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MACHINE LEARNING TECHNIQUE FOR ANALYZING STUDENT INTEREST IN USING TIKTOK IN THE NEW E-LEARING SYSTEM DURING THE COVID-19 PANDEMIC

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Abstract

The prolonged COVID-19 pandemic has forced the world of education to change the method of delivering material from face-to-face to online. This change has had a big impact on both students and educators, one of which is student anxiety to take part in online learning and the difficulties experienced when studying independently while online. Tiktok is a social media platform that is currently booming and loved by the younger generation, which offers live sessions and can upload short videos. The advantages of tiktok can be used as a means to mingle and motivate students to take part in online learning. Besides that, the emotions of TikTok users when they see videos on TikTok have been carried out and it is known that users of productive age are more emotional. Several previous studies have conducted an analysis of the use of Tiktok using the questionnaire method. However, the questionnaire method cannot capture information about the emotions of e-learning system users. In addition, the use of a questionnaire as a media analysis is also less effective and requires more time to carry out the calculation process. From the research results it is known that students do not like the learning method with TikTok. This is corroborated by the accuracy rate of the Naïve Bayes method which reaches 80.32%.

Index Terms— E-Learning, Tiktok, Student Opinion, Machine Learning

I. INTRODUCTION

The Covid 19 pandemic has not been felt for almost 2 years in Indonesia, this has had an impact on business processes in all areas of industry including the education sector (Nanigopal Kapasia, 2020). The lock down policy has forced the education industry to adapt its teaching and learning processes online (Wenjun Cao Z. F., 2020) (Nur Rohim Yunus, 2020). The sudden change in the learning process to online has made the readiness of many parties not optimal (Soni, Global Impact of E-learning during COVID 19, 2020), especially for educational institutions in developing countries (Giorgio Marinoni, 2020). This is because there are still many educational institutions who have not implemented online learning (Wildana Wargadinata, 2020). Students are getting bored with online education and need solutions from educators to be able to motivate students to teach better (Ilmi Zajuli Ichsan, 2020).

Various existing platforms are used to conduct online meetings with students such as google meet, zoom, whats app group (Robert Connor Chick, Using Technology to Maintain the Education of Residents During the COVID-19 Pandemic, 2020), even social media (Liang, 2021). From these various platforms it is known that students' interest in social media is higher, which is due to more flexible direct interaction and communication during live (Hong Chen, 2021). Students, the majority of whom are children of productive age and belong to the millennial generation, really like watching short videos (Paloma Escamilla-Fajardo, 2021) and interacting directly face-to-face online in a more informal way (Aida Nabilah Azman, 2021)

Educators are expected to be more innovative and creative in making teaching materials, this is of course a greater pressure for educators to make their students able to be motivated and get targeted knowledge (Bozkurt, 2020). Therefore educators are expected to be able to adjust the delivery of material by adopting various platforms to attract the interest of the z generation and the Alpha generation so

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that they can better understand the material and have competencies in accordance with the learning targets.

II. RELATED WORK

Previous research has explained the reasons for using social media to assist online learning, namely because social media is able to facilitate the creation and dissemination of knowledge from several people who have the same interests (Shuai Yang, 2019). Tiktok as one of the social media has been researched to be able to increase the emotionality of its users, especially for young users (Aida Nabilah Azman, 2021) and is able to increase student learning motivation (Liang, 2021). This is because Tiktok is an entertaining social media and can be used to seek information and communication (Aida Nabilah Azman, 2021) apart from duet interactions with other users and saving videos that you want to view again (Amir, 2020). In Indonesia, the use of tiktok has been used for various English language teaching (Anggi E Pratiwi, 2021), strengthening character education (Jefri Setyawan, 2021), hand washing campaigns to prevent the spread of covid 19 (Togi Prima Hasiholan, 2020), for health education for handling pandemics covid 19, courses (Amir, 2020). The effectiveness of learning with Tiktok has also been measured and it is known that its effectiveness is still not optimal (Handrini Ardiyanti, 2021). However, these measurements were carried out using the phenomenological method in which conclusions were drawn from the opinions of parents whose children used tiktok as a learning tool. This still allows for bias, where the opinion of parents is not necessarily the same as that experienced by their children as students and the opinions of parents can be subjective and not directly correlated with children who are directly active students.

