

IMPLEMENTATION OF E-FORECASTING ON JIMMY FISH USING THE WIEGHTED MOVING AVERAGE METHOD

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Abstract: This research is a development of previous research, where the results of previous studies have only arrived at the application design stage. Jimmy Fish UMKM is a business that sells fish seeds, while the fish seeds that are sold are: catfish, tilapia, goldfish, mujaer fish, catfish, and carp. Jimmy Fish UMKM has several activities to support its business, one of which is determining how much stock of fish fry is needed for each period. Jimmy Fish SMEs have problems in determining the amount of fish seed stock, Jimmy Fish SMEs still use estimates without definite calculations to determine the number of fish seed stocks. As a result of this problem, when someone wants to buy fish seeds, the number of stocks is not fulfilled (less), the number of fish seeds is depleted, and there is even an excess stock of fish seeds (only a few sold), so that activities at Jimmy Fish SMEs become less effective. The solution to the existing problems is to build an e-forecasting application using the wieghted moving average (WMA) method. The e-forecasting application is very important because it can predict the number of fish seed stocks for the next period using calculations from previous data. The e-forecasting application also provides convenience, speed and as a support system for making decisions on how many fish seed stocks must be fulfilled for the next period.

Keywords: applications; e-forecasting; WMA

Abstrak: Penelitian ini merupakan pengembangan dari penelitian sebelumnya, dimana hasil dari penelitian sebelumnya baru sampai pada tahap desain aplikasi. UMKM Jimmy Fish merupakan usaha yang menjual bibit ikan adapun bibit ikan yang dijual yaitu: ikan lele, ikan nila, ikan emas, ikan mujaer, ikan patin, dan ikan gurame. UMKM Jimmy Fish mempunyai beberapa aktifitas untuk mendukung usahanya salah satunya penentuan berapa jumlah stok bibit ikan yang diperlukan untuk setiap periodenya. UMKM Jimmy fish mempunyai permasalahan dalam menentukan jumlah stok bibit ikan, UMKM Jimmy Fish masih menggunakan perkiraan tanpa perhitungan yang pasti untuk menentukan jumlah stok bibit ikan. Akibat yang ditimbulkan dari permasalahan tersebut, ketika ada yang ingin membeli bibit ikan jumlah stok tidak terpenuhi (kurang), jumlah stok bibit ikan habis, dan bahkan ada jumlah stok bibit ikan yang berlebih (hanya terjual sedikit), sehingga aktifitas pada UMKM Jimmy Fish menjadi kurang efektif. Solusi dari permasalahan yang ada, dengan membangun aplikasi e-forecasting menggunakan metode *wieghted moving average* (WMA). Aplikasi *e-forecasting* sangat penting karena dapat prediksikan jumlah stok bibit ikan untuk periode selanjutnya menggunakan perhitungan dari data-data sebelumnya. Aplikasi *e-forecasting* juga memberikan kemudahan, kecepatan dan sebagai *support system* pengambilan keputusan berapa jumlah stok bibit ikan yang harus terpenuhi untuk periode selanjutnya.

Kata kunci: aplikasi; *e-forecasting*; WMA

INTRODUCTION

This research is a development of previous research, where the results of previous studies have only reached the application design stage. Research will be further developed into applications that are ready to be implemented, so that Jimmy Fish can forgive SMEs. The application developed is in the form of e-forecasting, where this application will later be used to support the determination of the number of fish seed stocks for the next period. Based on the explanation of the article [1], Forecasting is a science or art that predicts events that will be experienced in the future. In this study, forecasting calculations will be carried out by collecting previous sales data and then calculating using the (WMA) weighted moving average method.

Based on the explanation from previous research, Jimmy Fish UMKM is a business that sells fish seeds that are ready to be kept, while the fish seeds sold are catfish, tilapia, goldfish, mujaer fish, catfish, and carp. MSME Jimmy Fish has several activities to support its business, namely determining the amount of fish stock needed for each period and selling fish seeds. Determination of the number of fish seed stocks at Jimmy Fish SMEs currently still uses estimates without definite calculations, so the consequences are when someone wants to buy fish seeds, the stock is not fulfilled (less), the stock of fish seeds is depleted, and there is even an amount of stock excess fish seeds (only a few sold). This problem makes the activities that exist in Jimmy Fish SMEs become less effective, in the process of meeting the needs for the number of fish seed stocks and selling fish seeds.

