Implementation Decision Tree Algorithm for Ecommerce Website

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Abstract---*Making E-commerce websites has been widely used in business fields where buyers and sellers doesnt to meet in directly , the activities of transaction between one company or individually, the advantages of E-commerce marketing is the products sold will be more numerous and varied and has a wide range too, shop owners do not need to open another branch to distribute goods. This e-commerce sales system will reduce operational costs because there is no need to use too many employees.The recently problem today is E-commerce websites there will be a very large number of transactions, which are caused by sales data and orders that are opened at any time and not limited by distance and time. This automatically the amount of data ordering goods must be checked manually. The shop owner will sort and see the product and the number of orders, this is very difficult because of the category of goods sold when they are varied and consist of several product categories.The solution to the above problems can be overcome by adding a product category tracking system feature to the e-commerce website database, by adding the dec-tree algorithm concept this algorithm will automatically record and read the number of transactions and the number of items sold, the system will then provide a report on the system of the best-selling number of goods and the amount of stock, the results of this report can be used to display a product that is most sold to be offered back to consumers or as a recommendation for the next stock procurement.*

Keyword: *E-Commerce, Dec-Algorithm,Order transaction*

I. INTRODUCTION

The current sales system has grown rapidly from the conventional one and now currently mobile, the conventional sales system has several weaknesses, the data on goods sold cannot be varied because of limited sales, increased sales are usually done by opening new branches, this system will be problem if the funds owned shop are limited and will automatically be recruited for new employees.

The sales transaction data collection system will be more difficult because there is no computerization on sales data, the data collection system will be more difficult because the product data categories are more than one type. The solution to this problem is to make a sales website that is online as known as E-Commerce, the online system can manage the number of categories of goods that are increasing and do not require a lot of space. Store owners can see the amount of transaction data but still have shortcomings between recommendation data and bestseller products that are difficult to analyze, the problem is overcome by applying the data mining concept by applying the dec-Tree algorithm, the algorithm will automatically perform sales data clusters taken directly in the transaction database, sales of the data will be carried out by normalizing the data by eliminating unneeded data, the data scanning system will be treated for many purchased products, the algortima system will record sales data and display best-seller products, this system will facilitate the admin in the retrieval further decisions and monitoring the amount of stock.

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II. THEORETICAL BASIS

FP-Growth AlgorithmThe FP-Growth algorithm uses the FP-Tree data structure. The information stored is an FP-Tree node: Item, Parent Index, Support, and Next (Pointer). When you finish creating FP-Tree, you cannot just get the frequent itemset contained in the dataset. An itemset combination can be in several different paths. To get a pattern in FP-Growth, the easier step is to find the direction from the end of a path, then we search starting from the header for the item at the end, then then based on each node containing the item the direction of the node path up. This is certainly faster than the up-down because the direct pointer for each node is a pointer to the parent. Explored paths are only the paths that have the node being searched for. So in the FP-Tree structure there is a link from an item to the paths that have the item, so when it takes a search for patterns for a particular item, just search for these paths [1]. The following are the stages of the FP-Growth algorithm:

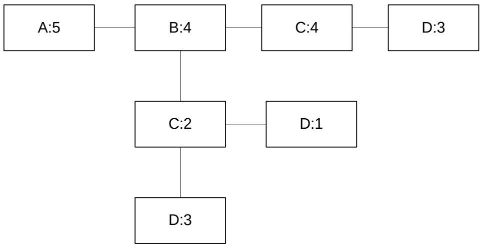
create an Item HeaderThe header in this case other than as the header of an item to FP-Tree is also a type of basic item that meets the minimum support. After getting the item and its support value, items that are not frequent are discarded and items are sorted by their support value. Headers for items, prepared in a certain array and added when making FP-Tree [2].

Make FP-TreeP-Tree is built by searching for items in the order of frequent items. Transaction data does not need to be sorted, and for each item found it can be directly entered into the FP-Tree. After creating a root, each item found is entered based on the path in the FP-Tree [3]. If the item found already exists, then the item's support value is added, but if the path does not yet exist, then a new node is created to complete the new path in that FP-Tree. This is done as long as the item on the transaction is still qualified, meaning that it meets the minimum support value. So, the items found in the transaction will sequentially extend down. In the FP-Tree structure, the path path is applied from child to root. So, a complete path in FP-Tree is from the lowest child to the root of each node in the FP-Tree having a pointer to the parent, so search - must start from the bottom [4].

