

Trend Moment Method to Predict Sales of Pekanbaru Hoya Bread

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Abstract: Hoya or better known as Hoya Bakery is located on Durian Street, Pekanbaru City. Is one of the shops and factories that produce and sell various kinds of bread and market snacks located in various places in Pekanbaru. Especially in meeting the demand that will be distributed to consumers which is relatively large so that there are often out of stock bread and excess stock. Therefore, accurate and efficient predictions of bread sales are needed using the trend moment method. A forecast to produce forecasts of bread supplies in the future. In this study, data on bread sales are used every month from October 2019 to September 2021. The sales record for each month is useful to see whether it has increased or decreased. The result of this research is the creation of a computerized system that is able to generate estimates for the next month using the PHP and MySQL programming languages, making it easier to find out how much bread will be sold and consider how much will be produced in the following month so that there is no shortage or excess stock of bread. So, the trend moment predict blueberries 2403.03 pcs in januari 2022. MSE 481212.89

Keywords: culinary; forecasting; hoya sales prediction; technology; trend moment

INTRODUCTION

Forecasting is the workmanship and study of anticipating future opportunities. The development technology is very growing rapidly. In all fields of work has used a computer in every activity to facilitate a job or overcome a problem in the work. In addition to facilitating a technological job can also shorten the work time and accuracy in calculations is also very precise. Now there are quite a lot of businesses that use computers, one of which is the bread sales business that many of us find around us whose prospects are good and profitable.

Business objectives are certainly to seek maximum profit, achieving these goals the company can follow the development of marketing in the field of management because one of the keys to the company's success is being able to compete, survive and create innovation and run business activities. Hoya is a type of production business that sells a variety of dry bread, one of the breads that is quite a lot in demand is a small bread 1000 from some other breads. From existing data sets, the level of sales of small loaves forms the hallmark of the trend. Trend is a long-term movement that has a tendency towards the direction in one direction, namely the direction up and down with these conditions.

Especially in Indonesia It is a rapidly growing country in the field. Technology or in the field of marketing in terms of culinary. According to Economic Agency Creative (Bekraf) assess Indonesian in terms of culinary efforts are getting ahead and moving fast. Porter businessmen (food) is a choice. Culinary business is a profitable type of business, and will always be in demand all the time, because food is, a basic human need that cannot be separated from our lives. This culinary business also has many categories, ranging from snacks, drinks, staple foods It has high potential. It's good, depending on how we are, in marketing it. Our country with so many existing populations is now the largest market for the service industry. Will be in ASIA Trend. Anthony Food products have become commonplace now, due to the many innovations that are present and expand the food industry market network. As a consumer, I am interested in Try new foods and concepts. The new one. Indonesian, they are now becoming more aware of the quality of food and the ease of buying, resulting in demand for safely prepared food as well as fast delivery options. One example is securely prepared as well as a quick delivery option. One of culinary which is still in interested in various circles that is cake culinary business.

The number of types of roti and brands sold in Hoya, making the owner must be able to optimize in the procurement of available goods. So far, the calculations in the procurement of goods are only done by estimate

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only. So that the owner must be able to predict the number of sales that occur in a type of goods and brands that will occur in the coming month. Of course, it is not accurate if the forecast only uses estimates only. Forecasting is very influential in the procurement of goods, if the supply of goods is too much then the capital that must be used for the procurement of other goods is exhausted for the procurement of too many goods. Conversely, if the stock of goods is too little, of course, this leads to demand from buyers. Indirectly affects the profits obtained in sales. With this background, the main discussion of this study is how to make a forecasting system (forecasting) Hoya bread sales using the trend moment method. In this study the results of calculations from previous sales data using the trend moment number method as a suggestion to hold seller predictions in the expected period.

There are several problems that often occur in Hoya Pekanbaru. This factory often experiences excess and lack of inventory of goods, this results in a lot of merchandise that is not sold and the amount of goods needed by buyers but the load of goods is not enough. Another result is the profit on the part of Hoya that should be less, with this problem Hoya must have a reductive to assess the number of goods to be sold and the number of goods to be produced in the next month.