Weighted moving average method by article [2], is a method used for fore-

casting which in the calculation process uses value weighting for each data per previous period, the largest value weight is given to the last data used for forecasting. The total weight value for each forecasting process is equal to 1 (one). Based on the problems that exist in this study, it is necessary to find a solution to solve the problem, by building an e-forecasting application using the weighted moving average method. This e-forecasting application is a support system for Jimmy Fish SMEs in making decisions on how much stock of fish seeds are needed for the next period. This e-forecasting application is a support system for Jimmy Fish SMEs in making decisions on how much stock of fish seeds are needed for the next period.

Previous research that was used as a reference, was carried out by [3], related to forecasting, with the results of the use of forecasting methods can make it easier to make inventory decisions for the future and reduce or minimize the problem of accumulation or shortage of goods. Previous research which is also used as a reference, was carried out [4], with the title "weighted moving average method in m-forecasting", with the results of research on the forecasting process can be displayed quickly. This study has the aim of building an e-forecasting application as a support system to support decision-making on how many stock of fish seeds are needed for the next period. The benefits of building an e-forecasting application to accelerate and simplify the process of forecasting the amount of fish stock needed for Jimmy Fish SMEs for the next period.

METHOD

Research material collection techniques

The data collection technique used in the research is interview [5], This technique is carried out by the researcher in the form of a direct dialogue with the owner and manager of MSME Jimmy Fish. The dialogue is in the form of questions about what fish seeds are sold, how is the process of determining the amount of fish seed stock, what fish seeds are not sold and how many are left, what fish seeds are short of fish seed stocks and how many customers are not fulfilled when they want to buy fish seeds. Observation Technique [6], is a data collection technique that is also used in research conducted on Jimmy Fish SMEs. The results obtained from observation techniques, seeing fish seed shelters that are ready to be sold, seeing the process of buying fish stock, and seeing the process of selling fish seeds.

Waterfall method

Waterfall method [7], this method is used to complete the stages of working on the e-forecasting application on Jimmy Fish SMEs, while the stages of work are:

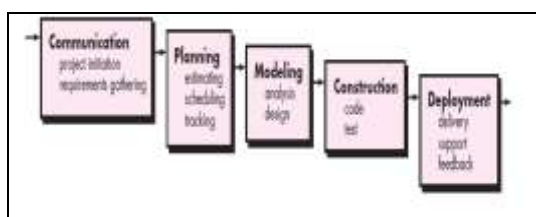


Image 1. Waterfall method

Communication, during this time the researchers conducted surveys and interviews with the owner and manager of Jimmy Fish SMEs to obtain data, the aim is to analyze the problems that exist in Jimmy Fish SMEs and find solutions to these problems. As for the problems analyzed in accordance with the research limitations, in the prediction system how

many fish seed stocks are for the next period, which now only uses estimates without any data calculations which result in too many fish seed stocks and a shortage of fish seed stocks (the stock of fish seeds is running out). The solution to overcome this problem requires the development of a system to determine how much stock of fish seeds should be purchased for the next period. The proposed system builds an e-forecasting application using the weighted moving average (WMA) method.

Planning, at this stage researchers schedule how long the system development must be completed. Based on time scheduling, the researcher targets the completion of the system in approximately 3 (three) months from March to June 2022.

Modeling, at this stage the researcher makes a flowchart of the proposed system using the flowchat system which can be seen in Image 2. Researchers also design application interfaces the design of the Jimmy Fish e-forecasting application interface design has been described in the previous article [8].

Construction, this stage is the application coding stage, where the forecasting application that has been designed in the previous stage is translated into a program language, which can later be accessed and used for forecasting fish seeds. At this stage the researcher also tested the forecasting application interface using blackbox testing.

