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Inventory Grouping to Support IT Business Management with the K-Means Algorithm

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Abstract

Inventory control is an important factor in a company that functions to maintain smooth production. Inventory control is the most important activity in the survival of the company. Fulfillment of stocks of goods or products and recording transactions manually. The fluctuating number of requests from consumers resulted in the stock that Gaptech computer had to prepare to become unstable. In addition, the various and many types of products made stock management inaccurate. by extracting data using one of the data mining methods, namely data grouping. In this study grouping sales reports on Gaptech computer, the data is grouped into 2 groups using one of the data grouping algorithms, namely the K-Means Algorithm. The K-Means algorithm is a non-hierarchical data clustering method that divides data into one or more clusters, so that data with the same characteristics are grouped in the same cluster. The grouping results are used to find out which product groups are in great demand and which are less desirable. The results of this study will produce a software that is created using a method of managing incoming transaction data so that it will make it easier for Gaptech computer store owners to manage stock items.

Keywords : Inventory, Transactions, Management, K-Means Algorithm, Clustering.

1. Introduction

Advances in information and communication technology have made big changes to life, including companies or organizations. With information technology, it makes it easier to work on various documents, reports and other correspondence so that with information technology everything can be completed as effectively and efficiently as possible. The need for quality information is the main factor why the use of information technology needs to be planned. Because of that, it is necessary to have governance that regulates how information technology is used in organizations. The existence of Business Management Information Technology can reduce the error rate when data collection is followed by increased business output.

Inventory is important in supporting the company's operational activities. Without inventory, the company's operational activities will be hampered , this will result in not achieving the target the company wants [1]. Inventories are goods that can usually be found in closed warehouses, fields, open warehouses, or other storage places, either in the form of raw materials, semi-finished goods, finished goods, goods for operational purposes, or goods for industrial purposes. a project [2]. Inventory needs must also be controlled so that there is no shortage or excess of inventory. Inventory control is important in advancing the company. Inventory control is expected to increase profits and minimize costs that can be incurred. Inventory control is an important factor in a company that functions to maintain smooth production. Inventory control is the most important activity in the survival of the company [3].

Gaptech computer is a computer shop domiciled in Padang. Items sold include computers, laptops, flash disks, mice and others. Gaptech computer fulfills the stock of goods or products and records transactions manually. The fluctuating number of requests from consumers resulted in the stock that Gaptech computer had to prepare to become unstable. In addition, the various and many types of products made stock management inaccurate [4].

Sometimes, because they don't want to have a shortage of stock of certain goods or products when consumer demand is large, companies take steps to place orders for certain products larger than before. This can overcome the shortage of stock for certain products and Gaptech computer also does not need to place repeated orders from suppliers, but results in high and uneconomical holding costs. In addition, inaccurate stock management also results in frequent shortages or excesses of certain products which will ultimately disappoint consumers [5].

Determination of the amount of product stock that is less accurate because it must be in accordance with great knowledge. In order to obtain this knowledge, it is necessary to process historical data for many transactions, namely data mining techniques [6] . In this study, researchers will produce a software that is made using methods to manage incoming transaction data so that it will make it easier for Gaptech computer

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store owners to manage stock items. Research is needed to produce an example program that can cluster or group products that must have a large number of stocks because they are most in demand, moderate stocks because the products are in demand and small stocks because they are less desirable than a large variety of products.

Information technology can be a principal facilitator for business activities and can provide great assistance to changes in the basis for the structure, operation and management of companies [7]. IT Business Management is a field of management that can manage information technology resources according to the needs of a business or company. These resources include hardware, software, computer networks, and data, as well as human resources to maintain these devices. IT Business Management is an information technology that can provide information to users with the same needs [8].

K-Means is a non-hierarchical data clustering method that divides data into one or more clusters, so that data with the same characteristics are grouped in the same cluster. So that data with different characteristics will be grouped in another group. The method included in the distance-based clustering algorithm which divides data into a number of clusters and the K-Means algorithm only works on numerical attributes [9].

K-means clustering is a non-hierarchical data clustering method that groups data in the form of one or more clusters/groups. Data that has the same characteristics are grouped in one cluster/group and data that has different characteristics are grouped with other clusters/groups so that data in one cluster/group has a small level of variation [10].

