Implementation Trend Moment For Predicting Hoya Bread Sales

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Abstrak
Prediksi penjualan roti dengan akurat dan efisien menggunakan metode trend moment. Suatu peramalan untuk menghasilkan angka prakiraan persediaan roti pada masa yang akan datang, sehingga tidak terjadi kelebihan maupun kekurangan stok persediaan roti di bulan yang akan datang. Di dalam penelitian ini menggunakan data penjualan roti setiap bulan, dari mulai bulan Januari sampai Desember 2021. Catatan penjualan pada setiap bulan tersebut berguna untuk melihat gambaran apakah mengalami kenaikan ataukah mengalami penurunan. Adapun hasil dari penelitian ini yaitu terciptanya sistem yang sudah terkomputerisasi dan mampu menghasilkan angka perkiraan dalam memprediksi penjualan untuk bulan berikutnya menggunakan bahasa pemrograman PHP dan MySQL, sehingga mempermudah dalam mengetahui berapa kebutuhan roti yang akan dipasarkan dan mempertimbangkan persediaan barang dan berapa banyak yang akan diproduksi pada bulan berikutnya sehingga tidak ada kekurangan produk atau kelebihan bahan untuk memasak kue. Hasil dari prediksi penjualan selama 12 bulan pada tahun 2021, menghasilkan prediksi pada tahun 2022 bulan Januari, pada periode ke-13 dengan Hasil MAD (Mean Absolute Deviation) 40.08% dan tingkat MSE (Mean Squared Error) 27.64%.

Kata kunci: Peramalan, Metode Trend Moment, Memprediksi Penjualan

Abstract
Forecast of bread deals precisely and effectively utilizing the pattern second strategy. A gauge to create an expected number of bread supplies from now on, with the goal that there is no abundance or deficiency of bread stock in the approaching month. In this review, information on bread deals are utilized consistently, from January to December 2021. Deals records for every month are helpful to see whether they have expanded or diminished. The aftereffects of this study are the production of a modernized framework that can create surmised numbers in anticipating deals for the following month utilizing the PHP and MySQL programming dialects, making it more straightforward to figure out how much bread will be sold and considering the load of merchandise and how much will be delivered in the following month, the next month with the goal that there is no lack or overabundance of bread stock. The aftereffects of deals forecasts for a long time in 2021, produce expectations in January 2022, in the thirteenth period with MAD (Mean Absolute Deviation) consequences of 40.08% and MSE (Mean Squared Error) paces of 27.64%.

Keywords: Forecasting, Trend Moment Method, Predicting Sales
1. INTRODUCTION

Forecasting is the work of anticipating future opportunities. Technological developments are currently growing so fast. Almost in all parts of the work have used computers in the business world, every movement to do a task or take care of a problem in a work business. In addition to making some jobs easier, innovation can also shorten work time and accuracy in job calculations is also very precise in calculations. Today quite a lot of organizations are using PCs, one of which is a cake marketing company selling bread that we often encounter around us with good and profitable prospects [1].

The business goal is of course to get as much profit as possible, to meet this goal the company can follow marketing developments in the field of management [2]. So the owner must be able to estimate the number of transactions that occur for the type and brand of products that will occur in the coming month. It's definitely not appropriate to just specify the lens size. Measurement is very important in purchasing goods, if the stock is too large then the capital that should be used to buy other goods is used to buy goods in large quantities. On the other hand, assuming almost no stock, this will obviously attract buyers. Indirect effect on profits earned in transactions [3].

With that in mind, the basic discussion of this experiment is how to create a framework for determining bread supply using the second pattern technique. In this case, it focuses on estimating the consequences of past trading information using a second denominator strategy as a means of generating normal time frame trading expectations.

The main problem that arises through this association is the question of the hope of bread relief for the next month. Because the cake business is growing rapidly, and the association only relies on common sense to consistently bake bread. The general assumption here is that manifestations are made in equal numbers from day to day with little prior action. This will obviously make it difficult for the association to know how much to send so to solve this and show the association it is important to measure the cycle using automated thinking. A measure of hope or foresight [4].