The first problem that arises through this organization is the problem of anticipating bread offers for next month. Because consistently the transaction increases bread and the organization rely only on conventional estimates in making bread every month. The conventional forecast here is as creation is completed in equal numbers from day to day practically without prior estimates. This will certainly make it difficult for the organization to know the number of goods that must be delivered. To be able to solve this problem and work on organizational presentations, it is important to estimate the cycle using computerized reasoning. Predictions or forecasts.

Basic needs there are maximum benefits obtained from transactions most often occur. Where the largest deal implies that it can meet every current need, assuming the amount of goods delivered by the organization is not so much, the organization will miss out on the opportunity to get the most profit. Then again, assuming that the organization sends more items than the number of requests, the organization will face losses. Therefore, predicting the number of sales in a company is very important in order to meet the right market demand and with the appropriate amount. Factors that need to be considered in determining the amount of production, among others: the amount of supply and the amount of demand.

A development that will generally build (develop) or decrease in the long term is obtained from normal changes in the long term and its value is very flat or smooth. In the end, a series of periods is said to have a pattern if the normal value changes after some time, so that it can be relied upon to increase or decrease, over the period for ideal estimation. Forces that can influence patterns are population change, cost, innovation, and usability (Chandra, 2021).

One strategy in artificial intelligence that can be utilized for prediction is the trend moment method. Some companies to encourage their employees to be able to meet sales targets. Many strategies are needed to meet the varied needs of customers. Hoya is a Factory and Shop engaged in sales and management, so far experiencing problems in the form of sales in the coming month because of many orders.

Forecasting techniques with trend moment methods are used to find out, if sales will come by using sales data over the last 2 years the trend moment method can predict sales over the next 12 months, forecasting is a tool to overcome all kinds of potential problems that occur from demand anomalies both seasonal and change the global economy, according to forecasting, is difficult for companies to thrive or succeed in running a business.

The trend moment method utilizes measurable estimation and mathematical techniques to find the capacity of straight lines in lieu of chaotic lines formed by the company's chronic information. In determining a gauge must be completed using certain assessment techniques so that the impact of abstract components in determining a gauge option can be kept away from many once the measurement technique that can be used to decide the determination, one of which is the trend moment method.

Based on the above problems, the author of the study aims to design a forecasting system using the trend moment method that can be used to predict the sale of Hoya Pekanbaru bread. So that it can be utilized by the owner in determining the planning of sales and inventory of goods in the next month and year.

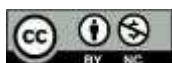
In order to run smoothly in the process of predicting the best Hoya Pekanbaru bread sales effectively and efficiently, a Forecasting System will be created entitled "Trend Moment Method to Predict Sales of Pekanbaru Hoya Bread".

LITERATURE REVIEW

System

A system derived from Latin (*systema*) and Greek (*sustema*) is a unity consisting of components or elements that are linked together to facilitate the flow of information, matter and energy. The term is often used to describe the existence of interacting entities. In another sense, a system is defined as a collection or set of

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organized, inter-inter interdependent, interdependent elements, components, or variables. In essence, a system is a set of entities (hardware, brain ware, software) that interact, cooperate and collaborate to achieve a specific goal (R. S. Tiara Dewi, 2016).

A system is a set of components that are interconnected and work together to achieve multiple goals. In addition, the other understanding of the system consists of elements and inputs (inputs), processing (processing), and output (output). Thus, simply system can be interpreted as a collection or set of elements or variables that are organized, interacting and depending on each other. Systems are designed to improve or enhance the information (M.Sesaria, 2020).

According to Prasetyo & Tjahjani (2018), sistem is a network of interconnected procedures, coming together to perform an activity or complete a specific goal (Prasetyo & Tjahjani, 2018). According to Prasojo and Riyanto (2011:152), it is argued that "A system is any one consisting of objects, or elements, or components that are related and related to each other, in such a way that they are a certain unit of processing or processing". Based on the above understanding it can be concluded that the system is a network of work or a set of elements that are united and designed to achieve a common goal (Prasojo Diat, Lantip., 2011).