Clustering is a technique in data mining that functions to group data based on the similarity of data in a group and can minimize similarities in other groups. Clustering is grouping records, observations, or paying attention and forming classes of objects that are similar. Cluster is a collection of records in another cluster. There are two known clustering methods, namely hierarchical clustering and partitioning [11].

Clustering or classification is a method used to divide data sets into several groups based on predetermined similarities. A cluster is a group or set of data objects that are similar to one another in the same cluster and are dissimilar to objects that are in different clusters. Objects will be grouped into one or more clusters so that objects in one cluster will have high similarity between one another [12].

To face business competition in this era of information technology, companies or shops are required to be able to make the right decisions in determining sales and marketing strategies for products to be sold so that product sales can increase. Computer Gaptech is a computer store located at Plaza Andalas Padang, 2nd Floor Next to the Ramayana Door, 2nd Floor No. 110, Padang City, West Sumatra, is a shop selling various kinds of laptops and other computer equipment.

2. Research methodology

The research framework is the order in a study. Where the purpose of this framework is to make a design so as not to cross the boundaries of the subject matter and to make it easier to understand the contents of the research. The sequence of these steps is made into a framework that will facilitate the completion of this research. The research framework that the authors conducted in the research will be described in Figure 1.

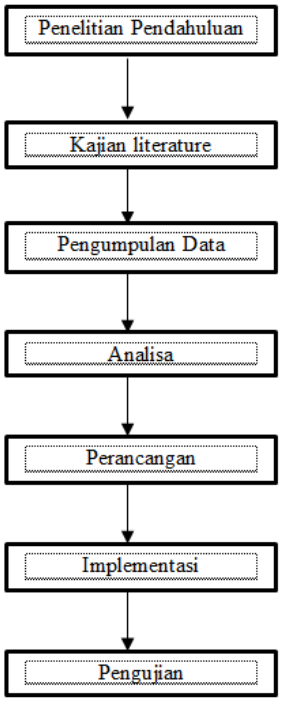

Figure 1. Research Framework

The research stage is a sequence of processes or steps that will be carried out in completing this research. The stages of this research are as follows:

Previous Research

The problem in this study examines the process of problems that can be identified on Gaptech computers in determining inventory stocks that are still not computerized, namely by fulfilling stocks of goods or products and recording transactions manually. the fluctuating number of requests from consumers resulted in the stock that Gaptech had to prepare to become unstable.

Literature Review

There are several previous studies using the same method, one of which is the research conducted. In previous research using the K-Means method, one

example is research conducted by Anggraini in 2019. Pensmart Jambi for the coming period so as to assist the Jambi Pensmart Store in determining the amount of stock purchases in the next period

Data collection

At this stage, the authors collect data related to the object under study in various ways , namely observation, interviews and library research. This research was conducted from November 2021 until completion at Gaptech Computer located at Plaza Andalas Padang, 2nd floor next to the door of Ramayana 2nd floor No. 110, Padang City, West Sumatra.

Analysis

After doing the data collection stage, the next stage is to do the analysis. Analysis is the process of finding, collecting and researching an existing problem. This analysis was carried out using three stages, namely the stages of data analysis, process analysis, and system analysis.

a. Data analysis

After the data is collected, then data analysis is carried out. Data analysis is an attempt to examine and process the data that has been collected so that a useful conclusion is obtained in accordance with the research objectives.

b. Process Analysis

Process analysis carried out in this study is by applying the concept of IT Business Management based on sales websites using the K-Means Algorithm method. The K-Means algorithm method will group products that are in great demand based on existing data.

c. System analysis

This stage is carried out by designing the system that will be implemented. System analysis is carried out to find out and develop a running system. This system has some data related to research and these data will be entered in the database so that it is well organized.

Design

After the analysis phase is carried out, the next stage is to design. Where the design stages aim to make the research designed in accordance with its objectives, so it does not come out of the research objectives. This design stage is divided into two, namely model design using UML (Unified Modeling Language) and interface design.

Implementation

After the design stage is carried out, the next stage is the implementation stage, where the implementation stage is carried out to find out the computer specifications to run the program and what software is needed. At this implementation stage, researchers used the PHP programming language and MySQL database

Testing

After the implementation stage is carried out, the next stage is to carry out the testing process, where the testing process is carried out on the program that has been designed to find out whether the program is running correctly and in accordance with the design that has been carried out.

