FORECASTING SALES PRICES APPARTMENT USING FUZZY TSUKAMOTO (CASE STUDY MY TOWER APARTMENT)

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ABSTRACT

Currently apartment buildings are not foreign anymore we see let alone in the middle of the city. The price is still fairly cheap or under the price of housing makes a lot of interest to have an apartment either for personal or investment. Each developer has a strategy to attract buyers whether it increases or decreases the price of the apartment in each period or every year. The research was conducted to help the company change the price of the apartment by using method Fuzzy Tsukamoto based on input-an Inflation Value in the year to be predicted, View apartment, and Sales Price before. The results here show that for the output of the program is different from the original data, that is more expensive or the price is higher than the original data. There is an ratio of error 0.7609184% to -0.334665% or difference between Rp.200.000.000 to Rp.400,000.

I. INTRODUCTION

Sales forecasting is an activity to estimate the amount of sale of goods or services by producers, distributors over a certain time period and marketing area. Sales forecasting is part of the management function as one of the contributors to the success of a company. When sales are predicted accurately then the sales decline can be improved by marketing strategy.

In this era of globalization very much we see apartment buildings in various major cities in Indonesia. From year to year sales of apartments in Indonesia increased rapidly. One apartment that has many unit sales is My Tower. This apartment is located in Surabaya city. Currently 80% of units in tower A and B apartment have been sold. But in 2016 this sales declined. With this research is expected to predict sales in the next year.

logic Fuzzy is a good way to map an space input into the output space. For very complex systems, the use of fuzzy logic is one of the solutions. For this case used fuzzy Sugeno and Tsukamoto for completion. Sugeno method has been widely applied in various fields. In the method Tsukamoto, each rule is represented using a set ofsets fuzzy, with a monotonous membership function. The Sugeno and Tsukamoto methods are usually used for decision support systems.

Based on the description above, then the problem can be improved by making a forecast to predict sales. Flexible and easy-to-understand methods help companies make it easier to find solutions to these problems. Then the research conducted to raise the problem, with the title of the study "Forecasting the sale price of the Apartment using fuzzy Tsukamoto (Case Study of My Apartment Tower)"

II. REVIEW REFERENCES

Tri Murti, Leon Andretti Abdillah, and Muhammad Sobri, 2015, Decision Support Support System Fuzzy Tsukamoto Method. Decision support system (SPK) can be used to help solve problems or decision making that is semi structured or structured. The method used is Fuzzy Tsukamoto. PT Triprima Finance is a company engaged in lending services with the guarantee of Book Owners Motor Vehicle or car (BPKB). PT. Triprima Finance should consider borrowing from its customers with the approval of the chief manager. The approval takes a long time because it has to go through many stages of reporting procedures. Decision-making activities at PT Triprima Finance are done by manual analysis process. To help solve the problem, it is necessary to settle the method in the accuracy and speed of decision making of loan worthiness. To overcome this need to develop a new system that is decision support system with fuzzy tsukamoto method.

III. DESIGN SYSTEM

3.1 *Flowchart*

Figure 1 Flowchart Fuzzy Tsukamoto

In Figure 1 can be explained first for the input data used to forecast the price of the price per floor, inflation, apartment type, and apartment view. Then determine the degree of membership consisting of linear up and down as well as the curve of the triangle. After that determine therules *fuzzy*, then calculate the composition of the maximum value and a new minimum after that we do defuzzyfikasi. *Output* is the result of forecasting the sale price of apartments next year period.

Figure 2 Flowchart Forecasting Program

In Figure 2 the flow of running the program begins with the login first, then perform input data that will predict Inflation, *View*, and Sales Price that has been determined on the page forecasting perinputan. After that we forecasting process by clicking the submit button. Forecasting results will appear to be one page of them, there are membership values, rule results, and final Z results. At the end of the calculation there are *output* numbers and categories cheap / expensive. If we want to save can click save and data will automatically stored on the result data page.