Ariyanti, L., Satria, M. N. D & Alita, D. (2020), It is a combination of individual, hardware, software (software), computer networks and data communications and databases in collecting, disseminating, and changing information in form of organization (Ariyanti et al., 2020).

Forecasting

Before explaining about forecasting, experts initially described the assembly system: Forecasting and Forecasting Expectations, characterized as the most common way to anticipate a variable (event) then depending on the previous factor information (Machendrawaty, 2019).

Qualitative forecasting strategies as demonstrated by Jay Heizer and Barry Render (2017:118) outlined by Hirson Kurnia, Ratna Saraswati, and David Wijaya are largely separated into two main classes, namely qualitative forecasting methods and quantitative forecasting (Nugraha et al., 2018). Subjective anticipation strategies rely on the board's judgment, and do not use explicit models (Hendi & Feronica, 2017). Quantitative anticipation strategies rely on past information and can be utilized to forecast the future by utilizing fundamental numerical models (Rachman et al., 2016).

Forecasting System

Forecasting systems are an important tool for making informed business decisions. Regardless of company size and profile, forecasting helps organizational management anticipate trends in important business indicators, such as sales expectations or customer behavior. Forecasting is a valuable asset but requires specialized skills and the right data. Methods of making predictions of information by using historical data as the main input to determine the direction of future trends. Companies use forecasting for a variety of purposes, such as anticipating future spending and determining how to allocate their budgets.

Trend Moment Method

Trend moment is a movement that tends to increase (growth) or decrease (decline) in the long term obtained from the average change over time and the value is quite flat or smooth (smooth). In other words, a time series is said to have a trend if its average value changes from time to time, so it is expected to increase or decrease, during the period for the desired forecast. The forces that can influence trends are changes in population, prices, technology and productivity. The trend moment method is one of the methods in forecasting, which has one benefit, for example in terms of how to know the projected profit and loss of sales of an object of goods that will occur in the following year.

The trend moment method uses certain statistical and mathematical calculations to determine the function of a straight line as a broken line formed by historical company data. Thus, the influence of subjective elements can be avoided. The trend moment method is different from other methods, for determining historical X data in its use, it does not have to be even or odd, because the value of X always starts with the value 0 as the first order in this trend moment method, there is a combination of statistical analysis in the form of trend analysis and moments method. In the application of the trend moment method, it can be done using historical data from one variable, while the formula used in the preparation of the $Y = a + b X$ method. Equation 1 is used to calculate the value of the trend or variable to be predicted. Equation 2 is used to calculate the slope or coefficient of the trend line. Equation 3 is used to calculate constant numbers (Iqbal, 2021).

Bread Sales Prediction

Prediction is a process of systematically estimating what is most likely to happen in the future based on past and present information possessed, so that the error is marginalized. While the method used to measure a variable in the future based on the contemplation of instincts from the previous time (Nugroho & Sulhan, n.d.).

System Development Live Cycle (SDLC)

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According to Krismiaji stated that SDLC (System Development Life Cycle) was one of the popular methods of information system development when information systems were first developed that were carried out by system analysis and programmers to build an information system. Here is an image of SDLC (System Development Life Circle) (Maya Sari, 2018). SDLC (Systems Development Life Cycle) is the process of designing, developing and testing software. This method describes the overall software development process to produce quality software and meet expectations of system users.

Systems Analysis and Design Tools

In designing an information system, it takes a system design tool that makes the author so that the results of the analysis to be achieved are maximal (Rozali & Patrie, 2018). The tools for designing information systems used by the author consist of UML (Unified Modeling Language), activity diagrams, class diagrams, sequence diagrams, use case diagrams and flowcharts.