Results

The results of clustering using the k-means method in this study showed that the types of bags that were in high demand and those that were less desirable were grouped into Gaptech computer Padang.

3. Results and Discussion

3.1 Data analysis

Data analysis is the most important stage in the development of a system, which is the initial stage in the design and development of a system. To assist in system analysis and design, relevant data is needed from the object under study. By doing data analysis, the needs and existing problems will be identified so that improvements can be made to the system. To obtain data or information in this case the authors first carry out data collection activities on the object of research. Data collection was carried out at Gaptech Computer by taking and interviewing Gaptech Computer owners **.**

3.2 Process Analysis

on Gaptech computers from the database, which is a K-Means algorithm clustering method . . Of the many sales attributes obtained, several products will be taken as samples for the application of the K-Means algorithm. The following are the products or items that were sampled.

Table 1. Preliminary Data Table

Product name	First stock	Sold
Asus E410m	12	3
HP 14S	16	3
Acer Expire 3	8	3
Lenovo IP Notebook 1	8	4
Asus Notebooks	8	6
Wireless Mouse	30	20
VAD mice	40	30
Keyboard Protector	12	8
SSD 120GB	20	10
SSD 250GB	30	20
SSD 320GB	80	70
SSD 500GB	100	80
1TB SSD	20	3
Epson Printers	10	1
Canon printers	10	2

ASUS Eeepc 1015BX	6	3
ASUS Eeepc X101H	5	3
Acer aspire one D270 Battery	7	3
ASUS A450C Laptop battery	5	2
Acer Aspire one722 Laptop Battery	8	4
Asus A3 Laptop battery	8	2
Sandisk flash drive 16 gb	100	40
Sandisk flash drive 8 gb	50	20
Toshiba flash drive 16 gb	80	60
vga cable	100	89
hdmi cable	50	4
Hdmi to vga	30	8
1.8m 3-hole laptop cable	33	20
Laptop Power Cable Thickness 1mm 1.8 meters EU C5	32	5
Power cable ps2 ps4 fat printer adapter 1.8M	30	15
Active speakers f-017	8	6
Mini usb 2 in 1 speaker	8	6
Jbl t5 mini bluetooth speaker	8	7
Speaker active mini blustoch stereo subwoofer	8	4
G105 active speaker for computer	8	4

Determination of Initial Cluster Center

The initial center of the cluster or centroid is obtained from the most sales data and the fewest sales, for the initial determination of the cluster it is assumed as follows:

Cluster center 1 : (100,89)
Cluster center 2 : (10,1)

Calculates the distance to the cluster center

To measure the distance between the data and the cluster center, Euclidian distance is used. Euclidean distance formula:

$$D_{11} = \sqrt{(M_{1x} - C_{1x})^2 + (M_{1y} - C_{1y})^2}$$

Where:

M = Data Coordinates

C = Centroid coordinates

D = Distance

1. 1st iteration: C1 = (100,89)

$$D_{11} = \sqrt{(M_{1x} - C_{1x})^2 + (M_{1y} - C_{1y})^2}$$
$$= \sqrt{(12 - 100)^2 + (3 - 89)^2} = 123.04$$

$$D_{12} = \sqrt{(M_{2x} - C_{1x})^2 + (M_{2y} - C_{1y})^2}$$
$$= \sqrt{(16 - 100)^2 + (3 - 89)^2} = 120.22$$

$$D_{13} = \sqrt{(M_{3x} - C_{1x})^2 + (M_{3y} - C_{1y})^2} = \sqrt{(8 - 100)^2 + (3 - 89)^2} = 125.94$$

$$D_{14} = \sqrt{(M_{4x} - C_{1x})^2 + (M_{4y} - C_{1y})^2} = \sqrt{(8 - 100) + (4 - 89)^2} = 125.26$$

$$D_{15} = \sqrt{(M_{5x} - C_{1x})^2 + (M_{5y} - C_{1y})^2}$$
$$= \sqrt{(8 - 100)^2 + (6 - 89)^2} = 123.91$$

$$D_{16} = \sqrt{(M_{6x} - C_{1x})^2 + (M_{6y} - C_{1y})^2} = \sqrt{(30 - 100)^2 + (20 - 89)^2} = 98,29$$

