JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. VIII No 3, Agustus 2022, hlm. 335 - 342 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v8i3.1733
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

PREDICTION OF 35,000 ALL CLOTHES SALES RANGE USING WMA METHOD

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Abstract: The 35,000 department store is a business engaged in the sale of clothes, having its address at Jalan Sisingamangaraja. Clothing is one of the basic human needs to protect and beautify themselves. The problem that occurs in the 35,000 department store is the difficulty of predicting the number of clothing sales, resulting in an accumulation of goods. The method used in this study is the Weighted Moving Average (WMA) forecasting method. The purpose of this study is to apply the Weighted Moving Average method to the forecasting system in determining clothing sales at 35,000 convenience stores. The results of the application of the Weighted Moving Average method to predict clothing sales that have been made, then get the prediction results for June 2022 using 3 weights totaling 203 Pcs with an error accuracy of 33.40% and prediction results for June 2022 using 6 weights totaling 220 Pcs with accuracy 34.31% error. The conclusion is that the Weighted Moving Average method can accurately predict clothing sales at 35,000 department stores.

Keywords: Clothes; Prediction; Sales; WMA Method

Abstrak: Toko serba 35.000 adalah usaha yang bergerak dalam bidang penjualan baju yang beralamat di jalan Sisingamangaraja. Baju merupakan salah satu kebutuhan pokok manusia untuk melindungi, dan mempercantik diri. Permasalahan yang terjadi pada toko serba 35.000 adalah Sulitnya memprediksi jumlah penjualan baju, sehingga mengakibatkan terjadinya penumpukkan barang. Metode yang digunakan dalam penelitian ini adalah metode peramalan *Weighted Moving Average* (WMA). Tujuan penelitian ini adalah untuk menerapkan metode *Weighted Moving Average* pada sistem peramalan dalam menentukan penjualan baju pada toko serba 35.000. Hasil penerapan metode *Weighted Moving Average* untuk memprediksi penjualan baju yang telah dilakukan, maka mendapatkan hasil prediksi bulan juni 2022 dengan menggunakan 3 bobot berjumlah 203 Pcs dengan akurasi kesalahan 33,40% dan hasil prediksi bulan juni 2022 dengan menggunakan 6 bobot berjumlah 220 Pcs dengan akurasi kesalahan 34,31%. Kesimpulan yang diperoleh bahwa metode *Weighted Moving Average* dapat memprediksi penjualan baju pada toko serba 35.000 dengan akurat.

Kata kunci: Baju; Metode WMA; Penjualan; Prediksi

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INTRODUCTION

The success of a company is supported by the level of sales made, as well as employees who are required to meet sales targets every year. Customer demands that change every day require companies to be more detailed in planning strategies to increase sales every day. One thing that can be done by management is to do sales forecasting. [1].

Sales forecasting can help companies in minimizing costs in producing the goods produced, because by knowing some sales in the next period, the company can produce goods in an excessive manner. Sales calculations and predictions can be done by applying the forecasting method. The method used in this research is done by forming a model based on past data to predict future values. In the development of the national economy in Indonesia, Micro, Small and Medium Enterprises have an important role in creating jobs and encouraging economic growth. A formidable challenge in business development in the era of free trade and global competition today is increasingly fierce business competition [2].

The 35,000 department store is a business engaged in the sale of clothes, having its address at Jalan Sisingamangaraja. Clothing is one of the basic human needs to protect and beautify themselves. In the era of covid, which continues to increase every day, many 35,000 convenience stores are in demand by many buyers, where the prices are cheaper and the quality is no less good than the clothes sold in stores with more expensive prices, thus making shoppers prefer to buy at 35,000 department stores.

The problem that occurs in the 35,000 department store is the difficulty of predicting the number of clothing sales, resulting in an accumulation of goods. Based on the existing problems, a sales strategy is needed at a 35,000 department store. In planning sales, the company needs a forecasting method to predict sales in the future. By analyzing sales transaction data every month that has occurred, it is hoped that it will make it easier for the finance department to get forecasting information about sales in the coming month, and it is hoped that it will reduce or even find existing problems.

