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Application of Trend Projection in Prediction of Animal Feed Sales at PT. Android-Based Charoen Pokphand Medan

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ABSTRACT

PT. Charoen Pokphand Medan is a company engaged in the production and sale of animal feed on a large scale.In business processPT. Charoen Pokphand Medanevery day keeping records using paper as proof of sales and purchase transactions, if it continues like this it will cause problems if there is a missed sales and purchase history recap. PartyPT. Charoen Pokphand Medanconfusion is created because there is no calculation in buying goods so that the accumulation of the same goods often occurs in the warehouse. Stock data collection onPT. Charoen Pokphand Medanwhich has various types of goods and the recording of transactions needs to be computerized. So it is necessary to create a system to record every sale and purchase transaction so that every existing transaction can be stored in a computer database. This information system application can also perform forecasting which is useful for predicting how many items are sold in certain periods. This process is carried out to produce a prediction of the amount of animal feed that might be sold in the following month. So the system will help the company in checking animal feed stocks because it can estimate the need for goods so they don't run out of stock and determine the amount of stock in the future.

INTRODUCTION

Forecasting is an estimate of a variable (event) in the future based on data from that variable in the past. Forecasting is also needed for various fields such as procurement, sales, personnel, including technology, economics, social and culture. This prediction is very useful in various fields of life, especially in planning to anticipate various conditions that will occur in the future. Forecasts can be done qualitatively or quantitatively. (Alexius Honey: 2017).

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produce a prediction of the amount of animal feed that might be sold in the following month. So the system will help the company in checking animal feed stocks because it can estimate the need for goods so they don't run out of stock and determine the amount of stock in the future.

In this research PT. Charoen Pokphand Medan requires an application to determine the amount of inventory of animal feed products that will be sold in the coming period so that the company will gain increasingly rapid profits. In this study, the authors apply the Trend Projection method in calculating the numberprediction of animal feed stock.PT. Charoen Pokphand Medan often experiences several problems in terms of recording the amountproduct stock predictionsand the system that is running is still classified as semi-computerized so that in making product stock reports and submitting reports to leaders it takes a long time and the reports produced are not accurate, whereas for the calculation of product stock prediction data still uses a manual system so it is not efficient because it takes a long time.

The application of the trend projection method is very appropriate to solve the above problems because the trend projection method is used for short-term forecasting, usually only 1 month ahead. The forecasting method with trend projection is to match the trend line to a series of historical data points and then project the line to the future with medium and long time horizons. By applying the trend projection method, the calculation of the prediction of the number of stock items can be carried out effectively and without requiring a long time.

METHOD

In completing this study the authors used 2 (two) study methods, namely:

1. Field Study

Is a method that is carried out by conducting direct studies in the field to collect data, namely direct observation to the study location. The data collection techniques carried out by the author are:

a. Observation

Namely by observing the data on sales of animal feed at PT. Charoen Pokphand Medan.

b. Interview

This technique is directly face to face with the parties concerned to get an explanation of the problems that were previously unclear, namely about the mechanism of the system used in the company and also to ensure that the data collected is truly accurate. And asked questions to the Sales department with Mother Earth Damayanti. Library Studies (Library Research)

The author conducts a literature study to obtain data related to thesis writing from various reading sources such as books or journals that discuss the concept of predicting the total sale of animal feed.

2. *sampling*

The researcher chose the available data and was in accordance with the research, namely previous research applications and previous research thesis to be used as samples in this study. The data obtained by the researcher is the sales and purchase data of the product.

The Waterfall system development methodology can be seen in Figure 1 below:

Figure 1. Waterfalls

In its development the waterfall method has several stages, namely: requirements (needs analysis), system design (system design), coding, program testing, system maintenance:

1. Needs Analysis

Contains things that must exist in the results of the design in order to be able to solve existing problems according to the purpose. The data needed in designing the system is datastock of goods, author data, user data and the programming languages used to create applications are Java, PHP and MySQL.

2. System Design

In generalComparison Application of the Trend Projection Method in PredictingSales of Animal Feed at PT. Charoen Pokphand Medanusing the Unified Modeling Language design model.

3. Writing Coding Programs

This stage is a real stage in working on a system. In the sense that the use of computers will be maximized in this stage. After the coding is complete, testing will be carried out on the system that was created earlier. The purpose of testing is to find errors in the system and then fix them.