METHOD

Research Framework

To help the preparation of this research, there needs to be a clear arrangement of research frameworks of the stages yes. The framework is the steps that will be carried out in solving the problem, so that the final goal in predicting the sale of Hoya Pekanbaru can be implemented. The research framework used is: (1) Identify problems (2) Identify problems; (3) Research Design; (4) Data Collection; (5) Data and System Analysis; (6) System Planning; (7) System Implementation; (8) System Testing; (9) Results Analysis.

Research Methods

In working on a study, the author must first arrange the steps or stages of work that the author must do in implementing the Trend Moment method that will be used to predict the sale of Hoya in the future. The method used in this research is a quantitative method that is a method whose specification is systematic, planned, clearly structured from the beginning until the creation of the research design. Quantitative research is research that demands the use of numbers, ranging from data collection, interpretation of data and the appearance of the end result. This method uses a variety of mathematical models or statistical methods that use historical data and/or causal variables to forecast sales.

Data Collection Techniques

Whether or not a study is valid depends on the type of data collection used for the selection of the right method in accordance with the type and source of data in the study. Data collection techniques in writing this research are carried out in three ways, namely interview, observation, and document collection (Documentation).

Research Site and Time

The location of the research was conducted at the Hoya Pekanbaru Factory located on Durian Road No.37, RW.41, Central Kp., Pekanbaru City, Riau Province. The research began from a survey conducted in Hoya Pekanbaru, conducted by the authors in November 2020 the first week. Then determine the title and topic of research in the third week of November 2020, title submission, acc title. The research application begins on November 26, 2020 and so on until the completion of the research.

RESULT AND DISCUSSIONS

Forecasting Implementation

Login Form

Picture 1. Display Login Form



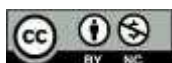
The login form display is the initial display that appears when the admin runs the application system. If you want to enter the system, the admin must enter the correct username and password.

Form Display

The following is a display of the main form of the Trend moment method for predicting bread sales:

Picture 2. Form Display

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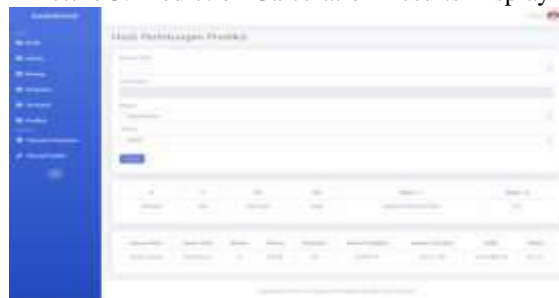
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Prediction Calculation Results Display

This page displays the input design of the prediction calculation results, from the application of the Trend moment method to predict the sales of Hoya bread:

Picture 3. Prediction Calculation Results Display



System Testing

Testing is the most important thing that aims to find errors or shortcomings in the software to be tested. Testing intends to find out that the software created meets the criteria that are in accordance with the purpose of designing the software. Some of the tests done are:

Login Form Testing

The following is a login form test from the application of the Trend moment method to predict the sale of Hoya bread:

Table 2. Login Test Results

No.	Tested Interface	Application Status	Testing Scenario	Expected Results	Test Results (Successful or Failed)
1	Login form.	The login view is open.	Enter your username and password and then click login.	If the username and password are correct, it will go to the administrator's main page if it is incorrect then a combination message appears username and password.	Succeed.
2	Login form.	The login view is open.	Enter the username and clear the password field and then click login.	If the user's name input is correct and the password field is emptied, it will appear the wrong message combination of username and password.	Succeed.
3	Login form.	The login view is open.	Click out.	If you click out, the system will close the login	Succeed.

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				<i>form.</i>	
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Main Page Testing

The following is the main page test of the application of the Trend moment method to predict the sale of Hoya bread:

Table 3. Main Page Testing Results

No.	Tested Interface	Application Status	Testing Scenario	Expected Results	Test Results (Successful or Failed)
1	Main page.	Go to the main page	Click the available menu	The selected menu can display their respective pages.	Succeed.

