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Application of Single Exponential Smoothing in Forecasting Number of New Students Acceptance

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Abstract: This study aims to produce the smallest Mean Absolute Percentage Error (MAPE) to show the best forecasting, the best Alpha Constant, and forecasting ability level based on forecast results. This study used Single Exponential Smoothing Method with different Alpha constants in forecasting the number of new students' acceptance from Academic Year 1999/2000 until 2018/2019 in a private primary school, Pekanbaru, Riau Province-Indonesia. MAPE formula aims to measure the accuracy of forecast results in percentage. The analysis shows that the best forecast results in certain years are in Academic Year 2004/2005, 2010/211, and 2015/2016 with 0% MAPE. The smallest MAPE Average Value is generated by $\alpha = 0.8$ with only 0.62% error, so the best forecasting used when $\alpha = 0.8$. The results of MAPE average values show that all forecast results are below 10%. Therefore, all the results of the research, in general, are grouped into excellent forecasting ability. The results highlight that by using Single Exponential Smoothing Methods to accept new students in a school, relevant policies could be devised and implemented.

Keywords: *Forecasting system, single exponential smoothing method, alpha constant, MAPE value, forecasting ability level*

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I. INTRODUCTION

Nowadays, the development of technology is very quick. This speedy development has greatly influenced all of the sectors of human life. Almost all activities and businesses are related to technology. Along with the development of technology, this condition also must be balanced with the development of Human Resources (HR). One effort to develop HR is by the establishment of schools. Schools themselves are expected to be able to educate students to use maximal technology today [1].

Every year, schools always accept new students. The number of accepted new students can increase every year or even decrease from the previous year. One way to find out the number of accepted new students is by doing forecasting [1].

Changes in the number of students that cannot be forecasted cause problems for the schools themselves, such as supplying adequate infrastructure, the less number of teacher, inefficiency of student learning hours (studying hours in the morning/afternoon), insufficient classrooms, and so forth. Actually, these problems can be handled by doing forecast towards up and down of the number of accepted new students. Therefore, a method that can forecast the fluctuation in the number of new students acceptance is needed.

Using Single Exponential Smoothing Method in the acceptance of new students in a school can help that school in making policies related to it. Apart from the

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ability of this method to handle fluctuated data, Exponential Smoothing Method also consists of several smoothing models to handle data with different fluctuations. One of the Exponential Smoothing Methods that can be used in this research is Single Exponential Smoothing Method because Single Exponential Smoothing method is more suitable for predicting things with random (irregular) fluctuations [2].

Basically, contexts of the problem in the research are:

- How to forecast the number of new students' acceptance every year from Academic Year 2000/2001 until 2018/2019 based on available data by using Single Exponential Smoothing Method with different Alpha Constant in one private Primary School in Pekanbaru, Riau Province Indonesia.
- How to calculate MAPE average values from every Academic Year 2000/2001 until 2018/2019.
- How to obtain the smallest MAPE Average Value to show the best forecasting.
- How to determine the best used Alpha Constant to get the smallest MAPE Average Value.
- How to determine the Forecasting Ability Level based on Forecast Results and MAPE average values from Academic Year 2000/2001 until 2018/2019.

This study aims to produce the smallest MAPE, the best Alpha Constant, and Forecasting Ability Level based on Forecast Results and MAPE Values by using Single Exponential Smoothing Method with different Alpha constants in forecasting the number of new students' acceptance based on data of accepted new students every year from Academic Year 1999/2000 until 2018/2019 in one private Primary School in Pekanbaru, Riau Province - Indonesia.

The scopes of the research are :

- Forecasting is done from Academic Year 2001/2002 until 2018/2019 by using Single Exponential Smoothing Method with different Alpha Constants for New Primary Students in one Private Primary School in Pekanbaru, Indonesia.
- Alpha Constant is used in a range of 0.1 - 0.9.
- Comparing results between real data from accepted new students and forecast data from calculation every year.
- Obtaining the smallest MAPE Average Value.
- Determining the best Alpha Constant to get the smallest MAPE Average Value to show the best forecasting.
- Determining Forecasting Ability Level based on Forecast Results and MAPE average values.

Outputs of the research are:

- Forecast table from academic year 2000/2001 until 2018/2019 by using Single Exponential Smoothing Method with different Alpha Constants.
- Comparing results between real data from accepted new students and forecast data from calculation every year.
- The smallest MAPE average value to show the best forecasting.
- The best Alpha constant to get the smallest MAPE average value.
- Determining forecasting ability Level based on Forecast Results and MAPE average values.

This research is expected to be used as a reference to forecast the number of new students' acceptance in every school in Primary School in general, based on data of accepted new students every year of that school.

II. LITERATURE REVIEW

A. *Related Works*

Rahayu [3] conducted research using the Moving Average Method and MYSQL Programming Language by predicting rice sales per month in 2015. To obtain a sales prediction, the researcher used sales data in 2014. Sales data each month was forecasted using Moving Average Method; then forecast results of sales were used to get forecast errors using the MAPE. Forecast results are uploaded into the visual basic program. The result showed that rice sale in January was 8583 kg, with 20.53% MAPE. It means that the success rate of forecasting reaches 79.47%.

Rahmawati [4] was forecasting kawasaki motorcycle sales by using Least Square Method and compared this method with market trend. In this study, the researcher collected motorcycle sales data from 2008 - 2012. Sales number was grouped into X and Y, then calculated forecastings using least square formula. These results were used to find results of Linear Trend Formula. Both of these results were compared with the sales target of the company. This method forecasted that in January 2013 to April 2013, the company would reach motorcycle sale of 2,244 units. This result was different 37.4% with the company's target or 6,000 units.

Iqbal [5] predicted development of students number in 2010 using the Least Squares Method. The researcher collected students' data from 2000 to 2009. Firstly, the researcher grouped data into a table whereas the number of students into Y column and Academic Year into X column. The table was used to find Y lines trend with respect to time (t). After the trend line was obtained,

then predictions of accepted students were calculated with the Least Squares Method, which is 299.855 students or rounded up to 300 students. These results raised up to 30% from 2009.