$$D_{17} = \sqrt{(M_{7x} - C_{1x})^2 + (M_{7y} - C_{1y})^2} = \sqrt{(40 - 100) + (30 - 89)^2} = 84,15$$

$$D_{18} = \sqrt{(M_{8x} - C_{1x})^2 + (M_{8y} - C_{1y})^2} = \sqrt{(12 - 100)^2 + (8 - 89)^2} = 119.60$$

$$D_{19} = \sqrt{(M_{9x} - C_{1x})^2 + (M_{9y} - C_{1y})^2}$$
$$= \sqrt{(20 - 100)^2 + (10 - 89)^2} = 112,43$$

$$D_{110} = \sqrt{(M_{10x} - C_{1x})^2 + (M_{10y} - C_{1y})^2} = \sqrt{(30 - 100) + (20 - 89)^2} = 98.29$$

$$D_{111} = \sqrt{(M_{11x} - C_{1x})^2 + (M_{11y} - C_{1y})^2}$$
$$= \sqrt{(80 - 100)^2 + (70 - 89)^2} = 27,59$$

$$D_{112} = \sqrt{(M_{12x} - C_{1x})^2 + (M_{12y} - C_{1y})^2}$$
$$= \sqrt{(100 - 100)^2 + (50 - 89)^2} = 9$$

$$D_{113} = \sqrt{(M_{13x} - C_{1x})^2 + (M_{13y} - C_{1y})^2} = \sqrt{(20 - 100) + (3 - 89)^2} = 117,46$$

$$D_{114} = \sqrt{(M_{14x} - C_{1x})^2 + (M_{14y} - C_{1y})^2}$$
$$= \sqrt{(10 - 100)^2 + (1 - 89)^2} = 130,97$$

$$D_{115} = \sqrt{(M_{15x} - C_{1x})^2 + (M_{15y} - C_{1y})^2}$$
$$= \sqrt{(10 - 100)^2 + (2 - 89)^2} = 125,18$$

$$D_{116} = \sqrt{(M_{16x} - C_{1x})^2 + (M_{16y} - C_{1y})^2} = \sqrt{(6 - 100)^2 + (3 - 89)^2} = 127,40$$

$$D_{117} = \sqrt{(M_{17x} - C_{1x})^2 + (M_{17y} - C_{1y})^2} = \sqrt{(5 - 100)^2 + (3 - 89)^2} = 128,14$$

D_{118}= $\sqrt{(M_{18x} - C_{1x})^2 + (M_{18y} - C_{1y})^2}$ = $\sqrt{(7-100)^2 + (3-89)^2}$= 126 ,67

D_{119}= $\sqrt{(M_{19x} - C_{1x})^2 + (M_{18y} - C_{1y})^2}$ = $\sqrt{(5-100)^2 + (1-89)^2}$= 128 ,82

D_{120}= $\sqrt{(M_{20x} - C_{1x})^2 + (M_{20y} - C_{1y})^2}$ = $\sqrt{(8-100)^2 + (4-89)^2}$= 126 ,26

D_{121}= $\sqrt{(M_{21x} - C_{1x})^2 + (M_{21y} - C_{1y})^2}$ = $\sqrt{(8-100)^2 + (1-89)^2}$= 126 ,62

D_{122}=$\sqrt{(M_{22x} - C_{1x})^2 + (M_{22y} - C_{1y})^2}$ = $\sqrt{(100-100)^2 + (40-89)^2}$= 49

D_{123}=$\sqrt{(M_{23x} - C_{1x})^2 + (M_{23y} - C_{1y})^2}$ = $\sqrt{(50-100)^2 + (20-89)^2}$=85 ,21

D_{124}=$\sqrt{(M_{24x} - C_{1x})^2 + (M_{24y} - C_{1y})^2}$ = $\sqrt{(80-100)^2 + (60-89)^2}$= 35 ,23

D_{125}=$\sqrt{(M_{25x} - C_{1x})^2 + (M_{25y} - C_{1y})^2}$ = $\sqrt{(100-100)^2 + (89-89)^2}$=0

D_{126}= $\sqrt{(M_{26x} - C_{1x})^2 + (M_{26y} - C_{1y})^2}$ = $\sqrt{(50-100) + (4-89)^2}$= 98.62

