, 54, 55:1} {54:1}	24	{5, 0, 17, 1:1} {5, 0, 27:1} {16, 27:1} {27:1}
65	{9, 54, 55:1} {27, 25, 26:1}	19	{5, 0, 17:1} {9, 16, 17, 46, 6, 7:1} {16, 17, 27:1}
55	{45,44:1} {16, 54:1} {9, 54:1}	7	{9, 16, 17, 46, 6,7:1} {9, 36:1} {9, 46:1} {6:1}
54	{ 16:1} {9:1}	6	{9, 16, 17, 46:1} {9, 36:1} {9, 46:1}
47	{9, 16, 17, 46, 6, 7, 19, 25, 26:1} {46:1} {9, 46, 7:1}	1	{5, 0, 17:1} {5, 16, 17:1} {5, 0, 36:1} {5, 0:1}
44	{5, 0, 1, 45:1} {45:1} {46, 45:1}	46	{9, 16, 17:1} {9:2}
38	{5, 0, 17, 19, 37:1} {16, 17, 27, 19, 45:1} {37:1}	27	{5, 0:1} {16, 17:1} {16:1}
37	{5, 0, 17, 19:1} {19:1}	36	{5, 0:2} {5:1} {9:2}
45	{5, 0, 1:1} {16, 17, 27, 19:1} {46:1}	17	{5,0:2} {5,16:1} {9,16,17:1} {16:2}
35	{5, 36:1} {9, 36, 7:1} {36:1} {6, 7:1}	16	{9:1} {5:1}
26	{9, 16, 17, 46, 6, 7, 19, 25:1} {16, 27, 24:1} {27, 25:1} {27, 24:1}	9	{empty
25	{5, 0, 17, 24:1} {5, 0, 27, 24:1} {9, 16, 17, 46, 6, 7, 19:1} {27:1}	0	{5:6}
		5	empty

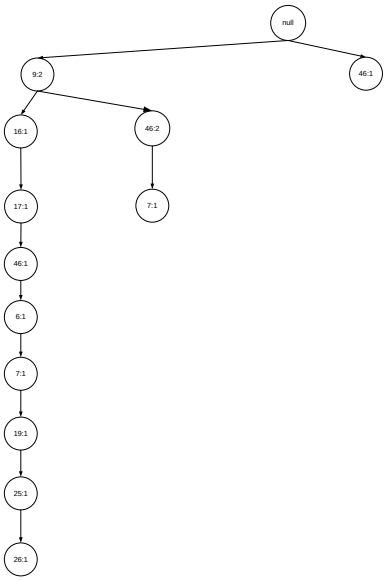
7 Stage of stirring Conditional FP-Tree

1. Stage of discovering conditionals fp-tree ending in item 47



Picture 3 *Fp-Tree* containing 47

1. First step undertaken was to build upapohon fp-tree with only include path ending in item 47.
2. Support count of 47 items are calculated and compared with the minimum support count = 3. Because it meets, then {47} including frequent, due to the support of the count of items 47 = 3.
3. Due to frequent 47 items {47} then will be raised with conditionals fp-tree. Here are the steps:
    1. In conditionals pattern base for 47, there are 3 paths:
        1. First path : {9, 16, 17, 46, 6, 7, 19, 25, 26:1}.
        2. Second path : {46:1}.
        3. Third path : {9, 46, 7:1}.
    2. On the path of ending {47} nodes is updated support his count in accordance with the support of count-owned {47} due to the support of count-owned nodes reflect transactions that ended up in {47}.
    3. When in a given path across one or two the trajectory, then support count will always gain 1.
    4. After all nodes ending {47} updated support his count then remove nodes that support his count is less than the minimum support count.



