



Linear Regression Algorithm Predicts Bullying Rate Of Sma Negeri 6 Binjai Students

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Abstract

At SMA Negeri 6 Binjai which is a school located in the city of Binjai in the village of Nangka village, and has several educators and teaching staff in this school, the case study of bullying in schools that is focused in this study, in order to obtain the predicted level of bullying that occurs in SMA Negeri 6 Binjai schools where there is physical and non-physical bullying and through social media. So that the school can find out how much bullying occurs in SMA Negeri 6 Binjai. Method used to solve problems in bullying rate prediction with Linear Regression algorithm. To make it easier for SMA Negeri 6 schools to predict bullying with a linear regression algorithm. The results of testing the linear regression method in the bullying level at SMA Negeri 6 Binjai school used linear regression with the amount of forecasting data that had been analyzed as an analysis, and determined the forecasting results of the value of 19.60222 obtained data results with the number of bullying levels.

Keywords: Prediction, Bullying, Linear Regression

1. Introduction

Law No. 35 of 2014 which is an amendment to Law No. 23 of 2002 concerning Child Protection Article 9 Paragraph (1a) which states: Every child has the right to protection in the education unit from sexual crimes and violence committed by educators, educators, fellow students, and / or other parties. Permendikbud No. 82 of 2015 concerning the prevention and mitigation of violence in the Education Unit Environment.[2] At SMA Negeri 6 Binjai which is a school located in the city of Binjai in the village of Nangka village, and has several educators and teaching staff in this school, the case study of bullying in schools that is focused in this study, in order to obtain the predicted level of bullying that occurs in SMA Negeri 6 Binjai schools where there is physical and non-physical bullying and through social media. So that the school can find out how much bullying occurs in SMA Negeri 6 Binjai. Method used to solve problems in bullying rate prediction with Linear Regression algorithm. This research is reinforced by a research journal conducted [6]"Prediction of the Number of New Students Using the Linear Regression Method" The number of new students of a university for the last 5 years, from 2016 to 2020, has increased and decreased. The data will then be used to predict the number of students in the next 5 years. The purpose of making a prediction is to find out the ratio of available lecturers to the number of new students, prepare lecture halls and also other facilities.

2. Research Methods

2.1 Previous Research

According to the first study [6], entitled "Prediction of the Number of New Students Using Simple Linear Regression Method" in this study The number of new students of a university for the last 5 years, from 2016 to 2020, has increased and decreased. The data will then be used to predict the number of students in the next 5 years. The purpose of making a prediction is to find out the ratio of available lecturers to the number of new students, prepare lecture halls and also other facilities.

According to the second study [7], entitled "Implementation of linear regression for sales prediction and cash flow in restaurant point of sales applications" In this study, restaurant transaction data actually has various kinds of important information that are still scattered and hidden that should be used for various restaurant business strategies such as sales. Restaurant managers must know which foods and beverages are more in demand by predicting sales based on the previous month's sales data because an algorithm is needed to make predictions. Linear regression is an algorithm that models the relationship between a dependent variable and an independent variable that can be used to perform forecasting based on previous data, the main purpose of which is to help restaurant managers to make the right decisions based on prediction results and existing data.

2.2 Predictions

According to [8] Prediction or forecasting can be assumed as an activity to predict what will happen in the future. This activity is carried out by paying attention to past or current data or information either mathematically or statistically Predictions aim to know, see and estimate economic prospects or business activities. A prediction can be qualitative (not in the form of numbers) or quantitative (in the form of numbers). Qualitative predictions tend to be difficult to obtain good results because the variables have a very relative nature. Meanwhile, quantitative predictions make very dependent on the method used. Different methods will produce different prediction values. In designing a prediction or forecasting method, there are three stages that must be passed, namely:

1. Perform analysis on past data. This step aims to get an overview of the pattern from the data concerned.
2. Choose the method to use. There are various methods available for its purposes. The choice of method can affect the outcome of the forecast. The forecast results are measured by calculating the smallest error or error. Therefore, no forecasting method is definitely good for all types of data.
3. The transformation process from past data using the chosen method. If necessary, changes are made according to their needs.

2.3 Bullying

Bullying is unpleasant behavior either verbally, physically, or socially in the real world or cyberspace that makes someone feel uncomfortable, hurt and depressed whether done by individuals or groups. Law No. 35 of 2014 which is an Amendment to Undang-Undang No. 23 of 2002 concerning Child Protection Article 76 C which states "Everyone is prohibited from placing, allowing, doing, ordering to commit, or participating in violence against children". Law No. 35 of 2014 which is an amendment to Law No. 23 of 2002 concerning Child Protection Article 9 Paragraph (1a) which states: Every child has the right to protection in the education unit from sexual crimes and violence committed by educators, educators, fellow students, and / or other parties. Permendikbud No. 82 of 2015 concerning the prevention and mitigation of violence in the Education Unit Environment. [2]

2.4 Linear Regression

According to [4], the regression method is a statistical method that makes predictions using the development of mathematical relationships between variables, namely the dependent variable (Y) and the independent variable (X). The dependent variable is the consequent variable or the affected variable, while the independent variable is the cause variable or the influencing variable. Predictions against the value of the dependent variable can be made if the independent variable is known. Generally the sales or demand of a product is expressed as a large dependent variable or its value is influenced by an independent variable. Linear regression is one of the methods used in production to forecast or predict quality and quantity characteristics. This is because by estimating various product combinations, companies can maximize profits and estimate the right amount of production. The formula for Linear Regression by least or simple squares method is:

$$a = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2} \quad (1)$$

$$b = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2} \quad (2)$$

$$y = a + b.x \quad (3)$$

Definition 2.1:

where y is the quantity of sales, x is the sales period or month of sales, a is a constant that shows the magnitude of y if $x = 0$, and b is the amount of change in the value of y .

