Sentiment Analysis of Face-To-Face Learning Based on Social Media

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Abstract—The use of restricted face-to-face learning during the epidemic in Indonesia was discussed not just by education and health professionals, but also on social media. The study used the Twitter dataset with the keywords ‘school’ and ‘face-to-face’ to examine public opinion about face-to-face learning. The research data was obtained from Twitter utilizing Drone Emprit Academic, and it was then processed using the Naive Bayes method to create sentiment analysis. During that time, research revealed that 32% of people were positive, 54% were negative, and 14% were indifferent. Because of worries about the dangers associated with the use of face-to-face learning, negative attitudes predominate.

Keyword: Sentiment Analysis, Face-to-Face Learning, Pandemic, Covid-19, Social Media

INTRODUCTION

Covid-19 influences many aspects of human existence, including schooling. In times of pandemic, the technique of learning from home via online learning can best meet students' learning demands (Shaleh & Anhusadar, 2021). The Indonesian government has established Distance Learning (PJJ) is used to carry out Learning From Home (BDR) by dividing three categories online, semi-online, and offline (Flowriza & Rahmiati, 2021). The use of online learning as a remedy during the epidemic sparked much debate. It has been more than a year since the Covid-19 epidemic in Indonesia, yet this learning technique is still seen as inadequate and faces several challenges (Ganefri et al., 2020). According to research done on students of PGRI University Yogyakarta, online learning continues to be extremely successful throughout a year of the pandemic that is caused by boredom and has reached saturation point. Furthermore, the amount of content that students can absorb is less than half, and the capacity of lecturers and students to use the internet is still limited (Dewantara & Nurgiansah, 2020).

While in another study conducted on 118 learners in Bekasi Regency stated that the implementation of online learning has not been effective. The questionnaire results showed that the effectiveness of online learning was influenced by economic factors (38%), social factors (30%), health factors (19%), and personality factors (13%) (Baety & Munandar, 2021). Other nations are also having difficulty implementing online learning during the epidemic era. The study was carried out in Albania by 627 students from diverse disciplines of study. It is said that online learning cannot replace classroom instruction. According to the data, Albanian pupils are unfamiliar with technology-based education (Xhelili et al., 2021). The study of the impact of online learning on undergraduate students at 13 dentistry schools in seven Asian nations and regions is a combination of face-to-face learning and will be a future trend (Chang et al., 2021).

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Figure 1. Weekdays spent online schooling in Indonesia in August 2020

Nadiem Makarim, Indonesia's Minister of Cultural Education Ristek and Technology (Mendikbudristek), recognized several flaws in the online learning system. The spirit of education in
Indonesia, according to Nadiem, was lost with the introduction of Distance Learning in Indonesia. This is due to a variety of restrictions, such as several blind spots and unequal smartphone ownership (Mustaqim, 2021). Figure 1 depicts the average time spent studying online, which is dominated by just 1 to 2 hours, indicating that this technique is not employed. Distance learning that lasts longer than a year, according to Nadiem, results in pupils losing learning chances (Sahir et al., 2021).

In this situation, pupils experienced cognitive learning loss, which influenced the dangers to children's intellectual capacities and life skills. As a result, limited Face-to-Face Learning (PTM) can be introduced in regions at level 3 Covid-19 in early September 2021, albeit gradually and carefully. The use of restricted face-to-face learning during the epidemic in Indonesia was discussed not just by education and health professionals, but also on social media (Samala et al., 2021) (Watrianthos et al., 2021). The study used the Twitter dataset with the keywords 'school' and 'face-to-face' to examine public opinion about face-to-face learning. In modern times, a similar study has been applied to online learning. Drone Emprit Academic (Fahmi, 2021) was used to collect research data from Twitter. It generates sentiment analysis using the Naive Bayes method.

**METHOD**

A. Sentiment analysis

Opinion mining, also known as sentiment analysis, is a discipline that specializes in the examination of people's feelings and thoughts. For textual input to be classified as positive or negative, a technique known as sentiment analysis must be used (Chauhan et al., 2021).

Figure 2. Sentiment analysis workflow[16]

Semantic analyses aim to develop automated methods for extracting subjective information from natural language documents, such as opinions and feelings. This knowledge may then be utilized by decision support systems or decision makers to help them make better decisions. Sentiment analysis has grown in significance since the advent of social media. Their widespread adoption and importance in modern life are among the most intriguing developments in recent years, attracting the attention of scholars, journalists, businesses, and governments. The overall tendency in sentiment analysis research in social networks is to utilize techniques acquired from classical sentiment analysis explored since the early 2000s (Samsir et al., 2021).