Picture 4 *Conditional Fp-Tree* 47 After the resurrected



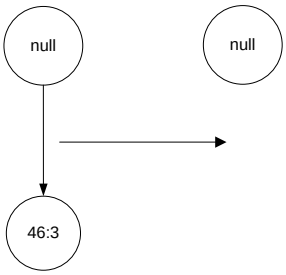
Picture 5 *Conditional Fp-Tree* 47, 46:3 selection result

Table 7 *Conditional Fp-Tree*

Item	*Conditional FP-Tree*	Item	*Conditional FP-Tree*
70	Empty	19	{17:3}
65	Empty	7	{9:3}
55	Empty	6	{9:3}
54	Empty	1	{0:3} {5:4} {5,0:3}
47	{46:3}	46	{9:3}
44	{45:3}	27	Empty
38	Empty	36	{5:3}
37	Empty	17	{5:3} {16:4}
45	Empty	16	Empty
35	{36:3}	9	Empty
26	{27:3}	0	{5:6}
25	Empty	5	Empty
24	{27:3}		

8 Search Stage *Frequent Pattern*

1. For items 47, frequent pattern is {46,47:3}.



Picture 6 *Conditional Fp-Tree* for *frequent pattern* {46, 47:3}

Table 8 Result of Frequent Pattern

Suffix	Frequent Pattern
47	{46,47:3}
44	{45,44:3}
35	{36,35:3}
26	{27,26:3}
24	{27,24:3}
19	{17,19:3}
7	{9,7:3}
6	{9,6:3}
1	{0,1:3} {5,1:4} {5, 0,1:3}
46	{9,46:3}
36	{5,36}
17	{5,17:3} {16,17:4}
0	{5,0:6}

9 Calculate the confidence from the frequent pattern, in supposing a minimum 70% confidence, remove frequent pattern that does not meet the minimum confidence.

Table 9 Result of *Generate Rule*

Rule	Support	Confidence(%)
45→44	3	(3/4) *100%=75
44→45	3	(3/3) *100%=100
47→46	3	(3/3) *100%=100
35→36	3	(3/4) *100%=75
19→17	3	(3/4) *100%=75
26→27	3	(3/4) *100%=75
6→9	3	(3/4) *100%=75
7→9	3	(3/4) *100%=75
1→0	3	(3/4) *100%=75
1→5	4	(4/4) *100%=100
5→0	6	(6/8) *100%=75
0→5	6	(6/6) *100%=100
24→27	3	(3/4) *100%=75
5, 1→0	3	(3/4) *100%=75
1,0→5	3	(3/3) *100%=100

Table 10 Results Of Production Fabric Recommendations

Rule	*Informasi Rekomendasi Produksi*	*Confidence(%)*
45→44	LEC 210 B→LEC 210 A	(3/4) *100%=75
44→45	LEC 210 A→LEC 210 B	(3/3) *100%=100
47→46	CHM 905 B→CHM 905 A	(3/3) *100%=100
35→36	SU 52 A→SU 52 B	(3/4) *100%=75
19→17	DF 207 B→DF 204 B	(3/4) *100%=75
26→27	OTN 401 A→OTN 401 B	(3/4) *100%=75
6→9	CD 396 A→CD 386 B	(3/4) *100%=75
7→9	CD 396 B→ CD 386 B	(3/4) *100%=75
1→0	CCN 1005 B→CCN 1005 A	(3/4) *100%=75
1→5	CCN 1005 B→CCN 1005 F	(4/4) *100%=100
5→0	CCN 1005 F→CCN 1005 A	(6/8) *100%=75
0→5	CCN 1005 A→CCN 1005 F	(6/6) *100%=100
24→27	OTN 400 A→OTN 401 B	(3/4) *100%=75
5, 1→0	CCN 1005 F, CCN 1005 B→CCN 1005 A	(3/4) *100%=75
1,0→5	CCN 1005 B, CCN 1005A→CCN 1005 F	(3/3) *100%=100

10 Having obtained the rule after the Association then that will be done is specify a comparison of stock for production based on the rule that has been gained, by summing the many fabrics are purchased based on the rule that has been obtained. Then after the combined search results from the comparison of the sums many fabrics are purchased, after

that see the minimum stock of any fabric and then determine the production will be done.