Therefore, it still needs further research on students' opinions in using Tiktok for learning so that they can find out the effectiveness of online learning with Tiktok social media from the student's point of view which will be compared with the opinions of students' parents from previous research. To reduce the bias of students' opinions, a deep learning method will be used which will retrieve student opinion data from Twitter regarding online learning through Tiktok. This is intended to provide feedback for online learning in order to further optimize all platforms (Ilmi Zajuli Ichsan, 2020).

III. METHODOLOGY

In this study we collected data on student opinions by utilizing python programming. The data we collect is 3403 opinions in the form of text, and the text still does not contain the labels "positive" and "negative", then we do the data manually.

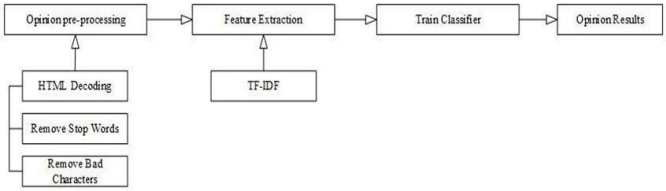

Figure 1. Research methodology concept

a. Opinions pre-processing
In classifying data, we must perform techniques to clean the text from several unnecessary notations, such as: html decoding, remove stop words, and remove bad characters. In html decoding, what must be removed is the extension http:// and https://, remove stop word means to remove some words that are not needed, such as: "and", if", "if", "if", "is ", and so forth. While remove bad characters, it means that some unnecessary characters must be removed in the text, such as: !, @, #, $, %, ^, &, *, (), +, =, `.

b. Feature extraction
In data classification, we have to do opinion extraction first to make it more effective and easy to understand. The point is, we give the label class to the text according to the content of the text. In this study we propose to use two classes, namely positive text and negative text.

c. Train classifier
In conducting this classifier train, we chose 70% of the data as training (training materials) and 30% for testing (trial). Some of the algorithms that we use in carrying out this activity are: Multinomial Naïve Bayes (MNB), K-Nearest Neigbors (K-NN), and Logistic Regression (LR).

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Multinomial Naïve Bayes (MNB)

Multinomial Naïve Bayes (MNB) is an algorithm used in classifying data. As an assumption for conducting data training in MNB, it is illustrated as follows: d is a variable from a test sample that has vector characteristics < $w1, w2, \ldots, wm$ >. For this it is illustrated as follows:

$$p(d|c) = \prod_{i=1}^{m} P(w_i|c) \quad (1)$$

Where, $P(c)$ is a variable for the probability of class c, n describes as a number of classification features, $P(wi|c)$ describes the condition of the probability that wi belongs to class c, wi describes the result of the first word included in d. fi is the total number of the word frequency wi in d, while C is the set number of all student opinions labeled c.

K-Nearest Neighbors (K-NN)

K-NN is a method used for data classification, where the basis can be used for binary classification or multi class classification. In classifying data using K-NN, K-NN changes the opinion target through reflection of feature vectors that have the same shape according to the training data. Then k-NN will calculate the distance between opinion targets and choose k as the closest distance to the "neighbors". The distance between student opinions is described as:

$$Sin(o_i, o_j) \frac{\sum_{k=1}^{M} w_{ik} x}{w_j}$$

$$\sqrt{\sum_{k=1}^{} w_{ik} \; w_{jk}}$$

Choose the shortest distance k with "neighbors" as an indication of opinion, where the Cj category that contains the most "neighbors" can be found as:

$$p(\bar{x}, Cj = \sum \bar{oi} \in K\text{-}NN \; Sim(\bar{x}, \bar{oi}) y(\bar{oi}, Cj) \quad (3)$$

Where, $\bar{oi}$ is ith of student opinion, $Sim(\bar{x}, \bar{oi}) y(\bar{oi}, Cj)$ describes the similarity of opinion θ and document b, while y $(\bar{oi}, \omega)$ describes the probability of including opinion into ω.