Deployment, this stage is the implementation stage of the forecasting application, where this application is accessed and used by users, application maintenance, application improvement, at this stage researchers get feedback in the form of input so that the application runs well.

Weighted Moving Average (WMA) Method

Weighted moving average (WMA) method, based on research [9], by using the WMA method, forecasting results can be done by calculating quarterly data from previous sales by weighting each data. Forecasting system with WMA method can help in predicting the ideal inventory.

The formula uses the Weighted Moving Average (WMA) method [10].

$$F_t = \sum_{i=1}^n W_i A_i \quad (1)$$

$$F_t = W_1 A_{t-1} + W_2 A_{t-2} + \dots + W_n A_{t-n} \quad (2)$$

Information:

W_i = Weight, repetition of activities

A_{t-1} = Request volume in previous time

A_{t-n} = Volume of demand in previous n periods

F_t = Forecasting for the upcoming period

E-forecasting Flowchart

The tools used to describe the flow of the system are flowcharts [11], tools are used to describe the running process of the application. The e-forecasting flowchart can be seen in Image 2.

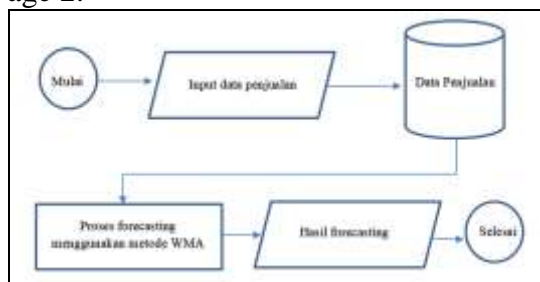


Image 2. E-forecasting Flowchart

Description: e-forecasting flowchart, first the user must access the e-forecasting application via login according to the access rights they have, then the user can input sales data or directly perform forecasting using the

weighted moving average (WMA) method. Forecasting results can be displayed by users based on quarterly data from previous sales data so as to produce forecasting for the next period, after the activity is complete the user can exit the E-forecasting application.

RESULT AND DISCUSSION

Jimmy Fish e-forecasting is an application that is used to predict the number of fish seed stocks for the coming period using the weighted moving average (WMA) method.

E-Forecasting Application Interface

Forecasting app [12], yang dihasilkan oleh (Setiawan), untuk membantu memprediksikan pembelian stok barang untuk periode selanjutnya. The e-forecasting application interface produced in this research consists of several parts of the login interface, the sales data input interface, and the forecasting interface using the weighted moving average method. The login interface can be seen in Image 3, where this interface is used to enter the system using the username and password you have.



Image 3. Login

The sales data interface is an interface used to input sales data, the sales data interface can be accessed after the user has successfully logged in. Sales data interface can be seen in Image 4. Sales

data that has been inputted is stored in the database, then the data can be processed to produce forecasts using the weighted moving average (WMA) method.



Image 4. Enter sales amount

The e-forecasting interface is an interface that is used to display the forecasting results of fish fry for the next period using the weighted moving average (WMA) method. Forecasting can be displayed by selecting sales data from the previous three months to produce forecasts for the number of fish seeds for the coming period. The e-forecasting interface can be seen in Image 5.



Image 5. E-Forecasting

Illustration of manual calculation of goldfish seedling forecasting based on Image 5.

$$A_{t-1} = 9.890$$

$$A_{t-2} = 9.970$$

$$A_{t-3} = 10.220$$

$$W_1 = 0.2$$

$$W_2 = 0.3$$

$$W_3 = 0.5$$

Looking for forecasting using the WMA method = F_1

$$\begin{aligned} F_1 &= (9.890 * 0,2) + (9.970 * 0,3) + \\ &\quad (10.220 * 0,5) \\ &= 1.978 + 2.991 + 5.110 \\ &= 10.079 \text{ goldfish seeds} \end{aligned}$$

E-Forecasting Application Testing

Testing [13], used for the Jimmy Fish UMKM e-forecasting application using a blockbox, the parts tested include: The login interface is the interface used to enter the e-forecasting application using a username and password, the results of the test did not find errors. Sales data interface is an interface that is used to input sales data for each period, the results of the test are not found errors. The e-forecasting interface is an interface that is used to generate forecasts for the next period, the results of the test are not found errors.