Nurdela [6] forecasted the number of births occurred in Surabaya in 2017, using data from 2012-2016. The most appropriate forecasting model for this study is the Artificial NN Method with network architecture using normalized preprocessing. Whereas the number of layer input neuron is one neuron, the number of hidden layer neurons is three neurons, and the number of layer output neuron is one neuron. In the results of this study, the researcher predicted 3,3838 babies would be born in January 2017, and 3,879 babies were born in December 2017 with Root Mean Square Error of 338, 115.

Mulyani [7] compared two forecasting methods, namely Projection Trend Method and Single Exponential Smoothing Method, to predict goods supply. In this study, sales data from April 2013 - April 2014 were forecasted with these two methods. The results of each method were grouped; then, forecast results for each method would find the biggest error using MAPE formula. Then, the results of the comparison between these two methods were obtained. This research used MYSQL and Database. Researchers compared the forecast of the number of goods supply for one year, starting from April 2013 - April 2014. The result showed that the MAPE average of Trend Projection Method was 32.42%, while MAPE average of Single Exponential Smoothing Method with alpha = 0.9 was 22.58%. It meant that Single Exponential Smoothing Method has better accuracy result rather than accuracy of Projection Trend Method.

Said [8] conducted forecasting of concrete sale for 8 months, from May 2011 to December 2011. Every result of sold concrete obtained by researchers was pre-casted with Exponential Smoothing Method. Then, results of forecasting were used to find forecast errors using Mean Absolute Error (MAE) Formula with weight of $\alpha = 0.1$; $\alpha = 0.2$ and $\alpha = 0.3$. The result obtained for MAE with $\alpha = 0.1$ was 2322.1346, for v = 0.2 was 65.86923 and for $\alpha = 0.3$ was 10.05962. These three values showed that residual error for $\alpha = 0.3$ is smaller than the residual error for $\alpha = 0.2$ and $\alpha = 0.1$.

Astuti [9] predicted sales of Black Tea in August 2015 and September 2005 by using sale volume data in 24 months, from August 2003 to July 2005. The data were uploaded into the Skater Diagram to get a regression. Results of this regression were used for calculation of Exponential Smoothing and MAE. From this study, it was found that sales volume data of Black Tea tended has a constant pattern, and Order 1 MAE with $\alpha = 0.3$ was the smallest compared to Order 2 MAE and Order 3 MAE. Therefore, Single Exponential Smoothing Method was chosen for forecasting of black tea sales. Prediction for August and September 2005 was that black tea sales reached 131462.74 kg and 92023.92 kg.

Salim [10] used Single Exponential Smoothing method to determine predictions of student acceptance in the next Academic Year period. Data processed is the number of new students admission from 1999/2000 to 2003/2004. Forecast results using the Single Exponential Smoothing Method could predict the number of new students in 2003/2004, which was 117 people, whereas the number of students accepted reached 125 people. MAPE forecasting with Exponential Smoothing Method, in this case, reached 0.44%, whereas this was the smallest MAPE forecasting in the research. The smallest number of students accepted predicted in 2000/2001 was 26 people, whereas the number of students accepted was 47 people. MAPE produced in this year was 2.23%.

The research conducts to continue the research from [10], with 20 years' data rather than five years' data. The research will prove that more data will produce better forecasting compared to lesser data.

B. Forecasting System

Forecasting is an effort to know an event will happen in the future [4].

Forecasting is business activities that predicting sale and using products so those products can be made in right quantity. Forecasting is also an assumption that demands will come based on many forecasting variables, and often based on historical timeline. This condition can be done by involving past data and placing in the future in mathematical model form [11].

There are two basic steps to perform forecast. Firstly, colleting data completely that has relation to the forecast. Secondly, choosing the right method to process data [5].

Based on time, forecasting can be grouped into three [12]:

- Short-term forecasting: The prediction can be made in one year continuously, but generally, it takes less than three months.
- Medium-term forecasting: Usually, it is done every month in three years.
- Long-term forecasting: Normally, it is used to forecast for three years or more.

Based on Assumption Trend, Forecasting is divided into four types [11]:

- Simple (Single), aassuming that observation series has no trend or seasonal variation.

- Holt, assuming that observation series has linear trend but does not have seasonal variation.
- Winters, assuming that observation series has linear trend and seasonal variation.
- Custom, this model makes it possible to do trend components and seasonal variation determination.

Used model in this research is Simple Model (Single), because forecasting the number of accepted new students usually does not have trend and seasonal variation. Based on its components, there are three variables that needed to be determined to find the results later, namely: [8]

Alpha (α) is a parameter that controls relative weighting for the observation that has just been made. If Alpha is 1, then only the most recent observation is used exclusively. Conversely, if Alpha is 0, then the previous observations are calculated with a weight equivalent to the latest. Alpha parameter can be used for any model.

Beta (β) is a parameter that controls relative weighting of recent observations to predict the availability of trend. The range of beta is from 0 to 1. If the value is greater, it means that the most recent observation is given a greater weighting. This parameter is used if using a model that has a linear or exponential trend component with no seasonal variation.

C. Single Exponential Smoothing Method

Exponential Smoothing Method is a method of forecasting using past data by smoothing out error results. This method works by improving forecasting continuously. It can be done by smoothing past data from time series data in an exponential way [2].

Exponential Smoothing is a method of moving averages forecasting with sophisticated weighting, but it is still easy to use. This method uses very little past data recording. This model assumes data fluctuates around a fixed average value, without following patterns or trends [13]

Single Exponential Smoothing Formula can be seen in Equation 1.

$$\hat{Y}_{t+1=}\alpha x_t + (1-\alpha)\hat{Y}_t \quad (1)$$

$\hat{Y}_{t+1=}$ = Forecast Value for next period.
α = Alpha Constant
X_t = Accepted New Students a year before
$\hat{Y}_t$ = Forecast Value obtained

D. Alpha Constant

Constant is a weighting method applied in Exponential Smoothing Forecasting. In this study, to determine constant or alpha is done by trial and error. Valid constant (α) is determined from $0 < \alpha < 1$. If students' data received show unstable changes, then constant that is close to 1 can be used. Otherwise, if changes in students' data received are still stable, constant approaching 0 is used [7].