Logistic Regression (LR)

LR is an algorithm that is used to classify data in binary models as well as multi class classification. For binary classification, Malanga explains as follows:

P(Y(T)=i | X)=1/((1+ e^(- θ ^(T_X))))

Where, P(Y(T)=i | X) is the posterior value of probability, Y describes the class, X describes the feature value of Y, T describes it as an experimental test, while θ is a vector of parameters for making predictions. Whereas x=[x_1,x_2,⋯,x_n]^T describes as a vector of feature values to identify a document.

IV. EVALUATION

TABLE 1. RESULTS OF DATA CLASSIFICATION FROM LOGISTIC REGRESSION (LR)

Fold (#)	Accuracy (%)	Recall (%)	Precission (%)	F1 (%)
1	80.05	66.41	71.90	69.05
2	77.49	66.00	72.79	69.23
3	78.97	71.43	72.41	71.92
4	82.82	72.03	79.23	75.46
5	78.72	66.67	77.04	71.48
6	78.21	67.36	71.85	69.53
7	80.77	79.26	69.48	74.05
8	78.72	66.91	71.54	69.14
9	77.95	79.03	62.03	69.50
10	81.28	75.52	73.97	74.74
Average	79.50	71.06	72.22	71.41

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TABLE 2. RESULTS OF DATA CLASSIFICATION FROM NAÏVE BAYES (NB)

Fold (#)	Accuracy (%)	Recall (%)	Precission (%)	F1 (%)
1	81.33	76.00	81.82	73.06
2	78.77	76.53	83.09	73.14
3	81.79	77.65	84.14	77.46
4	82.05	76.90	83.85	75.69
5	79.74	76.57	86.67	74.76
6	77.69	76.48	77.78	70.71
7	82.31	75.49	83.12	78.77
8	80.00	76.71	78.46	72.34
9	79.23	77.28	77.85	75.23
10	80.26	76.99	82.88	75.86
Average	80.32	76.66	81.96	74.70

TABLE 3. RESULTS OF DATA CLASSIFICATION FROM K-NEAREST NEIGHBORS (K-NN)

Fold (#)	Accuracy (%)	Recall (%)	Precission (%)	F1 (%)
1	87.98	85.95	86.01	85.24
2	87.79	87.77	85.41	83.03
3	89.12	87.87	83.60	86.83
4	87.65	86.71	85.21	84.34
5	85.94	84.53	83.60	84.06
6	83.53	85.63	85.61	83.81
7	82.65	85.54	83.44	83.92
8	85.71	86.50	82.75	84.15
9	85.41	85.67	86.43	83.04
10	83.29	85.77	86.67	83.08
Average	85.91	86.19	84.87	84.15

From the results obtained from the two methods, it can be seen that k-NN is the best method for classifying data in this study. The accuracy value obtained from k-NN is 85.91% while NB is 81.12% with a difference of 4.79%. From the fold (#) value that has been done, the smallest result of k-NN is in the 7th iteration with a value of 82.65%, and the highest value is 87.98 in the 1st iteration. Meanwhile, the smallest value in NB is in the 8th iteration with a value of 79.71% and the highest value is 83.84% in the 2nd iteration. The Recall value in k-NN is 86.19% and the value in NB is 83.03% with a difference of 3 .16%. Meanwhile, the value of fold(#) in k-NN shows the lowest result in the 5th iteration with a value of 85.43%, while in NB it is 79.32% in the 9th iteration.