D_{127}= $\sqrt{(M_{27x} - C_{1x})^2 + (M_{27y} - C_{1y})^2}$ = $\sqrt{(30-100)^2 + (8-89)^2}$= 107 ,06

D_{128}=$\sqrt{(M_{28x} - C_{1x})^2 + (M_{28y} - C_{1y})^2}$ = $\sqrt{(33-100)^2 + (20-89)^2}$= 96 ,18

D_{129}= $\sqrt{(M_{29x} - C_{1x})^2 + (M_{29y} - C_{1y})^2}$ = $\sqrt{(32-100)^2 + (5-89)^2}$= 108 ,07

D_{130}=$\sqrt{(M_{30x} - C_{1x})^2 + (M_{30y} - C_{1y})^2}$ = $\sqrt{(30-100)^2 + (15-89)^2}$= 101 .86

D_{131}= $\sqrt{(M_{31x} - C_{1x})^2 + (M_{31y} - C_{1y})^2}$= $\sqrt{(8-100)^2 + (6-89)^2}$= 123 ,91

D_{132}=$\sqrt{(M_{32x} - C_{1x})^2 + (M_{32y} - C_{1y})^2}$ = $\sqrt{(8-100)^2 + (6-89)^2}$= 123 .91

D_{133}= $\sqrt{(M_{33x} - C_{1x})^2 + (M_{33y} - C_{1y})^2}$ = $\sqrt{(8-100)^2 + (7-89)^2}$= 123 ,24

D_{134}= $\sqrt{(M_{34x} - C_{1x})^2 + (M_{34y} - C_{1y})^2}$= $\sqrt{(8-100)^2 + (4-89)^2}$= 125 ,26

D_{135}=$\sqrt{(M_{35x} - C_{1x})^2 + (M_{35y} - C_{1y})^2}$ = $\sqrt{(8-100)^2 + (4-89)^2}$= 125 ,26

2. 2nd iteration : C2 = (10,1)

D_{21}= $\sqrt{(M_{1x} - C_{1x})^2 + (M_{1y} - C_{1y})^2}$ = $\sqrt{(12-10)^2 + (3-1)^2}$= 2.83

D_{22}= $\sqrt{(M_{2x} - C_{1x})^2 + (M_{2y} - C_{1y})^2}$ = $\sqrt{(16-10) + (3-1)^2}$= 6 ,32

D_{23}= $\sqrt{(M_{3x} - C_{1x})^2 + (M_{3y} - C_{1y})^2}$ = $\sqrt{(8-10)^2 + (3-1)^2}$= 2.83

D_{24}= $\sqrt{(M_{4x} - C_{1x})^2 + (M_{4y} - C_{1y})^2}$ = $\sqrt{(8-10)^2 + (4-1)^2}$= 3 ,61

D_{25}= $\sqrt{(M_{5x} - C_{1x})^2 + (M_{5y} - C_{1y})^2}$= $\sqrt{(8-10)^2 + (6-1)^2}$= 5 ,39

D_{26}= $\sqrt{(M_{6x} - C_{1x})^2 + (M_{6y} - C_{1y})^2}$= $\sqrt{(30-10) + (20-1)^2}$= 27 ,59

D_{27}=$\sqrt{(M_{7x} - C_{1x})^2 + (M_{7y} - C_{1y})^2}$

= $\sqrt{(40-10) + (30-1)^2}$= 41 .73

D_{28}= $\sqrt{(M_{8x} - C_{1x})^2 + (M_{8y} - C_{1y})^2}$= $\sqrt{(12-10) + (8-1)^2}$= 7 ,28

D_{29}= $\sqrt{(M_{9x} - C_{1x})^2 + (M_{9y} - C_{1y})^2}$= $\sqrt{(20-10) + (10-1)^2}$= 13 ,45

D_{210}= $\sqrt{(M_{10x} - C_{1x})^2 + (M_{10y} - C_{1y})^2}$= $\sqrt{(30-10)^2 + (20-1)^2}$= 27 ,59

D_{211}= $\sqrt{(M_{11x} - C_{1x})^2 + (M_{11y} - C_{1y})^2}$= $\sqrt{(80-10)^2 + (70-1)^2}$=98 ,29