E. MAPE

MAPE is the absolute average of forecast errors without regard to positive and negative signs. MAPE formula aims to measure the accuracy of forecast results in percentage. The word of Mean itself is used when many data are processed and compared with real data [13].

MAPE Formula is shown in Equation 2.

$$\text{MAPE} = \left| \frac{1}{n} \sum \left(\frac{\text{Actual-Forecast}}{\text{Actual}} \right) \right| + 100\% \quad (2)$$

Whereas:
Actual = Accepted New Students
Forecast = Forecasted New Students

MAPE is used to evaluate the using of a method in prediction. A good forecast model certainly has the smallest MAPE, which indicates good accuracy [14].

Standard of Forecasting Ability Level based on MAPE Value can be seen in Table 1 [14].

TABLE 1
FORECASTING ABILITY LEVEL BASED ON MAPE VALUE

MAPE (%)	Forecasting Ability Level
< 10	Excellent Forecasting Ability
10 20	Good Forecasting Ability
20 - 50	Reasonable Forecasting Ability
> 50	Bad Forecasting Ability

III. METHODS AND MATERIALS

The following procedure has been adopted for carrying out current study.

- Identifying problems of the research.
- Studying and collecting data about the number of Accepted New Students in every Academic Year in a Private Primary School in Pekanbaru.
- Determining problems context of research by gathering problems occurred related to fluctuations of accepted students' number.
- Calculating Forecasting of Accepted New Students' Number using Single Exponential Smoothing Method with different Alpha Constants.

- Calculating Forecast Error from Forecast Results using MAPE Formula to get the Average MAPE Values for each Alpha Constant from 0.1 - 0.9.
- Comparing the MAPE average values.
- Determining Forecasting Ability Level of research based on Forecast Results and MAPE average values.
- Obtaining the smallest MAPE Average Value. The smallest MAPE Average Value shows the best Forecasting Value.
- Obtaining the Best Used Alpha Constant for forecasting.

Flowchart of research is shown in Fig. 1.

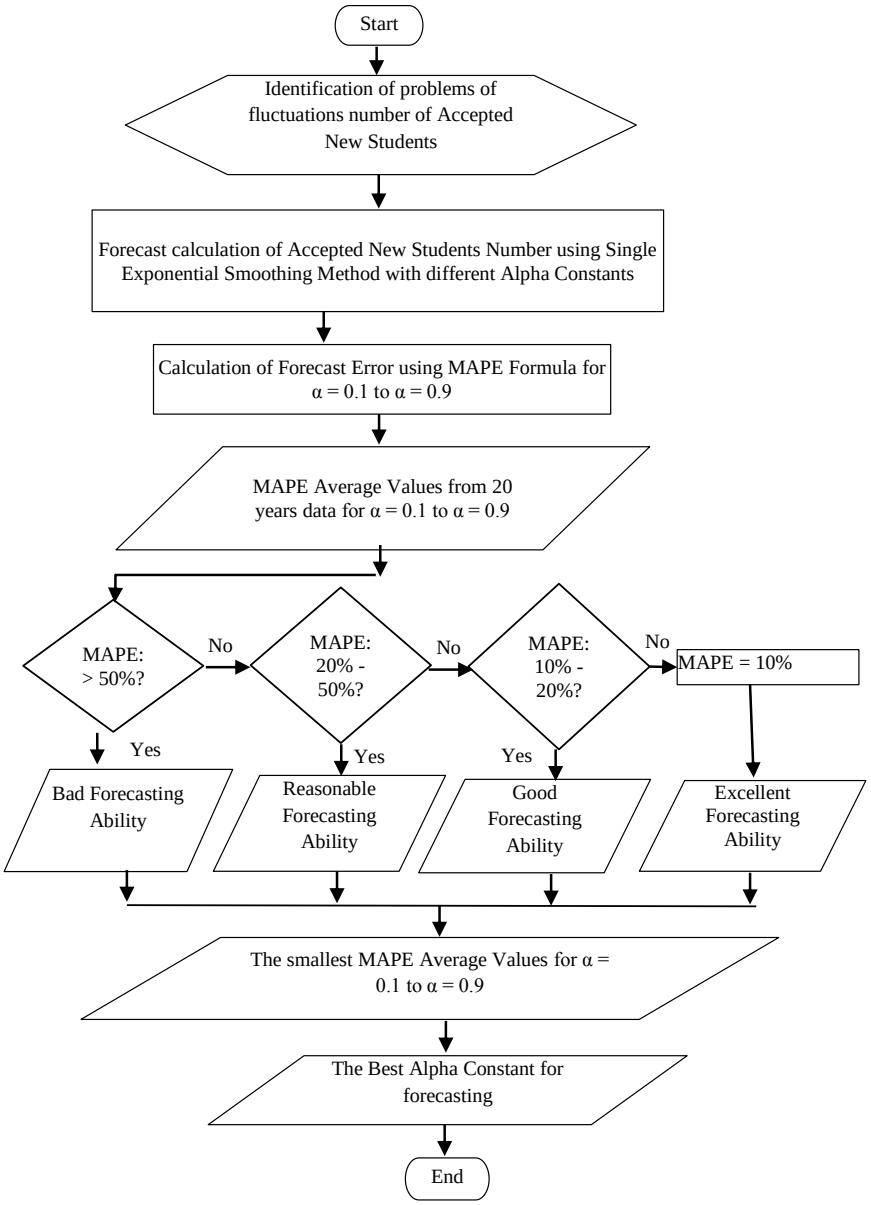

Fig. 1. Flowchart of research

IV. RESULTS AND DISCUSSIONS

A. *Forecast Calculations*

Real data of the Number of Accepted New Students from Academic Year 1999/2000 to 2018/2019 can be seen in Table 2.