Pattern ExtractionPattern extraction is based on the involvement of items on a page, each path is checked for all possible combinations where the item is involved. The next iteration is done by involving the next item, without involving the previous item, so that the same pattern will not be found twice in the same path. If the first item of a combination result is not the last item (before root), then the itemset combination can still be developed again.

After processing FP-Tree into patterns, it is necessary to process the accumulation of found patterns considering that the same pattern can be found in different paths for which the Pattern Tree data structure is used (see Figure 2. 3).

I. METHOD RESEARCH



Explanation :

For example at node d: 1 above, it means that there is a pattern a-c-d worth support 1. Then if there is a pattern a-c-d again worth n support found from FP-Tree then the support value 1 becomes n + 1. Examples of complete results from the PatternTree:

a: 5 illustrates that there is a pattern of 5
b: 4 illustrates that there is a pattern of a-b of 4
c: 4 illustrates that there is a pattern of a-b-c of 4
d: 3 illustrates that there is a pattern of a-b-c-d of 3 c: 2 illustrating that there is a pattern of a-c of
d: 1 illustrates that there is a pattern of a-c-d of 1
d: 3 illustrates that there is an a-d pattern of 3

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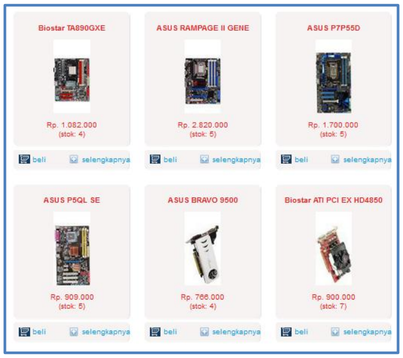
Patterns that doesn't meet the minimum support, are removed from the pattern list. The remaining patterns are then sorted to facilitate the creation of rules, the data structure used in the FP-Growth algorithm is an FP-Tree composed of FP-node, Pattern Tree consisting of the Pattern Tree Node, and also the FileTest. FP-Tree is a tree structure that stores items that have been found when reading data. Then this FP-Tree consists of the FPT Node which forms a path to look for, there are any patterns on the path. FPT Node is a node on FP-Tree that stores item information on nodes, support values, pointer to parent, and pointer to the next node that has the same item (next). Pattern Tree is a structure for storing all patterns found in FP-Tree. F-Itemset stores the frequent itemset that have been found. This format is used especially if you want to produce rules, to compare a frequent itemset with its subset, it will be easier with a structure like this from processing frequent itemset still in the form of a tree. The F-Itemset structure here is the same as F-Itemset in a priori.

II. IMPLEMENTATION

Figure 1:*Front End Website*

Explanation :

In the picture above is the main display of the E-Commerce website, parlindungan.com which will be used as sample data, the products sold are elktronika goods



Biostar TA890GXE
Rp. 1.082.000
(stok: 4)
beli selengkapnya

ASUS RAMPAGE II GENE
Rp. 2.820.000
(stok: 5)
beli selengkapnya

ASUS P7P55D
Rp. 1.700.000
(stok: 5)
beli selengkapnya

ASUS P5QL SE
Rp. 909.000
(stok: 5)
beli selengkapnya

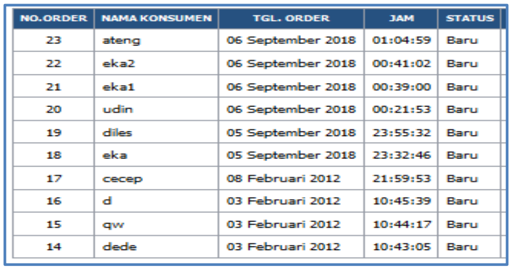
ASUS BRAVO 9500
Rp. 766.000
(stok: 4)
beli selengkapnya

Biostar ATI PCI EX HD4850
Rp. 900.000
(stok: 7)
beli selengkapnya

Figure 2:*Type Of Product*

Explanation :

In the picture above the data taken as a sample on the Parlindungan.com E-Commerce website, the goods sold are electronic, the data is uploaded to the admin section and items sold are still ordinary products and superior products, goods purchased by customers will be recorded in database and checked again through the order in the admin menu. the picture above is a list of buyers recorded in the database, the data will be sorted and performed data normalization techniques, the normal function of data is to eliminate unnecessary data.