On the other hand, by expecting the association to forward more than the number of invitees, the association will suffer misfortune [5]. In this way, predicting the number of transactions in business, it is very important to have options to solve the exact market problem and the perfect quantity. Elements to think about in deciding how much to create include: the amount of supply and the amount of demand [6].

From the data on the number of bread sales for 12 months starting from January to September in 2021, then with the trend moment method, the prediction of the optimal sales of bread production in Hoya Pekanbaru for January to December 2021 can be seen as follows. From the a collection of information, the degree of bread supply forms an increasing trademark pattern. A pattern is a protracted development that has a tendency towards one direction, specifically the overall direction with the current state of ups and downs.

2. RESEARCH METHODS

The technique used in this study is a quantitative strategy, namely a strategy whose details are orderly, organized, clearly arranged from the beginning to the making of an exploratory design, data and display of the eventual outcome. This strategy utilizes different numerical models or measurable techniques that utilization chronicled information or potentially causal factors to figure deals.
2.1 Data Collection Techniques

Information assortment methods recorded as a hard copy of this study were done in three ways, in particular meetings, perception, and archive assortment (Documentation). The data collection techniques can be described as follows:

1. Interview

The interview method is carried out by conducting interviews with related parties regarding matters relating to object information where the author conducts research, data collection techniques by question and answer [7].

2. Observation

This method is implemented to collect data and information by reviewing and conducting direct observations [8]. After making observations, the author knows that it is true that every time there is a shortage of bread stock. Then analyze theoretically the information system predicts sales or ongoing and learns ways to build a system that is able to predict sales of bread to build a computerized system.

3. Documentation

Documents can be interpreted as a data collection technique that is done by looking at files, notes or something written, printed that can be used as evidence or information [9]. Documents are carried out to collect data sourced from archives and documents contained in related companies.

2.2 Research Framework

To help the arrangement of this examination, it is important to have a reasonable exploration system structure in stages. The system is the means that will be taken in tackling the issue. The exploration structure utilized is displayed in Figure 1 below:

![Research Framework Diagram](image-url)

Figure 1. Research Framework
Based on the research framework described above, it can be described the discussion of each stage in the research, namely:

1. Problem Identification
   Make observations to find out the real problems that occur in

2. Literature Review
   Writing survey contains portrayals of speculations, discoveries and other exploration materials got from reference materials to be utilized as the reason for research exercises.

3. Research
   Design Research design is the design of the entire process required in planning and carrying out research.

4. Data Collection
   At this stage data collection is done by conducting interviews (interviews).

5. Data and System Analysis using the Trend Moment
   At this stage an analysis of the data that has been collected will be carried out, then data processing will be carried out to adjust the data to be processed on the trend moment which consists of several stages, namely analysis, design, coding, and testing with the aim of meeting the requirements for forecasting

6. System Design
   In this stage, determine the design of the User Interface (User Interface) that will be used in sales forecasting. To design a system must use a design model.

7. System Implementation
   At the system implementation stage, software installation will be carried out. The software used to create system applications that can predict sales predictions are XAMPP, PHP and the MySQL database used.

8. System Testing
   This stage is carried out to see to what extent the application program that has been made is able to solve problems in forecasting sales predictions. The system testing stage begins by inputting data into the application. Then calculate the sales forecast to ensure the correctness of the process using the trend moment.

9. Analysis of Results
   Analysis is the step taken after the research data has been collected, the interaction of efficiently looking and arranging the information got from the meetings, field notes. The analysis aims to find out the actual situation of the existing causes.

3. RESULTS AND DISCUSSION

3.1 System Design

In planning a data framework, it takes a framework configuration instrument that makes the creator so the consequences of the examination can be accomplished ideally [10]. The instruments in the plan of data frameworks utilized by the creator comprise of UML (Unified Modeling Language), action outlines, class graphs, grouping charts, use case charts and flowcharts.

3.1.1 UML (Unified Modeling Language)

In the improvement of item arranged programming procedures, a normalized displaying language arose for programming advancement that was constructed utilizing object-situated programming strategies, in particular the Unified Modeling Language (UML). is an approach in creating object-situated frameworks and is likewise an apparatus to emotionally supportive network advancement [11], can be seen from the relation in figure 2
3.1.2 Activity Diagram

Movement Diagram portrays work processes or exercises of a framework or business interaction, or menus that exist in programming. What to note here is that movement graphs portray framework exercises not what entertainers do, so exercises that can be performed by the framework [12].