CONCLUSION

This research produces an e-forecasting application that is used to support decision making in determining the amount of fish seed stock for the next period. This e-forecasting application makes Jimmy Fish's job faster in making decisions on determining fish seed stocks because there is no need for manual calculations anymore. Forecasting calculations are processed based on data from the previous three months using the weighted moving average (WMA) method.

BIBLIOGRAPHY

- [1] N. P. S. Widitriani, I. B. A. I. Iswara, and W. G. S. Parwita, "Analisis Faktor Penyebab Perbedaan Fluktuasi Data Aktual Penjualan Barang Dengan Hasil

- Forecasting Menggunakan Single Exponential Smoothing,” *Simetris J. Tek. Mesin, Elektro dan Ilmu Komput.*, vol. 11, no. 2, pp. 543–550, 2020.
- [2] Z. Silvya, A. Zakir, and D. Irwan, “Penerapan Metode Weighted Moving Average Untuk Peramalan Persediaan Produk Farmasi,” *JITEKH (Jurnal Ilm. Teknol. Harapan)*, vol. 8, no. 2, pp. 59–64, 2020.
- [3] R. Y. Hayuningtyas, “Peramalan persediaan barang menggunakan metode weighted moving average dan metode double exponential smoothing,” *J. PILAR Nusa Mandiri*, vol. 13, no. 2, pp. 217–222, 2017.
- [4] A. Nasution, “Metode Weighted Moving Average Dalam M-Forecasting,” *JURTEKSI (Jurnal Teknol. dan Sist. Informasi)*, vol. 5, no. 2, pp. 119–124, 2019.
- [5] B. Anufia and T. Alhamid, “Instrumen Pengumpulan Data,” 2019.
- [6] M. Makbul, “Metode pengumpulan data dan instrumen penelitian,” 2021.
- [7] D. Andrian, “Penerapan Metode Waterfall Dalam Perancangan Sistem Informasi Pengawasan Proyek Berbasis Web,” *J. Inform. dan Rekayasa Perangkat Lunak*, vol. 2, no. 1, pp. 85–93, 2021.
- [8] T. S. Gunarti, B. Tujni, and I. Solikin, “Desain E-Forecasting Menggunakan Metode Weighted Moving Average (WMA) pada Jimmy Fish: E-Forecasting Design Using Weighted Moving Average (WMA) Method on Jimmy Fish,” *KRESNA J. Ris. dan Pengabd. Masy.*, vol. 2, no. 1, pp. 45–52, 2022.
- [9] E. Agustina and E. Martantoh, “SISTEM PENDUKUNG KEPUTUSAN PREDIKSI JUMLAH STOK BARANG MENGGUNAKAN METODE WEIGHTED MOVING AVERAGE,” *J. Inform. SIMANTIK*, vol. 6, no. 2, pp. 18–23, 2021.
- [10] R. Riyanto, F. R. Giarti, and S. E. Permana, “Sistem Prediksi Menggunakan Metode Weight Moving Average Untuk Penentuan Jumlah Order Barang,” *J. ICT Inf. Commun. Technol.*, vol. 16, no. 2, pp. 37–42, 2017.
- [11] C. Connellius, “Analisis dan Perancangan Desain UI/UX pada Aplikasi AIS Mobile Menggunakan Flowchart dan Adobe XD di PT Accelist Lentera Indonesia,” 2022.
- [12] I. Setiawan, “RANCANG BANGUN APLIKASI PERAMALAN PERSEDIAAN STOK BARANG MENGGUNAKAN METODE WEIGHTED MOVING AVERAGE (WMA) PADA TOKO BARANG XYZ,” *J. Tek. Inform.*, vol. 13, no. 3, pp. 1–9, 2021.
- [13] T. S. Jaya, “Pengujian aplikasi dengan metode blackbox testing boundary value analysis (studi kasus: kantor digital Politeknik Negeri Lampung),” *J. Inform. J. Pengemb. IT*, vol. 3, no. 1, pp. 45–48, 2018.