TABLE 2
NO. OF ACCEPTED NEW STUDENTS

Number	Academic Year	No. of Accepted New Students
1	1999/2000	26
2	2000/2001	47
3	2001/2002	109
4	2002/2003	119
5	2003/2004	125
6	2004/2005	123
7	2005/2006	105
8	2006/2007	189
9	2007/2008	132
10	2008/2009	145
11	2009/2010	148
12	2010/2011	145
13	2011/2012	103
14	2012/2013	136
15	2013/2014	164
16	2014/2015	151
17	2015/2016	137
18	2016/2017	112
19	2017/2018	108
20	2018/2019	141

Based on data in Table 2, the forecast number of Accepted New Students from Academic Year 2001/2002 can be calculated using the Exponential Smoothing Formula in Equation 1 with $\alpha = 0.1$.

$$\hat{Y}_{t+1} = \alpha X_t + (1-\alpha)\hat{Y}_t$$
$$\hat{Y}_{t+1} = (0.1 \times 47) + (1-0.1)26$$
$$\hat{Y}_{t+1} = 4,7 + (0.9 \times 26) = 4.7 + 23.4$$
$$\hat{Y}_{t+1} = 28.1$$

In the same way, all calculation results of Forecast number of Accepted New Students from Academic Year 2001/2002 to 2018/2019 using Exponential Smoothing Formula with $\alpha = 0.1$ upto $\alpha = 0.9$ can be seen in Table 3.

TABLE 3
FORECAST RESULTS WITH $\alpha = 0.1$ UPTO $\alpha = 0.9$

Academic Year	Accepted Students	Forecast of Accepted New Students Number								
		$\alpha = 0.1$	$\alpha = 0.2$	$\alpha = 0.3$	$\alpha = 0.4$	$\alpha = 0.5$	$\alpha = 0.6$	$\alpha = 0.7$	$\alpha = 0.8$	$\alpha = 0.9$
1. 1999/2000	26	-	-	-	-	-	-	-	-	-
2. 2000/2001	47	26	26	26	26	26	26	26	26	26
3. 2001/2002	109	28	30	32	34	37	39	41	43	45
4. 2002/2003	119	36	46	55	64-	73	81	89	96	103
5. 2003/2004	125	44	61	74	86-	96-	104	110	114	117
6. 2004/2005	123	53	73	90	102	110	116	120	123	124
7. 2005/2006	105	60	83	100	110	1170	1200	122	123	123
8. 2006/2007	189	64	88	101	108	111	111	110	109	107
9. 2007/2008	132	77	108	128	140	150	158	165	173	181
10. 2008/2009	145	82	113	129	137	141	142	142	140	137
11. 2009/2010	148	88	119	134	140	143	144	144	144	144
12. 2010/2011	145	94	125	138	143	145	146	147	147	148
13. 2011/2012	103	99	129	140	144	145	146	146	145	145
14. 2012/2013	136	100	124	129	128	124	120	116	111	107
15. 2013/2014	164	103	126	131	131	130	130	130	131	133
16. 2014/2015	151	109	134	141	144	147	150	154	157	661
17. 2015/2016	137	114	137	144	147	149	151	152	152	152
18. 2016/2017	112	116	137	142	143	143	142	141	140	138
19. 2017/2018	108	116	132	133	131	128	124	121	118	115
20. 2018/2019	141	115	127	125	122	118	114	112	110	109

Comparison of Forecasted and Real Data of Accepted New Students' Number with $\alpha = 0.1$ from Academic Year 1999/2000 to 2018/2019 is shown in Fig. 2.

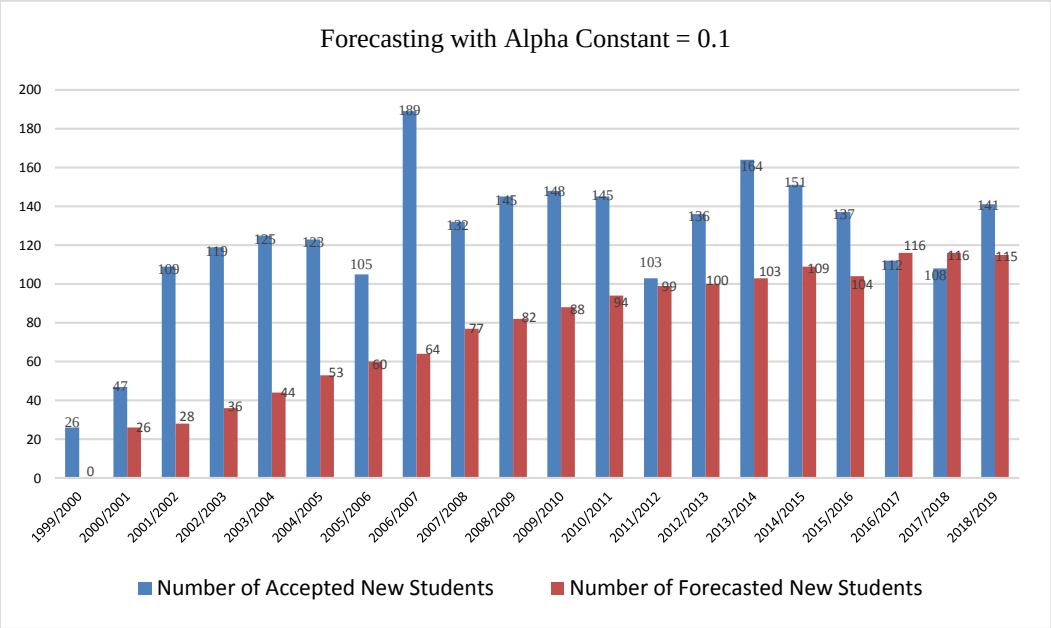

Fig. 2. Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.1$

Comparison of Forecasted and Real Data of Accepted New Students' Number with $\alpha = 0.2$ from Academic Year 1999/2000 to 2018/2019 is shown in Fig. 3.