2.5 Phyton

At first we will assume that the naming of this programming language is based on the name of a creeping animal, this assumption is wrong. The naming of this programming language was inspired when its creators watched a comedy show on television on the BBC called Monty Python's Flying Circus. The creator of this programming language is Guido van Rossum from Amsterdam, Netherlands. Initially, the motivation for creating this programming language was for a high-level scripting language on the Amoeba distributed operating system. Since its public domain appeared in 1991, the language has grown with the support of its user and developer communities, such as Python Software Activity, internet newsgroup comp.lang.python, and other informal organizations. This programming language has become commonly used among engineers all over the world in making software, even some companies use Python as a commercial software maker. Python is a freeware programming language or free device in the true sense, there are no restrictions on copying or distributing it. Complete with source code, debugger and profiler, interfaces contained in it for interface services, system functions, GUI (graphical user interface), and database. [7]

3. Results And Discussion

3.1 Research Methods

Research methodology is a science that studies how to make a correct scientific research. Activities carried out with strict rules and the aim of building knowledge that eventually gives birth to multidimensional science, can be defined in various ways, each of which is not a complete definition. On the way of thinking, with a scientific attitude as the main trait of science. Others emphasize the importance of the way of doing things, namely the scientific method, as the main trait of science. On the other hand, people consider the results of the application of scientific methods, that is, a collection of knowledge arranged systematically and coherently, as the main characteristic of science. [2].

3.2 Supporting Data

The supporting data used by the study on bullying problems at SMA Negeri 6 Binjai amounted to 47 students who filled out the bullying questionnaire data at schools that they had or had never done.

Table 1: Supporting Data

No	Name	Hit	Slapping	Push	Bite	Kick	Pinch	Claw	Sexual Harassment	Threaten	Embarrass	Lowering	Disturbing	Calling Nicknames
1	Shindi Arsinta	No	No	No	No	No	No	No	No	No	No	No	No	No
2	Wiken	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
3	Yoga Hariyanto	No	No	No	No	No	No	No	No	No	No	No	No	No
4	Keysaura Andinta	No	No	No	No	No	No	No	No	No	No	No	No	No
5	Luthfia Zahra	No	No	No	No	No	No	No	No	No	No	No	No	No
6	Arya Dwi Qiano Zibrán	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	No
7	Ruth Marishi Nadeak	No	No	No	No	No	No	No	No	No	No	No	No	No
8	Firza Azzahra	No	No	Yes	No	No	No	No	No	No	No	No	No	No
9	Amelia Rizky	No	No	No	No	No	No	No	No	No	No	No	No	No
10	Indriani	No	No	No	No	No	No	No	No	No	No	No	No	No
11	Naila Syafira Nst	No	No	No	Ya	No	No	No	No	No	Yes	Yes	No	No
12	Ajeng Anggraini	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	Yes
13	Bunga Asyfa Mahendra	No	No	Yes	No	No	Ya	No	No	No	No	Yes	Yes	No
14	Revan Syahputra	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
15	Shindi Arsinta	No	No	No	No	No	No	No	No	No	No	No	No	No

3.3 Application of Linear Regression Method

The application of the Linear Regression method for the prediction of bullying rates at SMA Negeri 6 Binjai is as follows:

First Step :

The following is a table that has been calculated, $X-2$., $Y-2$., XY and the Total.

Table 2: Regression Linear Calculation Results

X	Y	X ²	Y ²	XY
0	0	0	0	0
70	50	4900	2500	3500
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
35	25	1225	625	875
0	0	0	0	0
0	20	0	400	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
105	95	11025	9025	9975

Step Two:

Calculates A and B based on a linear regression formula

$$\text{Costa Regression Value } a = \frac{95 \cdot 11025 - 105 \cdot 9975}{10 \cdot 11025 - 11025}$$

$$a = 10,55459814$$

$$\text{Regression Coefficient Value } b = \frac{10 \cdot 9975 - 105 \cdot 105}{10 \cdot 11025 - 11025}$$

$$b = 0,904761905$$

Step Three:

Calculating Linear Regression Equation Models forecasting predictions against causal factors or consequent variables. Predict bullying rates with the number of 10 student data to predict.

$$Y = 10.55459814 + 0.904761905 \cdot 10$$

$$Y = 19.60222$$

Predict or Forecast the Variables of Causal Factors or Effect Variables

Constant Value + Coefficient Value * Number of Prediction data = 19.60222

It will be predicted that there will be 19.60222 students who commit bullying levels at SMA Negeri 6 Binjai

4. Conclusions

After discussing the previous chapter, the author gives some conclusions. The following are the conclusions that the author wrote in this study related to the prediction of bullying rates in SMA Negeri 6 Binjai using linear regression, namely:

The linear regression algorithm in this study was able to determine the value of the coefficient used in the linear regression model in predicting the level of bullying in SMA Negeri 6 Binjai. Criteria in non-physical as cause and physical as a result of bullying data from responses from students to regression liner bullying level in SMA Negeri 6 Binjai school using linear regression. The results of testing the linear regression method in the bullying level at SMA Negeri 6 Binjai school used linear regression with the amount of forecasting data that had been analyzed as an analysis, and determined the forecasting results of the value of 19.60222 obtained data results with the number of bullying levels.

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