Based on this, researchers are interested in conducting research to help predict sales of 35,000 clothes so that clothing supplies are met by using the Weighted Moving Average (WMA) method. Weighted Moving Average (WMA) is done by calculating the average value of a historical dataset by adding different weight components. By using WMA, the company can also determine the direction of the trend which can be an indication to increase or decrease the number of stock items sent to the booth at the right time [3].

The purpose of this study is to apply the Weighted Moving Average (WMA) method to the forecasting system in determining clothing sales at 35,000 convenience stores. It is hoped that the WMA method is able to provide solutions in providing clothing supplies so that customer needs can be met.

The prediction system using the WMA method produces an error value of 21% so that this method can be used to predict the amount of production [4]. The study entitled "Forecasting the Number of Unemployment in Asahan District Using the Weighted Moving Average Method". The results of this study are in the form of forecasting the number of unemployed in Asahan Regency in 2021,

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which is 19851 people with a weight value of 6 with an MAD value of 1763.43, an MSE value of 8394169.76 and a MAPE value of 8.55% [5]. The research entitled "Implementation of the Weighted Moving Average Method on a Web-Based Local Tobacco Stock Prediction System". This study resulted in the accuracy of the percentage of success at weight 3 of 77.636%, weight 5 of 78.164% and at weight of 7 of 79.051% [6]. The research entitled "Decision Support System Predicting the Number of Stocks Using the Weighted Moving Average Method". The results show that the WMA method can be used to assist store owners in predicting the ideal inventory of goods [7]. The research entitled "Inventory Information System With Android-Based Weight Moving Average Method In Awd Mranggen Store". The results of this study provide convenience in accessing wherever the user is, minimizing data manipulation, controlling quickly, and calculating stock predictions for the following month. So it will be more effective when using the new system than the old system [8]. The research entitled "Application of Weighted Moving Average Method for Forecasting Pharmaceutical Product Inventory". This research produces a system that makes it easy to determine the inventory of pharmaceutical products [9]. The research entitled "Application of the Weight Moving Average Method for Forecasting Cosmetic Inventories at Robin's Stores". The system created can predict the amount of cosmetic inventory that must be prepared by Robin's Shop for the next month [10]. The research entitled "Use of Weight Moving Average for Forecasting System for Estimating the Number of New Students". Forecasting systems can help in forecasting to determine the number of students in the future [11].

METHOD

The following are the stages of the research in Figure 1:

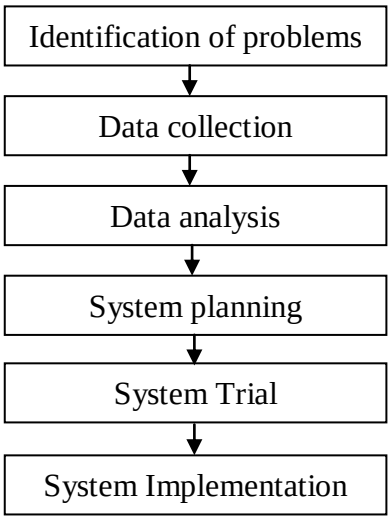

Figure 1. Research Stages

1. Problem Identification
   At this stage, research is carried out to find out the problems that exist in the 35.000 All-in-One Clothing Store and find the right solution to these problems.
2. Data Collection
   Data collection was carried out in the form of interviews in order to obtain the information needed in order to achieve the research objectives. The data used is data on sales of 35,000 all-round clothes from January 2021 to May 2022.
3. Data Analysis
   Analysis of the research data using the Weighted Moving Average method:

$$WMA = \frac{\sum Dt * Bobot}{\sum Bobot} \quad (1)$$

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4. System Design
   The system design is done by making UML and user interface designs and making the system using the PHP programming language.
5. System Trial
   System Testing is a process carried out to assess whether what is designed is in accordance with what is expected and ensures the quality made in the system.
6. System Implementation
   The procedure carried out to complete the design contained in the document is the design of the approved system and testing, installing, starting, and using the new system as well as the repaired system. Implementation of this system is a stage to find out whether or not an application system that is built will be successful.

RESULT AND DISCUSSION

The results of calculations using the WMA (Weighted Moving Average) method need to be determined how much weight is used. The amount of weight used in the system can be determined by searching for the forecast error value and comparing it, the weights to be compared in this calculation are weights 3 and weights 6.