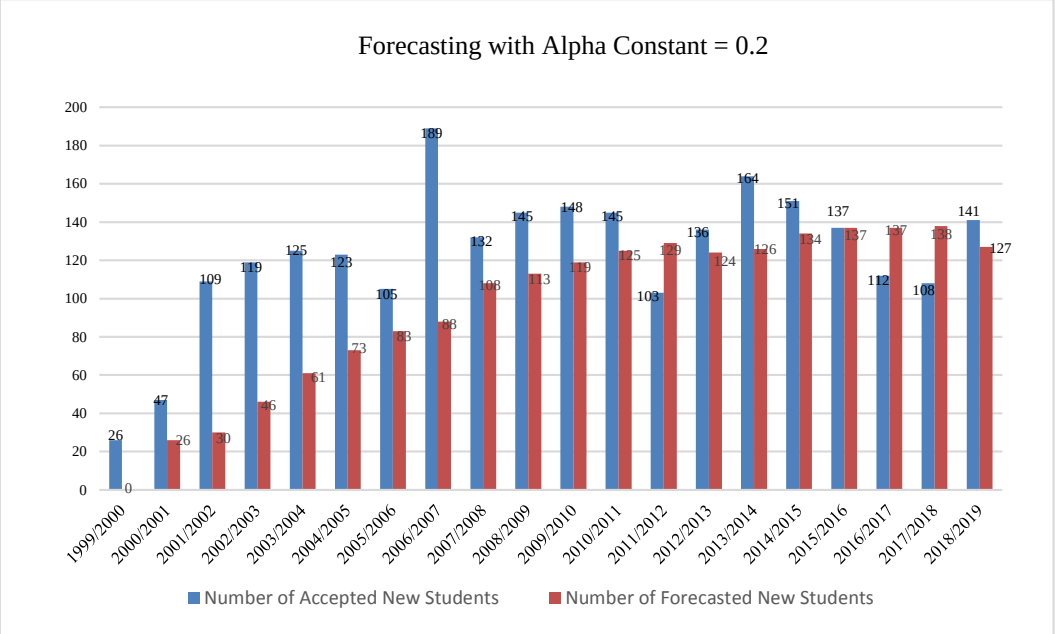

Fig. 3. Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.2$

Comparison of Forecasted and Real Data of Accepted New Students' Number with $\alpha = 0.3$ from Academic Year 1999/2000 to 2018/2019 is shown in Fig. 4.

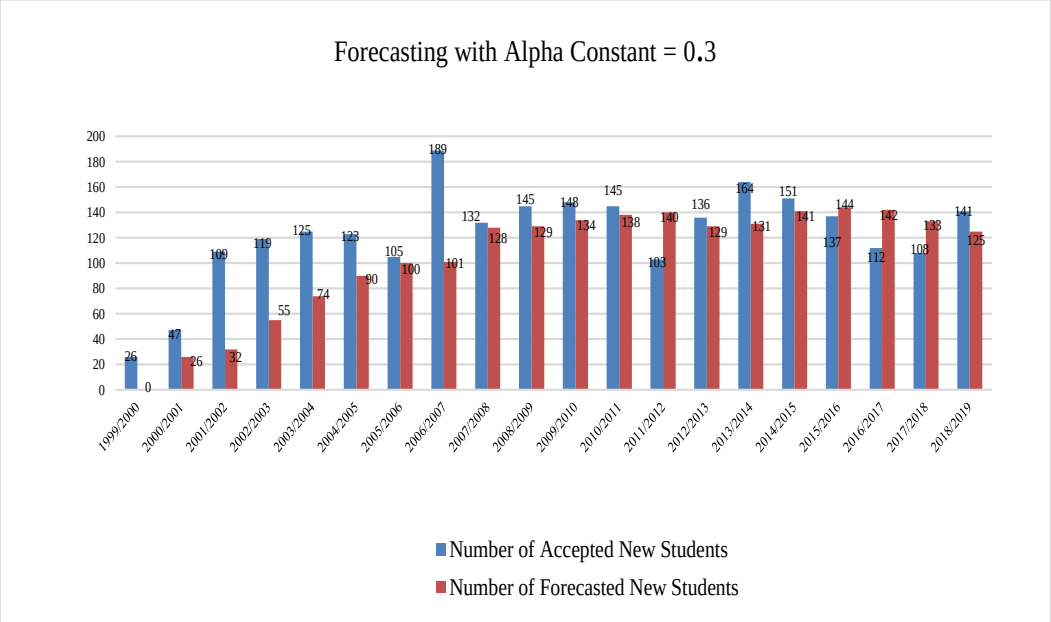

Fig. 4. Comparison of forecasted and real data of accepted new students' nuumber with $\alpha = 0.3$

Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.4$ from Academic Year 1999/2000 to 2018/2019 is shown in Fig. 5.

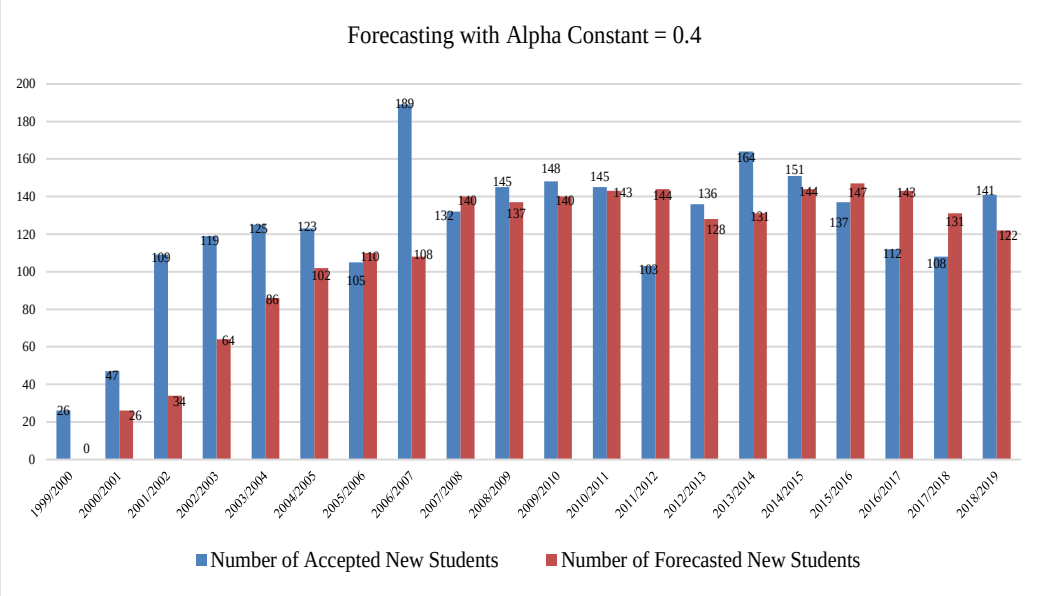

Fig. 5. Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.4$

Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.5$ from Academic Year 1999/2000 to 2018/2019 is shown in Fig. 6.