4. Program Testing

At this stage, a thorough application test is carried out by applying black box (interface) testing, namely software testing that tests the functionality of the application that conflicts with the internal structure or work.

5. System Maintenance

Software that is difficult to convey to users will definitely experience changes. These changes can be due to errors, because the software must adapt to a new environment, or because the user requires functional development

RESULTS AND DISCUSSION

The flowchart of the Trend projection method on the designed system can be seen as follows:

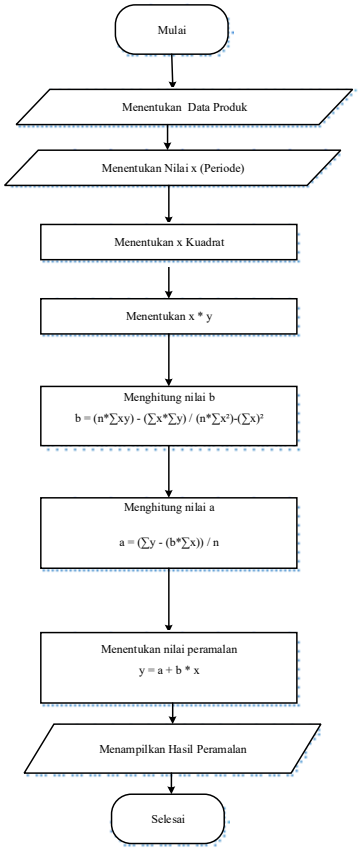

Figure 2. Trend projection method flowchart

Case study :

The animal feed sales data for March 2020 to December 2021 are as follows:

Table 1. Data Sales of Animal Feed

Month year	Amount Sale	Information
March 2020	230	tons
April 2020	178	tons
May 2020	130	tons
June 2020	100	tons
July 2020	123	tons
August 2020	145	tons
September 2020	160	tons
October 2020	201	tons
November 2020	239	tons
December 2020	232	tons
January 2021	273	tons
February 2021	137	tons

Month year	Amount Sale	Information
March 2021	175	tons
April 2021	143	tons
May 2021	164	tons
June 2021	127	tons
July 2021	160	tons
August 2021	120	tons
September 2021	136	tons
October 2021	179	tons
November 2021	160	tons
December 2021	160	tons
Total	3672	tons

By using the trend projection method, the forecasting results are obtained as follows:

Table 2. Sales Forecasting Data

Month year	Period (x)	Total Sales (y)	x^2	xy
March 2020	1	230	1	230
April 2020	2	178	4	356
May 2020	3	130	9	390
June 2020	4	100	16	400
July 2020	5	123	25	615
August 2020	6	145	36	870
September 2020	7	160	49	1120
October 2020	8	201	64	1608
November 2020	9	239	81	2151
December 2020	10	232	100	2320
January 2021	11	273	121	3003
February 2021	12	137	144	1644
March 2021	13	175	169	2275
April 2021	14	143	196	2002
May 2021	15	164	225	2460
June 2021	16	127	256	2032
July 2021	17	160	289	2720
August 2021	18	120	324	2160
September 2021	19	136	361	2584
October 2021	20	179	400	3580
November 2021	21	160	441	3360
December 2021	22	160	484	3520
Total	$\sum x = 253$	$\sum y = 3672$	$\sum x^2 = 3795$	$\sum xy = 41400$

b = (n*∑xy) - (∑x*∑y) / (n*∑x²)-(∑x)²
b = (22*41400) - (253*3672) / (22*3795) - (253)²b = -0.94
Then the value of b = -0.94 is obtained
a = (∑y - (b*∑x)) / n
a = (3672- (-0.94*253)) / 22 = 177.72

Then a value of 0 = 177.72 is obtained

1. Forecasting January 2022

Then the forecasting result for January 2022 = 156 tons.

Thus it can be seen that the forecast for the number of sales of animal feed in the coming period, namely the January 2022 period, is 156 Tons.

2. Forecasting February 2022

Then the forecasting result for February 2022 = 155 tons

Thus it can be seen that the forecast for the number of sales in the coming period, namely the February 2022 period, is 155 Tons.

3. Forecasting March 2022

Then the forecasting results for March 2022 = 154 tons

Thus it can be seen that the future sales forecast, namely the period March 2022, is 154 Tons.

4. Forecasting April 2022

Then the forecasting results for April 2022 = 153 tons

Thus it can be seen that the forecast for the number of sales in the coming period, namely the April 2022 period, is 153 Tons.