NO.ORDER	NAMA KONSUMEN	TGL. ORDER	JAM	STATUS
23	ateng	06 September 2018	01:04:59	Baru
22	eka2	06 September 2018	00:41:02	Baru
21	eka1	06 September 2018	00:39:00	Baru
20	udin	06 September 2018	00:21:53	Baru
19	diles	05 September 2018	23:55:32	Baru
18	eka	05 September 2018	23:32:46	Baru
17	cecep	08 Februari 2012	21:59:53	Baru
16	d	03 Februari 2012	10:45:39	Baru
15	qw	03 Februari 2012	10:44:17	Baru
14	dede	03 Februari 2012	10:43:05	Baru

Figure 3:*Database Customer*

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Explanation :

In the picture above, the product data that is inputted by the admin section is complete with the weight and stock of the data items. The data is then aggregated based on the product category.

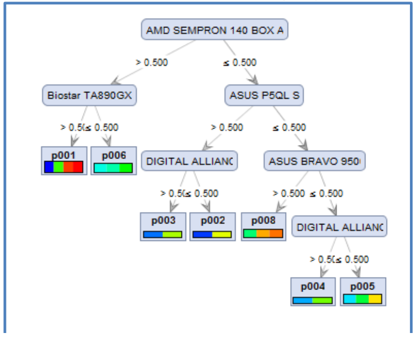
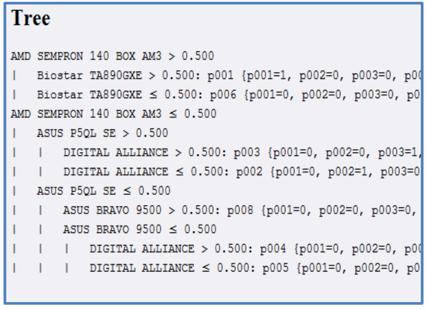


Figure 4:*FP-Tree Implementation*

Explanation :

In the picture above is the result of processing data on the products sold taken on the parlindungan.com website, on the sales data the priori algorithm determines the total transaction data to look for the superior product. The system used is by scanning the data on transaction data, the Decc-Tree algorithm will take the product linkage so that the product being lowered will be a best seller or a product recommendation to be offered.



Tree

```
AMD SEMPRON 140 BOX AM3 > 0.500
|   Biostar TA890GXE > 0.500: p001 {p001=1, p002=0, p003=0, p0
|   Biostar TA890GXE ≤ 0.500: p006 {p001=0, p002=0, p003=0, p0
AMD SEMPRON 140 BOX AM3 ≤ 0.500
|   ASUS P5QL SE > 0.500
|   |   DIGITAL ALLIANCE > 0.500: p003 {p001=0, p002=0, p003=1,
|   |   DIGITAL ALLIANCE ≤ 0.500: p002 {p001=0, p002=1, p003=0
|   ASUS P5QL SE ≤ 0.500
|   |   ASUS BRAVO 9500 > 0.500: p008 {p001=0, p002=0, p003=0,
|   |   ASUS BRAVO 9500 ≤ 0.500
|   |   |   DIGITAL ALLIANCE > 0.500: p004 {p001=0, p002=0, p0
|   |   |   DIGITAL ALLIANCE ≤ 0.500: p005 {p001=0, p002=0, p0
```

Figure 5:*FP-Tree result*

Explanation :

In the picture above is a recommendation reading system taken from the side of transaction data taken from the purchase code, for example ASUS PSQL products, purchased together with the buyer ID with ID number p003 and p008.

III. CONGCLUSION

In the experiment computer sales recommendation system on e-commerce website can be implemented and used to determine product recommendation data, the time used can be shorter and make it easier for admin in this case the website owner to determine the superior product, the more purchase data will offer product recommendations which will be the best seller product. Suggestion for further research is by increasing the transaction data then the sales data back-up system is needed regularly, other security features are added by adding personal data features so that each customer can log in and see the history of the items purchased later.

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