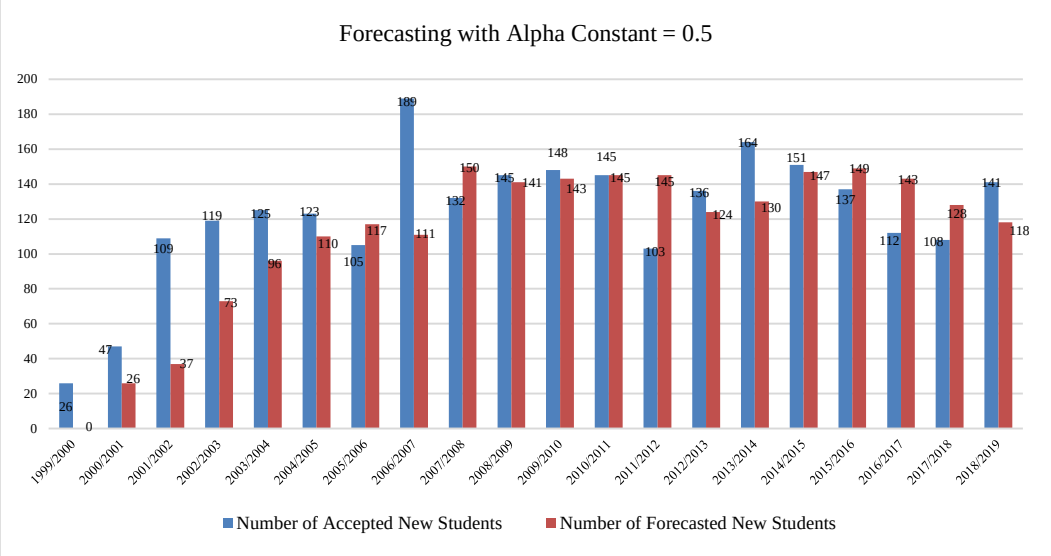

Fig. 6. Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.5$

Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.6$ from Academic Year 1999/2000 to 2018/2019 is shown in Fig. 7.

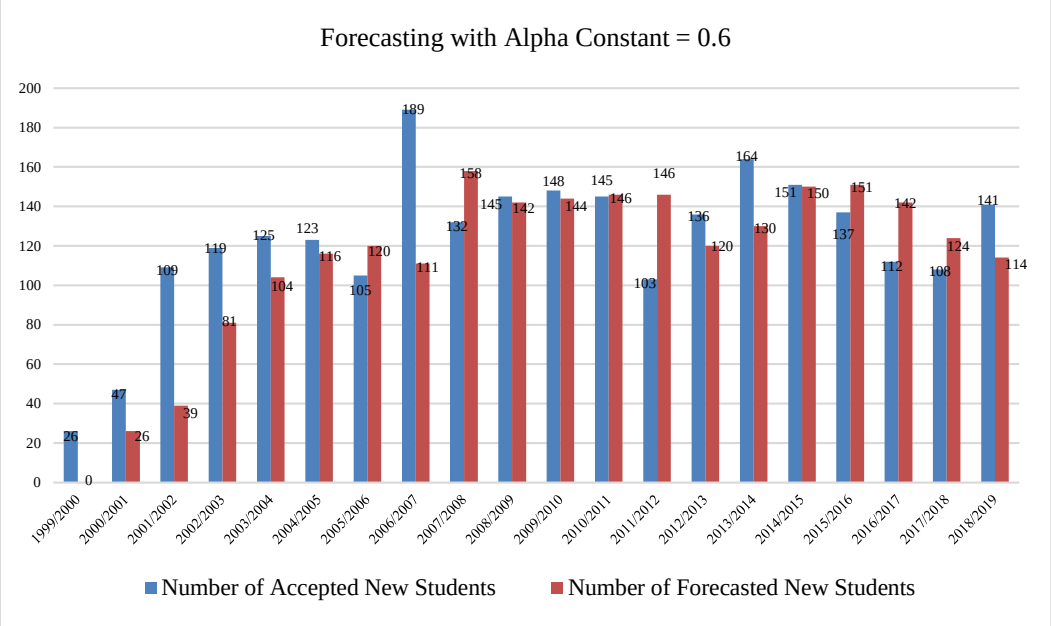

Fig. 7. Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.6$

Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.7$ from Academic Year 1999/2000 to 2018/2019 is shown in Fig. 8.

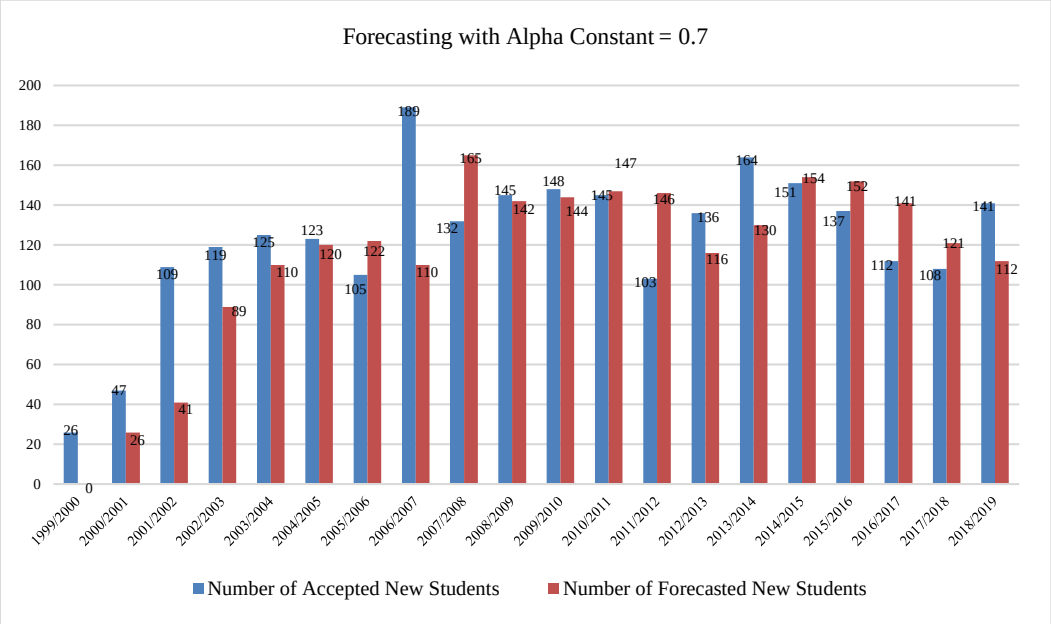

Fig. 8. Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.7$

Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.8$ from Academic Year 1999/2000 to 2018/2019 is shown in Fig. 9.