11 Rules used in production is recommend :

1. If the available stock of results should < produced will then be recommended to produce.
2. If the available stock of ≥ of results must be produced so it is not recommended for production.

12 In the instance will be produced as many as 5000 CCN 1005 B 'S yard, then on a rule that has developed it'S seen CCN 1005 B associated with any fabric pattern, turned out in rule CCN 1005 B'S association with two fabric pattern CCN 1005 F and CCN 1005 A, was obtained from the rule CCN 1005 B → CCN 1005 F, CCN 1005 B → CCN 1005 A.

13 take a sales transaction data based on rules that have been obtained, here is the result of a rule based on transaction data have been obtained:

CCN 1005 B = (400+900+2000+520)
= 3820

CCN 1005 F = (400+900+2000+380+100+500+500+400)
= 5180

CCN 1005 A = (560+900+140+500+1090+540)
= 3730

14 After getting a large number of data items are purchased from transaction data later earn a comparison of existing data that is.

=3820 : 5180 : 3730

After having obtained the comparison and then count the number of the fabric to be produced using the results of the comparison, then see the minimum stock to the amount of stuff that needs to be produced, following are the results of the calculations:

CCN 1005 B = $\frac{3820}{3820}$×5000 = 5000, CCN 1005 B is recommended for produced as much as 4250 because currently available stock is 750 while the minimum stock of 2500.

CCN 1005 F = $\frac{5180}{3820}$×5000 = 6780, CCN 1005 F It is recommended to produce as much as 4760 because stock currently available is 2020 while the minimum stock of 2500.

CCN 1005 A = $\frac{3730}{3820}$×5000 = 4882, 1005 A It is recommended to produce as much as 1032 because stock currently available is the minimum stock while 3850 2500.

2.3 Testing

1. Blackbox Testing

1.1 Alpha Testing

Alpha testing results state that applications to be built is not error and internal procedures are functionally issued the results as expected.

1.2 Beta Testing

Beta test results that are based on the results of interviews with CV. Makmur Abadi can be concluded that this system can help in knowing the purchasing patterns of customers and can assist in recommending a fabric production although there is a display that should require understanding.

2. Testing by comparing Calculation Manual and Application

Tabel 11 Test Result

Perhitungan Manual	Perhitungan Aplikasi
CD 382 B→ CCN 1005 E	CD 382 B ==> CCN 1005 E
CCN 1005 E→ CD 382 B	CCN 1005 E ==> CD 382 B
CD 382 → DF 207 B	CD 382 A ==> DF 207 B
CHM 905 A→ DF 207 B	CHM 905 A ==> DF 207 B
MY 330 A→MY 324 B	MY 324 B ==> MY 330 A
MY 324 B→MY 330 A	MY 330 A ==> MY 324 B
DF 207 B → CD 382 A	DF 207 B ==> CD 382 A
DF 207 B→ CHM 905 A	DF 207 B ==> CHM 905 A

Based on the testing that has been done, it can be known that to rule that is generated between the system with manual calculation is the same.

3. CLOSING

3.1 Conclusion

Based on results of analysis and testing of system as well as the interviews have been done before, it can be drawn a conclusion that the system data mining association rule that has been built has production recommendations can provide the appropriate fabric with a pattern of habitual customers in buying fabrics that can be used by the person who manages CV. Makmur Abadi for the production activities.

3.2 Advices

As for the advice given to the final task of the research in the development of this system is it needs further research regarding the implementation of data mining association rules for generating information about production recommendations can be applied with a data mining algorithm of association rule other than FP-Growth algorithm, because based on research done to fp-growth algorithm is getting a lot of data that is used then it will need a great memory to make the structure tree.

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