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DATA MINING FOR DETERMINING BOOK LOAN PATTERNS IN-LIBRARY USING APRIORI ALGORITHM

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Abstract

Data mining is the process of exploring the added value of knowledge so far not manually known from a data set using these techniques or methods. Data mining is a new science that has its roots in various fields of science such as artificial intelligence, machine learning, statistics, and databases. In the process of borrowing books, of course raw data will be processed by dividing it into different pieces of data. Among the lending data tables processed are general lending tables, 2-itemset candidate tables, lending tabular tables, support value tables, confidence value tables.
Keywords: data mining, patterns, a priori

1. Introduction

The library is a library that has a room with various types of books. Creativity is needed so that the existing book data in the library looks neat, there are various ways to tidy up the book data in the library, the way is to utilize data mining techniques, in this case, apriori algorithm is one of the data mining techniques that is a technique that has valuable information that is hidden or hidden in a very large collection of data (database) so that an interesting pattern is found that was previously unknown.

A priori algorithm is the most famous algorithm for finding high-frequency patterns. High-frequency patterns are patterns of items in a database that have a frequency or support above a certain threshold called the minimum support or threshold. The threshold is the minimum transaction limit. A priori analysis is also defined to find all a priori rules that meet the minimum requirements for support and the minimum conditions for confidence.

2. Literature Rivew

2.1 Data Mining

Data mining is a term used to describe the discovery of knowledge in a database. Data mining is a process that uses statistical techniques, mathematics, artificial intelligence, and machine learning to extract and identify useful knowledge information and knowledge that is assembled from various large databases. [1] - [5]

2.2 Apriori Algorithms

A priori algorithm is a pattern search algorithm that is very popular in data mining techniques. This algorithm is intended to find a combination of itemset that has a certain frequency value according to the desired criteria or filter. The tool used to make the program is a programming language. Programming languages are very diverse: C, C ++, Pascal, Java, C #, Basic, Perl, PHP, ASP, JSP, J #, J ++, and many other languages. From various programming languages how to give different instructions but aims to produce the same output. [6] - [9]

2.3 Algorithm Criteria According to Donald E. Knuth

1. Input: the algorithm can have zero or more input from outside.
2. Output: the algorithm must have at least one output.
3. Definiteness: the algorithm has clear and unambiguous instructions.
4. Finiteness (there are limits): the algorithm must have a stopping role.
5. Effectiveness (precise and efficient): the algorithm should be able to be implemented and effective as much as possible. Examples of ineffective instructions are: A = A + 0 or A = A * 1

2.4 Types of Process Algorithms

1. Sequence Process: instructions are carried out sequentially, sequentially.
2. Selection Process: instructions are carried out if they meet certain criteria
3. Iteration Process: instructions are carried out while meeting certain conditions.
4. Concurrent Process: several instructions are carried out together.

Apriori's algorithm uses knowledge of the frequency of attributes that have been known previously to process further information. The Apriori algorithm determines the possible candidates by paying attention to minimum support and minimum confidence. Support is the visitor value or percentage of a combination of items in the database.

3. Results and Discussion

3.1 Data Needs

Table 1 Data used

No	Code	Type	Value
1	002/Fiqih/MA.DH/13	Fiqih	6
2	013/Pantun/MA.DH/13	Novel	-
3	006/MTK/MA.DH/13	Matimatika	-
4	015/K25N/MA.DH/13	Kisah 25 Nabi	3
5	003/Q.H/MA.DH/13	Qur'an Hadish	20
6	004/A.N/MA.DH/13	Azab Neraka	-
7	008/A.A/MA.DH/13	Akidah Ahlak	-
8	021/T.S/MA.DH/13	Tuntuan Shalat	9
9	012/A.Q/MA.DH/13	Al-Qur'an	11
10	005/Sejarah/MA.DH/13	Sejarah	6
11	013/Novel/MA.DH/13	Pantun	12
12	007/I.S/MA.DH/13	Indahnya Surga	12
13	010/A.Y.D/MA.DH/13	Anak yang Durhaka	5
14	017/Majalah/MA.DH/13	Majalah	-
15	025/A.D/MA.DH/13	Atlas Dunia	4

3.2 Calculation

1. Calculation of support (L1)

Support from each candidate itemset is obtained by scanning the database to count the number of transactions containing all items in the candidate itemset.

Table 2 List of First Candidate Support Items (L1)

	Item	***Support***
1	Fiqih	66,66%
2	Sejarah	33,33%
3	Matimatika	83,33%
4	Qur'an Hadish	100%
5	Pantun	83,33%
6	Novel	16,67%
7	Kisah 25 Nabi	16,67%
8	Majalah	16,67%
9	Azab Neraka	16,67%
10	Atlas Dunia	16,67%
11	Indahnya Surga	16,67%

Minimum Support = 50%

Then compared to Minimal Support.

Table 3 List of L1 Achieving Support

No.	***Item* (merek)**	***Support***
1	Fiqih	66,66%
2	Matimatika	83,33%
3	Qur'an Hadish	100%
4	Pantun	83,33%

3.3 Formation of association rules

After all the high frequency patterns have been found, then the association rules are sought to meet the minimum requirements for confidence by calculating the confidence rules of association A B.

No.	**Kombinasi Item (Buku)**	***confidence***

1	If you borrow Mathematics, then you can borrow more Qur'anic Hadith	3/3	100%
2	If you borrow the Qur'an from the Hadith, then you can also borrow, Mathematics	3/4	75%
3	f you borrow Pantun, you can also borrow the Qur'an from the Hadish	3/4	75%
4	If you borrow the Qur'an from the Hadish, you can also borrow, Pantun	3/4	75%

Based on the discussion above, it can be seen that the most lending of books in the modern Darren boarding school library in the wisdom of the transaction is {Matimatika, Qur'an Hadish, Pantun}. For more details, see Figure 1 below:

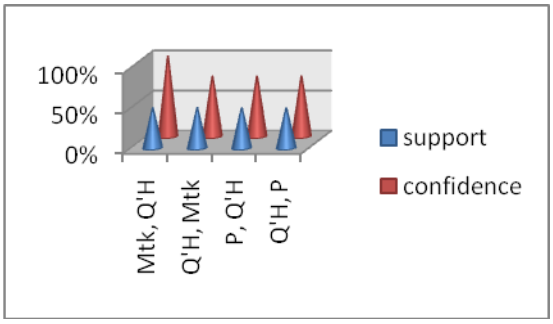

Figure 1: Final association graph

4. Conclusions

The greater the amount of data, the calculation process will be slower because of the large amount of data processing, but the results of data mining will be increasingly high quality because it is based on large data.

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