Profile Page Testing

The following is a profile page test of the application of the Trend moment method to predict the sale of Hoya bread:

Table 4. Results of Profi Page Testing

No.	Tested Interface	Application Status	Testing Scenario	Expected Results	Test Results (Successful or Failed)
1	Profile page.	Go to the profile page	Displays the profile menu	The selected menu can display the page	Succeed.

Testing of Goods Data Form

The following is a test of the goods data form from the application of the Trend moment method to predict the sale of Hoya bread:

Table 5. Results of Goods Data Form Testing

No.	Tested Interface	Application Status	Testing Scenario	Expected Results	Test Results (Successful or Failed)
1	<i>Formdata</i> stuff.	Go to the goods data <i>form.</i>	Click the button: - Edit - Delete - Add Data - Export To Excel - Export To Pdf	All buttons can work according to their function.	Succeed.

Sales Data Form Testing

The following is a test of the sales data form from the application of the Trend moment method to predict the sale of Hoya bread:

Table 6. Results of Sales Data *Form* Testing

No.	Tested Interface	Application Status	Testing Scenario	Expected Results	Test Results (Successful or Failed)
1	Criteria form.	Go to criteria <i>form.</i>	Click the button: - Edit - Delete - Add Data - Export To Excel - Export To Pdf	All buttons can work according to their function.	Succeed.

Test Form Results Calculation Prediction

The following is a test of the Prediction Calculate Results form from the application of the Trend moment method to predict the sale of Hoya bread:

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Table 7. Results of Test Form Results Calculation Prediction

No.	Tested Interface	Application Status	Testing Scenario	Expected Results	Test Results (Successful or Failed)
1	Form results calculate predictions.	Go to the prediction calculate form.	Click the button: - Name of bread - Kind of bread - Moon - Year	All buttons can work according to their function.	Succeed.

Test Form Prediction Results Data

The following is a test of the form of predictive data from the application of the Trend moment method to predict the sale of Hoya bread:

Table 8. Results of Test Form Data Prediction Results

No.	Tested Interface	Application Status	Testing Scenario	Expected Results	Test Results (Successful or Failed)
1	Calculation form.	Go to the calculation form.	Click the button: - Delete - Add Data - Export To Excel - Export To Pdf	All buttons can work according to their function.	Succeed.

Password Change Form Testing

The following is a test of the password change form from the implementation of the Trend moment method to predict the sale of Hoya bread:

Table 9. Test Results of Password Change Form

No.	Tested Interface	Application Status	Testing Scenario	Expected Results	Test Results (Successful or Failed)
1	Form change password.	Go to the password change form.	Click the button: - Edit password - Reset - Close - Add Data	All buttons can work according to their function.	Succeed.

Report Form Testing

The following is a test of the report form from the application of the Trend moment method to predict the sale of Hoya bread:

Table 10. Report Form Test Results

No.	Tested Interface	Application Status	Testing Scenario	Expected Results	Test Results (Successful or Failed)
1	Ranking report form.	Go to the ranking report form.	Click the button: - Export To Excel - Export To Pdf	All buttons can work according to their function.	Succeed.

Test Results

After conducting the process in testing, the author obtained some conclusions from the trial on the application (forecasting) forecasting of bread sales with the Trend moment method in Hoya Pekanbaru As for the test results of the application of the Trend moment method to predict the sale of hoya bread:

1. Blackbox Testing method is one of the easy methods to use because it only requires the lower limit and upper limit of the expected data.

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2. Estimates of the number of test data can be calculated through the number of entry data fields to be tested, the entry rules that must be met.
3. After testing it is known that the functionality of the system has been running well and the results of calculations with the system already match manual calculations. This system makes it easy to report results that can be printed repeatedly without any restrictions

CONCLUSION

Based on the discussion that has been described in previous chapters, some conclusions can be drawn as follows: (1) Predicting the sales of Hoya Pekanbaru bread using the Trend moment method; (2) The web-based forecasting system makes it easier for Hoya to predict sales. (3) Forecasting systems can function properly in providing solutions to avoid running out of stock or excess sales that will be distributed to consumers.

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