5. Forecasting May 2022

Then the forecasting results for May 2022 = 152 tons

Thus it can be seen that the forecast for the number of sales in the coming period, namely the period May 2022, is 152 Tons.

6. Forecasting June 2022

Then the forecasting results for June 2022 = 151 tons

Thus it can be seen that the forecast for the number of sales in the coming period, namely the June 2022 period, is 151 Tons.

7. Forecast July 2022

Then the forecasting results for July 2022 = 151 tons

Thus it can be seen that the forecast for the number of sales in the coming period, namely the July 2022 period, is 151 Tons.

8. Forecasting August 2022

Then the forecasting results for August 2022 = 150 tons

Thus it can be seen that the forecast for the number of sales in the coming period, namely the August 2022 period, is 150 Tons.

9. Forecast September 2022

Then the forecasting results for September 2022 = 149 tons

Thus it can be seen that the forecast for the number of sales in the coming period, namely the September 2022 period, is 149 Tons.

10. October 2022 forecast

Then the forecasting results for October 2022 = 148 tons

Thus it can be seen that the forecast for the number of sales in the coming period, namely the October 2022 period, is 148 Tons.

11. Forecast November 2022

Then the forecasting result for November 2022 = 148 tons

Thus it can be seen that the forecast for the number of sales in the coming period, namely the November 2022 period, is 148 Tons.

In compiling a program, a data model is needed in the form of a diagram that can explain a process flow of the system to be built. In writing this thesis the writer uses the UML method in which the writer applies a Use Case diagram. Then a form of Use Case diagram is drawn which can be seen in Figure 3 below:

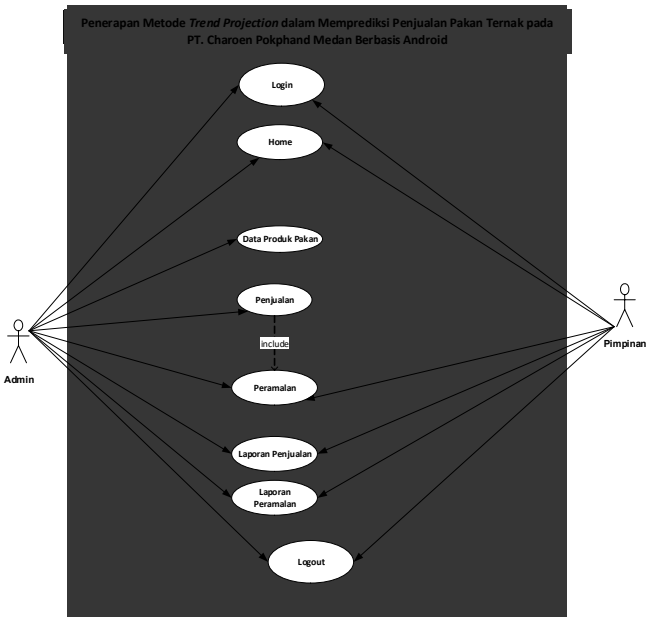

Figure 3. Use Case DiagramApplication of the Trend Projection Method in Predicting Animal Feed Sales at PT. Android-Based Charoen Pokphand Medan

The display of program results is as follows:

1. Display Forecasting Analysis Form

This form displays optionsforecasting analysis data, when selecting forecasting analysis data, the program will display forecasting analysis data. Picture of the display of the forecasting analysis data form can be seen in Figure 4:

Figure 4. Display of Forecasting Analysis Form

2. View the Sales Report Data Form

This form displays optionssales report data, when selecting ongoing sales data the program will display sales report data. The display image of the sales report data form can be seen in Figure 5

Figure 5. Display of the Sales Report Form

3. View the Forecasting Report Form

This form displays optionsforecasting report data, when selecting forecasting report data, the program will display forecasting report data. Picture of forecasting report data form display can be seen in Figure 6:

Figure 6 Display of the Forecasting Report Form

CONCLUSION

PT. Charoen Pokphand Medan can reduce the error rate in the determination and fulfillmentsale of animal feedand report generationsale of animal feedcan simplify and speed up the user in doing data collectionsale of animal feed. With this designed system using the methodTrend Projectionsusing Java application and Mysql Database. The designed system can assist companies in overcoming obstacles in forecasting animal feed salesin future periods.

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