D_{212}= $\sqrt{(M_{12x} - C_{1x})^2 + (M_{12y} - C_{1y})^2}$= $\sqrt{(100-10)^2 + (80-1)^2}$= 119.75

D_{213}= $\sqrt{(M_{13x} - C_{1x})^2 + (M_{13y} - C_{1y})^2}$= $\sqrt{(20-10)^2 + (3-1)^2}$=10 ,20

D_{214}= $\sqrt{(M_{14x} - C_{1x})^2 + (M_{14y} - C_{1y})^2}$= $\sqrt{(10-10)^2 + (1-1)^2}$=7

$D_{215}= \sqrt{(M_{15x}-C_{1x})^2+(M_{15y}-C_{1y})^2}= \sqrt{(10-10)^2+(2-1)^2}= 1$

$D_{216}= \sqrt{(M_{16x}-C_{1x})^2+(M_{16y}-C_{1y})^2}= \sqrt{(6-10)+(3-1)^2}= 4\ ,47$

$D_{217}= \sqrt{(M_{17x}-C_{1x})^2+(M_{17y}-C_{1y})^2}= \sqrt{(5-10)+(3-1)^2}= 5\ ,39$

$D_{218}= \sqrt{(M_{18x}-C_{1x})^2+(M_{18y}-C_{1y})^2}= \sqrt{(7-10)^2+(3-1)^2}= 3\ ,61$

$D_{219}= \sqrt{(M_{19x}-C_{1x})^2+(M_{18y}-C_{1y})^2}= \sqrt{(5-10)^2+(1-1)^2}= 5\ ,1$

$D_{220}= \sqrt{(M_{20x}-C_{1x})^2+(M_{20y}-C_{1y})^2}= \sqrt{(8-10)+(4-1)^2}=3\ ,61$

$D_{221}= \sqrt{(M_{21x}-C_{1x})^2+(M_{21y}-C_{1y})^2}= \sqrt{(8-10)^2+(1-1)^2}= 2\ ,24$

$D_{222}= \sqrt{(M_{22x}-C_{1x})^2+(M_{22y}-C_{1y})^2}= \sqrt{(100-10)^2+(40-1)^2}= 98\ ,09$

$D_{223}= \sqrt{(M_{23x}-C_{1x})^2+(M_{23y}-C_{1y})^2}= \sqrt{(50-10)^2+(20-1)^2}= 44\ ,28$

$D_{224}= \sqrt{(M_{24x}-C_{1x})^2+(M_{24y}-C_{1y})^2}= \sqrt{(80-10)^2+(60-1)^2}= 91\ ,55$

$D_{225}= \sqrt{(M_{25x}-C_{1x})^2+(M_{25y}-C_{1y})^2}= \sqrt{(100-10)^2+(89-1)^2}=125\ ,87$

$D_{226}= \sqrt{(M_{26x}-C_{1x})^2+(M_{26y}-C_{1y})^2}= \sqrt{(50-10)^2+(4-1)^2}= 40\ ,11$

$D_{227}= \sqrt{(M_{27x}-C_{1x})^2+(M_{27y}-C_{1y})^2}= \sqrt{(30-10)+(8-1)^2}= 21\ ,19$

$D_{228}= \sqrt{(M_{28x}-C_{1x})^2+(M_{28y}-C_{1y})^2}= \sqrt{(33-10)^2+(20-1)^2}= 29.83$

$D_{229}= \sqrt{(M_{29x}-C_{1x})^2+(M_{29y}-C_{1y})^2}= \sqrt{(32-10)+(5-1)^2}= 22\ ,36$

$D_{230}= \sqrt{(M_{30x}-C_{1x})^2+(M_{30y}-C_{1y})^2}= \sqrt{(30-10)^2+(15-1)^2}= 24\ ,41$

$D_{231}= \sqrt{(M_{31x}-C_{1x})^2+(M_{31y}-C_{1y})^2}= \sqrt{(8-10)^2+(6-1)^2}= 5\ ,39$

$D_{232}= \sqrt{(M_{32x}-C_{1x})^2+(M_{32y}-C_{1y})^2}= \sqrt{(8-10)^2+(6-1)^2}= 5\ ,39$

$D_{233}= \sqrt{(M_{33x}-C_{1x})^2+(M_{33y}-C_{1y})^2}= \sqrt{(8-10)^2+(7-1)^2}= 6\ ,32$