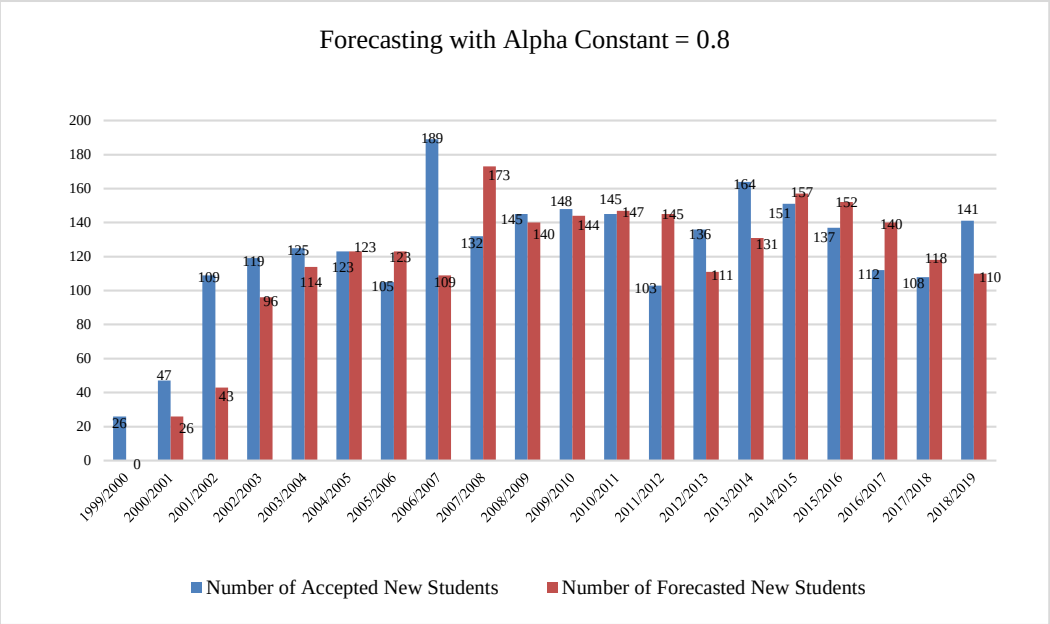

Fig. 9. Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.8$

Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.9$ from Academic Year 1999/2000 to 2018/2019 is shown in Fig. 10.

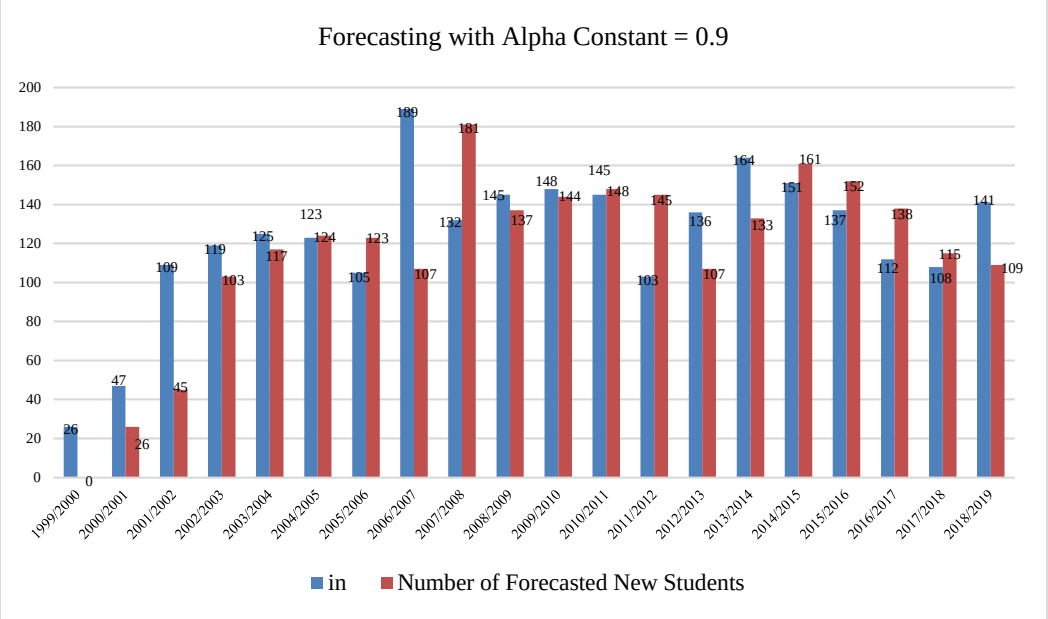

Fig. 10. Comparison of forecasted and real data of accepted new students' number with $\alpha = 0.9$

B. *MAPE Calculation*

MAPE itself is an equation used to find out how big the difference between actual and forecasted number of New Students Accepted is every year.

To obtain MAPE Value for $\alpha = 0.1$ for Academic Year 1999/2000, Equation 2 is used.

$$\text{MAPE} = \left|\frac{1}{n}\sum\left(\frac{\text{Actual}-\text{Forecast}}{\text{Actual}}\right)\right| * 100\%$$
$$\text{MAPE} = \left|\frac{1}{20}\sum\left(\frac{26-47}{47}\right)\right| \cdot 100\%$$
$$\text{MAPE} = 2.23\%$$

In the same way, results of MAPE calculations for Academic Year 1999/2000 to 2018/2019 using MAPE Formula with $\alpha = 0.1$ upto $\alpha = 0.9$ can be seen in Table 4.