The following are the results of the calculation of the WMA method with a weight of 3 in table 1.

Table 1. Forecasting Results 3 Weights

No	Month	Actual	Forecasting	Error	MAD	MSE	MAPE
1	January 2021	90					
2	February 2021	150					
3	March 2021	84					
4	April 2021	120	107,00	13,00	13,00	169,00	0,11
5	May 2021	190	113,00	77,00	77,00	5929,00	0,41
6	June 2021	204	149,00	55,00	55,00	3025,00	0,27
7	July 2021	216	185,33	30,67	30,67	940,44	0,14
8	August 2021	110	207,67	-97,67	97,67	9538,78	0,89
9	September 2021	144	161,00	-17,00	17,00	289,00	0,12
10	October 2021	250	144,67	105,33	105,33	11095,11	0,42
11	November 2021	260	191,33	68,67	68,67	4715,11	0,26
12	December 2021	310	237,33	72,67	72,67	5280,44	0,23
13	January 2022	325	283,33	41,67	41,67	1736,11	0,13
14	February 2022	200	309,17	-109,17	109,17	11917,36	0,55
15	March 2022	170	260,00	-90,00	90,00	8100,00	0,53
16	April 2022	275	205,83	69,17	69,17	4784,03	0,25
17	May 2022	166	227,50	-61,50	61,50	3782,25	0,37
18	June 2022		203,00				
		MAD			64,89		
		MSE				5092,97	
		MAPE					33,40%

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Table 2. Forecasting Results 6 Weights

No	Month	Actual	Forecasting	Error	MAD	MSE	MAPE
1	January 2021	90					
2	February 2021	150					
3	March 2021	84					
4	April 2021	120					
5	May 2021	190					
6	June 2021	204					
7	July 2021	216	156,95	59,05	59,05	3486,62	0,27
8	August 2021	110	178,76	68,76	68,76	4728,20	0,63
9	September 2021	144	164,29	20,29	20,29	411,51	0,14
10	October 2021	250	161,43	88,57	88,57	7844,90	0,35
11	November 2021	260	186,00	74,00	74,00	5476,00	0,28
12	December 2021	310	207,24	102,76	102,76	10560,01	0,33
13	January 2022	325	239,43	85,57	85,57	7322,47	0,26
14	February 2022	200	270,86	-70,86	70,86	5020,73	0,35
15	March 2022	170	261,38	-91,38	91,38	8350,48	0,54
16	April 2022	275	239,05	35,95	35,95	1292,57	0,13
17	May 2022	166	245,48	-79,48	79,48	6316,46	0,48
18	June 2022		220,00				
		MAD			70,61		
		MSE				5528,18	
		MAPE					34,31%

From the results of the calculation of the WMA method above using 3 weights, it is predicted that 203 PCS of clothing sales in June 2022 are predicted. The following are the results of the calculation of the WMA method with a weight of 6 in table 2. From the results of the calculation of the WMA method in table 2 using 6 weights, it is predicted that the sale of clothes in June 2022 is 220 PCS.

The results of the implementation of the system are the result of the program display that has been tested predicting clothing sales, namely in Figures 2 and 3. The following is a display of the results of forecasting clothing sales using the WMA method with 3 weights as shown in Figure 2.

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Figure 2. Forecasting Results 3 Weights

Figure 3. Forecasting Results 6 Weights

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In Figure 2, the forecasting results generated by the WMA method with 3 equal weights are the forecasting results in table 1. It means that the results of the implementation of the test system with 3 weights are going well. The following is a display of the results of forecasting clothing sales using the WMA method with 6 weights as shown in Figure 3.

In Figure 3, the forecasting results produced by the WMA method with 6 equal weights are the forecasting results in table 2. It means that the results of the implementation of the testing system with 6 weights went well.

CONCLUSION

The results of the application of the Weighted Moving Average (WMA) method can help predict sales of 35,000 clothes. The prediction results for June 2022 with 3 weights totaling 203 Pcs with an error accuracy of 33.40% and the prediction results for June 2022 with 6 weights totaling 220 Pcs with an error accuracy of 34.31%. The system created can be used to forecast sales of all 35,000 clothes quickly and accurately.

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