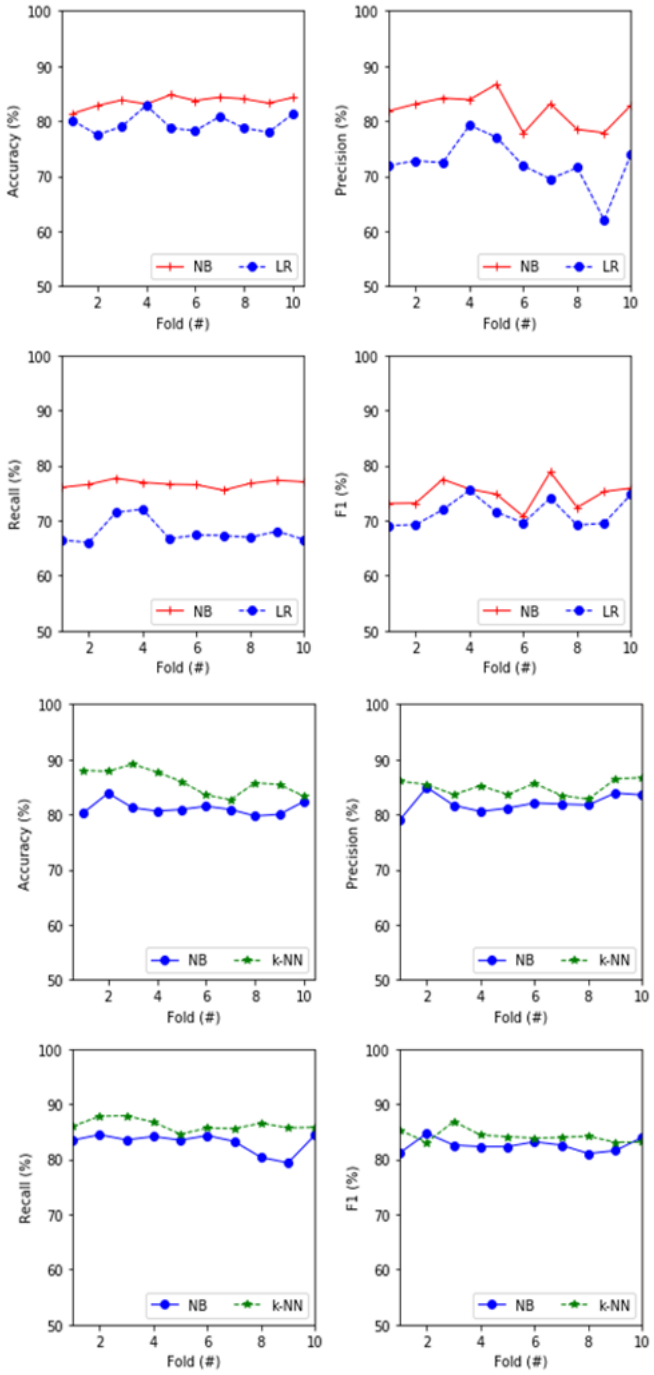

Figure 2. The results of the three different methods of folding (#)

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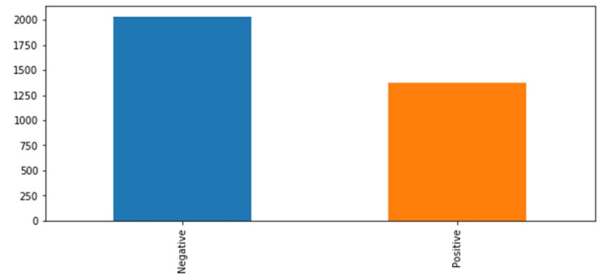

Figure 3. The results of classifying student opinions

In this study, we utilized 3 methods from machine learning, namely naïve Bayes (NB), KNN, and logistic regression (LR) to classify opinion data from Twitter about learning with tiktok media. Student opinion shows that students do not like learning by using social media for learning. The Naïve Bayes method is the best method for classifying data in this study with an accuracy of 80.32%.

CONCLUSIONS

In this study, we utilized 3 methods from machine learning, namely naïve Bayes (NB), KNN, and logistic regression (LR) to classify opinion data from Twitter about learning with the medium of tiktok. Student opinion shows that students do not like learning using social media Tik Tok. The Naïve Bayes method is the best method for classifying data in this study with an accuracy of 80.32%.

The drawback of this study is that it does not distinguish between age groups and types of lessons carried out using tiktok, this can be input for further research where students can be grouped according to age or z and alpha generations and grouped based on the type of lesson.

In the future, research is also needed on learning outcomes using social media such as tiktok, so that it can be clarified whether students who are happy or unhappy with the learning method using tiktok are proportional to the learning outcomes or engagement in the learning process. In addition, it will be known whether students who do not like learning with the social media tiktok experience an increase/decrease in learning outcomes.

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please refer to the top of file IEEETran.cls in the IEEE LaTeX distribution.

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