TABLE 4
NO. OF ACCEPTED NEW STUDENTS

No.	Academic Year	MAPE (%)								
		$\alpha = 0.1$	$\alpha = 0.2$	$\alpha = 0.3$	$\alpha = 0.4$	$\alpha = 0.5$	$\alpha = 0.6$	$\alpha = 0.7$	$\alpha = 0.8$	$\alpha = 0.9$
1	1999/2000	-	-	-	-	-	-	-	-	-
2	2000/2001	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
3	2001/2002	3.72	3.627	3.53	3.44	3.30	3.21	3.12	3.03	2.94
4	2002/2003	3.49	3.07	2.69	2.31	1.93	1.6	1.26	0.97	0.67
5	2003/2004	3.24	2.56	2.047	1.56	71.16	0.84	0.6	0.44	0.32
6	2004/2005	2.85	2.03	1.34	0.85	0.53	0.29	0.12	0	71.86
7	2005/2006	2.14	1.05	0.24	0.24	0.57	0.71	0.81	0.86	1.86
8	2006/2007	3.31	2.67	2.33	2.14	2.06	2.06	2.09	2.11	2.17
9	2007/2008	2.08	0.91	0.15	0.30	0.68	0.99	1.25	1.55	1.86
10	2008/2009	2.17	1.10	0.55	0.28	0.14	0.10	0.10	0.17	0.28
11	2009/2010	2.03	0.98	0.47	0.27	0.17	0.14	0.14	0.14	0.14
12	2010/2011	1.76	0.69	0.24	0.07	0	0.03	0.07	0.07	0.10
13	2011/2012	0.19	1.26	1.8	1.99	2.04	2.09	2.09	2.04	2.04
14	2012/2013	1.32	0.44	0.25	0.29	0.44	0.59	0.74	0.92	1.07
15	2013/2014	1.86	1.16	1.01	1.01	1.04	1.04	1.04	1.01	0.95
16	2014/2015	1.39	0.56	0.33	0.23	0.13	0.03	0.1	0.2	0.33
17	2015/2016	0.84	0	0.26	0.37	0.44	0.51	0.55	0.55	0.55
18	2016/2017	0.18	1.12	1.34	1.38	1.38	1.34	1.3	1.25	1.16
19	2017/2018	0.37	1.11	1.16	1.01	0.93	0.75	0.6	0.46	0.32
20	2018/2019	0.92	0.5	0.57	0.67	0.82	0.96	1.03	1.1	1.14
	MAPE Average		1.36	1.13	1.03	1.0	0.98	0.96	0.62	1.1

From Table 4, there are three results that have 0% MAPE. They are from $\alpha = 0.2$ at Academic Year 2015/2016, $\alpha = 0.5$ at Academic Year 2010/2011 and $\alpha = 0.8$ at Academic Year 2004/2005. These conditions mean that the number of Accepted New Students is same as the number of Forecasted New Students. These results show the best forecasts in certain years.

Based on the MAPE Average obtained in Table 4, the best Alpha that can be used in the research is 0.8 because it produces the smallest MAPE.

C. *Determination of Forecasting Ability Level*

From Table 4, MAPE Average with $\alpha = 0.1$ to $\alpha = 0.9$ can be obtained. MAPE Average with $\alpha = 0.1$ to $\alpha = 0.9$ can be seen in Table 5.

TABLE 5
FORECASTING ABILITY LEVEL BASED ON MAPE VALUE

Alpha	MAPE
0.1	1.81
0.2	1.36
0.3	1.13
0.4	1.03
0.5	1.00
0.6	0.98
0.7	0.96
0.8	0.62
0.9	1.1

From Table 5, it can be seen that $\alpha = 0.1$ produces 1.81% of MAPE Average. It can be concluded that for $\alpha = 0.1$, the value of MAPE Average can be categorized into Excellent Forecasting Ability. This also occurs to all other values of MAPE Average. Based on this condition, Alpha Value classification based on the value of MAPE Average produced can be grouped into the Forecasting Ability Level. Forecasting Ability Level is shown in Table 6.

TABLE 6
FORECASTING ABILITY LEVEL

Alpha	MAPE	Forecasting Ability Level
0.1	1.81	Excellent Forecasting Ability
0.2	1.36	Excellent Forecasting Ability
0.3	1.13	Excellent Forecasting Ability
0.4	1.03	Excellent Forecasting Ability
0.5	1.00	Excellent Forecasting Ability
0.6	0.98	Excellent Forecasting Ability
0.7	0.96	Excellent Forecasting Ability
0.8	0.62	Excellent Forecasting Ability
0.9	1.1	Excellent Forecasting Ability

Based on Table 6, it can be concluded that from a range of $\alpha = 0.1$ to $\alpha = 0.9$, the smallest MAPE Average Value is generated by $\alpha = 0.8$ with error 0.62% only. Therefore, $\alpha = 0.8$ is the best Alpha Constant value that can be used for forecasting in this study.

The results of MAPE Average value show that all results of the forecast are below 10%. This condition causes the Forecasting Ability of the research, in general, to be grouped into Excellent Forecasting Ability. It means that the research is working well as its framework.

V. CONCLUSION AND RECOMMENDATIONS

In this study, there are three results that have 0% MAPE, from $\alpha = 0.8$ at Academic Year 2004/2005, $\alpha = 0.5$ at Academic Year 2010/2011 and $\alpha = 0.2$ at Academic Year 2015/2016. All these results show the best forecasts in a certain year. From the results, it can be concluded that from the range of $\alpha = 0.1$ to $\alpha = 0.9$, the smallest MAPE average value is generated by $\alpha = 0.8$ with only 0.62% error.

The best forecasting is used when $\alpha = 0.8$. The results of MAPE average values show that all results of the forecast are below 10%. Therefore, all the results of the research, in general, are grouped into excellent forecasting ability. The research is working well as its framework.

This study took place in a single primary school in Indonesia, it must be implemented in other schools and other regions to identify the effectiveness of proposed method. Scholars are advised to further extend this study and identify other methods through which new student acceptance can be calculated and improved.

Declaration of Conflicting Interests

Authors declare that there are no conflicts of interest in this study.

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