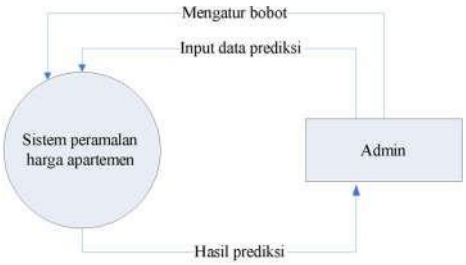

Figure 3 DFD

In Figure 3 explains that the admin input data to be predicted dsn set the weight which will then be processed by the apartment price forecasting system by Fuzzy Tsukamoto method. And forecasting results will be displayed to the *user*.

IV IMPLEMENTATION AND TRIAL TEST

4.1 IMPLEMENTATION

Examples of system implementation are as follows:

Figure 4page Login

Figure 5 Main Page

Figure 6Calculation Page

Image7 input membership value

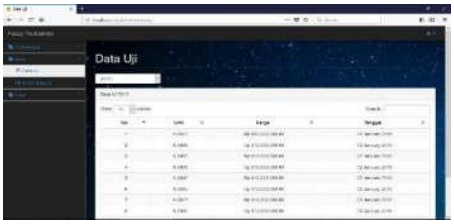

Figure 8 test data page

Figure 9 data page result

4.2 TRIAL TRIAL RESULTS

All related in the process input is administrator. The first test was conducted using inflation input 6.49, view 40, and apartment prices 375,000,000

Figure 10Data Input

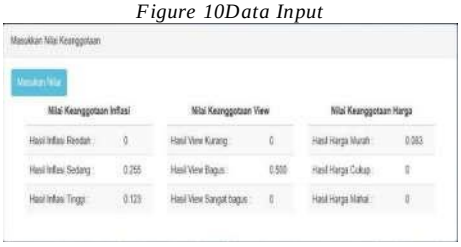

Figure 11 Result of membership value

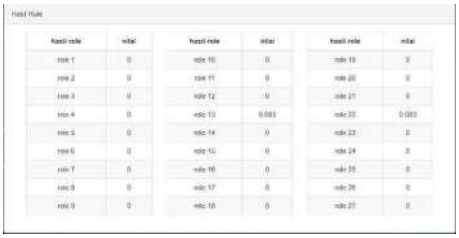

Figure 12 Result of fuzzy rule

Figure 13 Result of Z value

Figure 14 Final result

Figure 15 Test result data

Result this test data test is used to know the accuracy of output and data real. The author does an experiment 80 times with different input criteria and compares with the original data results that will be in the percentage of comparison for the feasibility of the system that became the subject. Based on the results of system testing has been done, it can be concluded that the system forecasting the sale price of the apartment with the feasibility of the program with the percentage of difference error average -0.2335%. However, there is still a need for further system development in order to obtain more optimal results and a more dynamic web.

V. CONCLUSION

Based on the results of research and discussion that has been done, it can be concluded that:

a) From the formulation of this research problem is made with the aim of predicting the sale price of apartments that can forecast the price for the next month or year.
b) To predict the price of apartments in this study required inflation data from Bank Indonesia, as well as data view of apartments and apartment prices obtained from the office of My Tower Apartments. In this calculation the outcome is the price of the apartment and the category is expensive or cheap.
c) Program for forecasting contains pages to enter data to be predicted, there is a data page to view the price data, there is a data page of results used to store forecasting results that have been in input on the page enter data. In the result data page there is a graph that is used to compare the original data and the result data from the program.
d) For testing the forecasting program, it has been tested on 80 test data that the average value of the value generated on the program is more expensive than the original data. The average error reaches -0.2335% because the program results are more expensive than the original data
e) Fortesting error handling there are some messages by the system. Error occurs if not fill login, fill one login (usename / password only), wrong input password or username, and also not running if not input data to be predicted completely.

VI. SUGGESTIONS

Based on the results of research and conclusions, suggestions that may be useful for My Tower Apartments are as follows:

a) Admin must make use and use of the system optimally as the media information will accelerate the delivery of information.
b) The forecasting system of selling the price of the apartment should always be analyzed whether the system is still feasible or not to be used, so it can be known whether or not to do development or replacement of existing systems in order to meet the needs of price sugestion

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