3.1.3 Class Diagram

Class Diagram depicts the construction of the framework as far as characterizing the classes that will be made to assemble the framework. Classes have what are called traits and strategies or tasks. Ascribes are factors that are possessed by a class, while tasks or strategies are capacities that are claimed by a class [13].

3.1.4 Diagram sequence

Outline grouping portrays the way of behaving of the item in the utilization case by depicting the existence season of the article and messages sent and got between objects. Subsequently, it is important to realize the articles engaged with a utilization case alongside the techniques having a place with the class that is launched into that item. Portrays the way of behaving of an item in a utilization case by depicting the lifetime of the article and the messages sent and got between objects [14].

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3.2 **Desain Sistem**

Describes how a system is formed in order to provide a clear picture to users who can use system design tools [15]. Use case diagrams describe an interaction between one or more actors and the information system that will be created. Use case diagrams can be very helpful when we are compiling requirements of a system on a system designed, there are 3 actors, namely admin and manager where is admin who performs the process of inputting goods and sales data and the results in the form of a report will be given to the manager.

As for the form of use cases diagram on the bread sales forecasting system that will be designed at the factory can be described as can be seen in figure 3:

![Use case diagram](image)

**Figure 3. Use case diagram**

3.1 **Implementation System**

System implementation is the steps or procedures performed in completing the approved system design, to test, install and start a new system or an improved system to replace the old system. Implementation that has been appropriate must be tested so that it can be seen that the reliability of the existing system is in accordance with what is desired.

The application of the Trend moment to predict Hoya bread sales consists of login form, main form the profile form the item data form the sales data form the prediction calculation form, password the prediction result data form, the and change form, report form

1. **Login Form Display**

Coming up next is the structure administrator login Trend second:
Show form login is the underlying showcase that seems when the administrator runs the application framework. To enter the framework, the administrator should enter username and secret phrase on the right.

2. **Main Form View**

Coming up next is the primary structure perspective on the Trend second:

The structure show is the display that will be seen after the admin has successfully logged in. On form, the admin has the right to access various menus available on the system and perform various actions according to the available buttons.

3. **Item Data Menu Display**

This page shows the information input plan for any things that are sold. Coming up next is a structure show. Products information from the use of the Trend second to foresee bread sales:
5. *Transaction Data Menu Display*
This page shows the contribution to overseeing exchange information, from the use of the Trend second:

![Transaction Data Display]

6. *Prediction Calculation Results Display*
This page shows the info plan for expectation estimation results, from the use of the Trend second to anticipate deals:

![Prediction Calculation Results Display]
7. Prediction Result Data Menu Display
This page shows the plan prescient information input, from the application method expectation information Trend second to anticipate deals:

8. Display Form of Sales Data Report
following is a presentation structure from the utilization of the Trend second to anticipate deals:
9. The display form of the prediction result data report

Coming up next is a presentation structure from the utilization of the Trend second to foresee deals:

4. CONCLUSION

Method Trend moment, it is known that the stock of bread that must be provided in January 2022 is 296, with MAD (Mean Absolute Deviation) 40.08% and MSE (Mean Squared Error) 27.64%. Based forecasting system is a website where the system is able to simplify and expedite predicting bread sales for the following month. Estimating frameworks can work appropriately in giving answers for try not to run unavailable or overabundance deals of bread that will be disseminated to customers/buyers. This system can be used as consideration in making sales prediction decisions.
5. SUGGESTION

1. To be able to improve system performance in the future so that it is hosted so that it can be accessed online.
2. Access rights between users are still generated, so a better difference in access rights is needed.
3. The level of security needs to be increased if the system is online, so as to avoid access from unauthorized parties.
4. In order to complete the system, the system should be implemented in a local network intranet, in order to improve team performance (teamwork)
5. Can be developed with other methods such as linear regression or least squares.

REFERENCES