$D_{234}= \sqrt{(M_{34x}-C_{1x})^2+(M_{34y}-C_{1y})^2}= \sqrt{(8-10)^2+(4-1)^2}= 3\ ,61$

$D_{235}= \sqrt{(M_{35x}-C_{1x})^2+(M_{35y}-C_{1y})^2}= \sqrt{(8-10)+(4-1)^2}= 3\ ,61$

Table 2. First Iteration Object Distance Table

Data i	C1	C2	Clusters
1	23.04	2.83	C2
2	120.22	6.32	C2
3	125.94	2.83	C2
4	125.26	3.61	C2
5	23.91	5.39	C2
6	98.29	27.59	C2
7	84.15	41.73	C2
8	119.60	7.28	C2
9	112.43	13.45	C2
10	98.29	27.59	C2
11	27.59	98.29	C1
12	9.00	119.75	C1
13	117.46	10.20	C2
14	125.87	0.00	C2
15	125.18	1.00	C2
16	127.40	4.47	C2
17	128.14	5.39	C2
18	126.67	3.61	C2
19	128.82	5.10	C2
20	125.26	3.61	C2
21	126.62	2.24	C2
22	49.00	98.09	C1
23	85.21	44.28	C2
24	35.23	91.55	C1
25	0.00	125.87	C1
26	98.62	40.11	C2
27	107.06	21.19	C2
28	96.18	29.83	C2
29	108.07	10:36 p.m	C2
30	101.86	24.41	C2
31	123.91	5.39	C2
32	123.91	5.39	C2
33	123.24	6.32	C2
34	125.26	3.61	C2
35	125.26	3.61	C2

So we get a new centroid from table 2, namely:
C1= (92 ,67,8)
C2= (17,36,7,63)

The next step is to make iteration 2. From the results of the cluster search that has been obtained, the 2nd iteration of the cluster position is the same (does not change), so the iteration process is stopped. Based on the analysis that has been done manually based on data on bag sales , it can be concluded that C1 is a product

that is included in the category of many enthusiasts and C2 is a product that is not interested.

1. First cluster: 320 GB SSD, 500 GB SSD, 16 gb Sandisk flash drive, 16 gb toshiba flash drive, vga cable.
2. Second Cluster: ASUS E 410 m, HP 14 s, ACER EXPIRE 3, Lenovo ip 1 Notebook, Asus Notebook, Keyboard Protector, 120GB SSD, 250GB SSD 1 Tb SSD, Epson printers, Canon printers, ASUS Eee pc 1015BX, ASUS Eee pc X101H, Acer aspire one D270 Battery, ASUS A450C Laptop Battery, Acer aspire one 722 Battery, ASUS A3 Laptop Battery, Flasdisk sandisk 8 gb , hdmi cable , Hdmi To Vga,, 3 hole 1.8 laptop cable, thick laptop power cable, cable power ps2 ps4 fat a, active speaker f-107, mini usb2 in 1 speaker, jbl t5 mini bluetoch speaker, active mini bluetochstereo subwoofer speaker, active G-105 speaker for computer.

3.3 System Testing and Implementation

System testing and implementation aims to see whether the designed system is in accordance with what is desired or not , after testing and implementation, the quality of a system will be seen. The program display is a sub-chapter that explains the process in the program, both the program input process and the output execution of the program being run, along with the program views that have been built including the admin login page which is the initial display when the website is accessed, on this page display there are two forms for username/e-mail and password. The display of the user's home page is presented in Figure 2 .

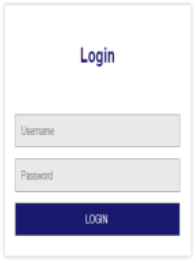

Figure 2 Display of the login page

On the Sales Data page, data from sales will be displayed which is displayed in tabular form. The user sales data page display is presented in Figure 3.

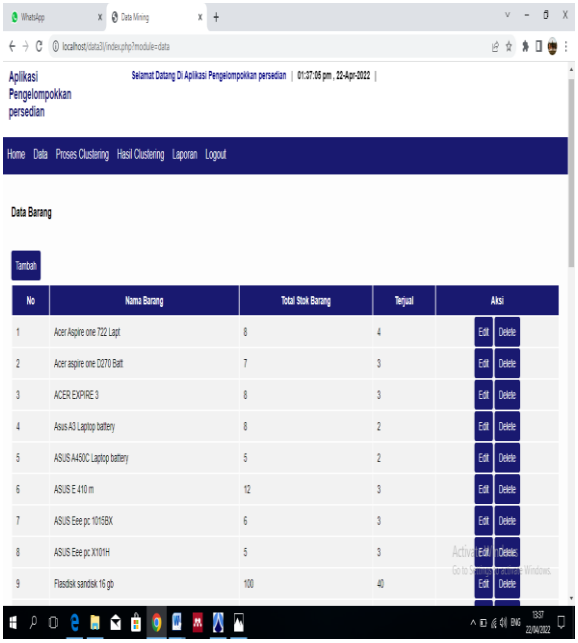

Figure 3. Display of Sales Data Pages

On the K-Means process page it will display a table of calculations that contains the attributes of the K-Means process. The display of the K-Means process page is presented in Figure 4.

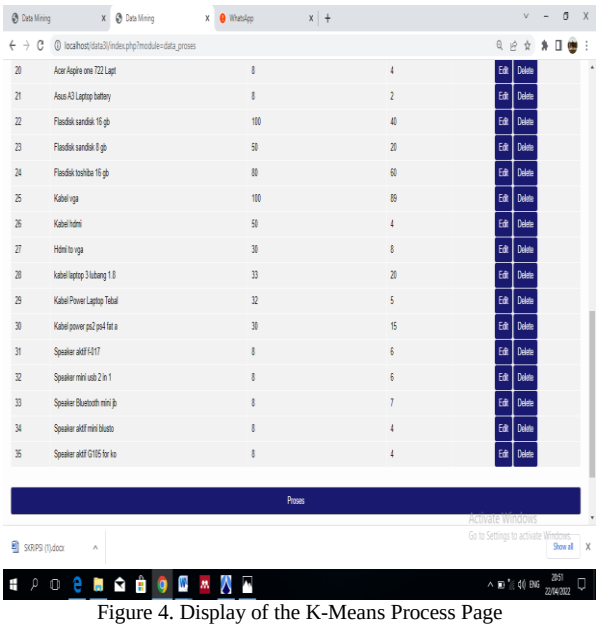

Figure 4. Display of the K-Means Process Page

results page will display the results of the K-Means method that has been processed by the system and will display some information. The display of the K-Means calculation results page is presented in Figure 5.

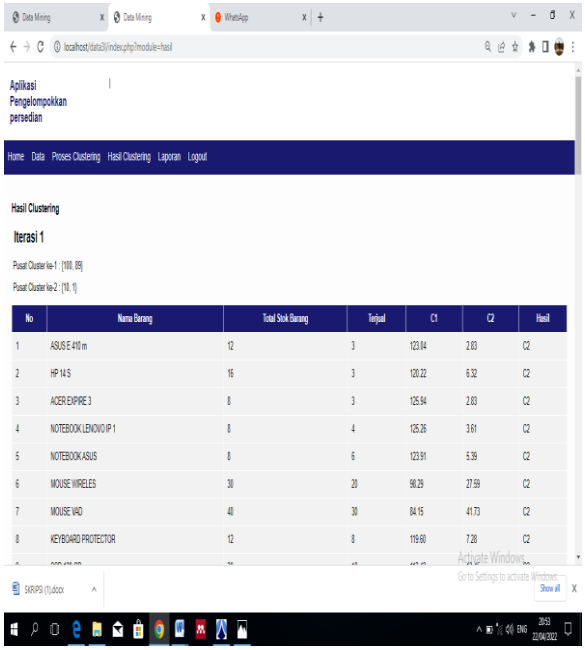

Figure 5 Display Results Page Calculation

4. Conclusion

From the research conducted, it can be concluded regarding the design and development of an IT Business Management Website using the K-Means algorithm method on the Gaptech Padang computer, namely the IT Business Management Website using the K-Means algorithm, this can help Gaptech owners in carrying out strategies in sales and Websites. IT Business Management using the K-Means algorithm method can help Gaptech computer owners find out items that are a lot of interest and are not interested, as well as Website IT Business Management using the K-Means algorithm can make it easier for Gaptech Padang computer owners to manage business management.

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