B. Naïve Bayes for Sentiment Analysis

The Naïve Bayes classifier, which utilizes the Bayes Theorem to determine the likelihood that a given feature set belongs to a certain model, is one of the most used classifiers. Conditional probabilities are calculated using the Bayes' Theorem, a straightforward mathematical formula that estimates the chance of a certain event occurring if another event has previously occurred (through assumption, supposition, claim, or evidence) (Irmayani et al., 2021).

You may use it to estimate the class's posterior probability by looking at document word distribution. The Bag of Words (BoW) feature extraction is used by the Naive Bayes Classification model. The location of a word in the document is not taken into account by the BoW feature extraction. The Naive Bayes (N.B.) classifier has a key benefit in that it executes quickly and consumes little memory. Calculation of probability categories in Nave Bayes using the Bayes algorithmic method using equations[18]:

\[
P(Y|X) = \frac{P(x|y)P(Y)}{P(X)}
\]

Equation (1) represents a class, X is data from an unknown class, P(X) is the probability of a hypothesis based on circumstances, and P(X) is the probability of Y.

C. Twitter Data Mining

Large-scale data sources such as Twitter and other social media platforms may now be mined using data mining methods and technology to uncover actionable information. Data mining, as well as related disciplines like statistics and machine learning, are used in the retrieval of information. In order to recognize patterns, database systems are used. Using publicly accessible Twitter data, data miners look for trends that may be helpful to companies, users, and other consumers. A new company may use Twitter data to attract new customers by getting customer feedback and creating customer recommendation systems.
Figure 3 depicts an opinion mining strategy utilizing the Naive Bayes algorithm via Twitter. Data crawling is accomplished by giving keywords during a specific time frame. After the data is obtained, the labeling procedure for assessing sentiment is done. The following level of preprocessing is organized for data selection and modification.

The cleaning procedure is carried out at this step to decrease noise and remove stop words. Tokenization is a method that uses spaces and punctuation to identify words and divide sentences down into terms (Samsir et al., 2021). The next stage of preprocessing is stemming, which converts affixes into fundamental words. The third stage of opinion mining is feature extraction, which is used to aid in the Naive Bayes classification. This stage creates a model, which is then utilized to demonstrate the accuracy of the classification findings (Sahir et al., 2021).

Data in the form of tweets is crawled from Twitter and saved in the form of a CSV file. The information is split into two categories: training data and test data. Positive and negative tweets will be labeled differently. The Naive Bayes technique is used during the sentiment classification and interpretation stages of sentiment analysis.

RESULT

We use the keywords 'sekolah' and 'tatap muka' as keywords for Indonesian tweets. Crawling data using the public Twitter stream Drone Emprit Academic (Fahmi, 2021) resulted in 17,388 tweets. Table 1 displays some of the tweets that have been gathered. The next step in preprocessing is to remove noise, clarify features, tokenize, and convert data. This is the data purification stage, in which classifications are defined and extraneous attributes such as URLs, mentions, usernames, RT, hashtags, and punctuation are removed. When the primary process is completed, the procedures convert a text into data that is easily accepted by the system.

Before applying the algorithm, the preparation stage is necessary. Case folding and URL removal are performed at this stage to uniformize the letters used into lowercase letters and delete the URL connection, as illustrated in Table 2 (Samsir et al., 2021).

Table 2. Process Case Folding

| Username   | Tweet                                                                                                                                 |
|------------|-------------------------------------------------------------------------------------------------------------------------------------|
| @PolresBoyolali1 | Pembelajaran tatap muka yang sudah berlangsung dimulai wajibkan pelajar untuk melakukan vaksinasi sebelum bisa masuk ke sekolah #ProkesMenjubelIndemi |
| @ainunnajib  | Adaptasi Kebiasaan Baru https://t.co/mTR0Y3RQQj Sekolah-sekolah di Indonesia yang mau tatap muka wajib berhati-hati ya. Para orang tua yang mau berhati-hati untuk anak-anaknya & keluarga besarnya, patut mempertimbangkan menolak sekolah tatap muka. |
| @ProfesorZubairi | Saya rasa ikhtiar kita melawan Covid-19 belum berakhir. Kita harus tetap waspada khususnya untuk anak-anak di bawah usia 12 yang belum dapat divaksinasi. Apalagi mereka akan memulai sekolah tatap muka dan amat mungkin membawa pulang Covid-19 ke anggota keluarga di rumah. |
| @detikcom   | Ribuan siswa terinfeksi COVID-19 saat sekolah tatap muka. Dari seluruh jenjang, siswa SD dilaporkan paling banyak tertular COVID-19. https://t.co/a6ZI77fhXA |

The preprocessed data is then sorted for the most word frequencies to emerge. As illustrated in Figure 3, the frequency of this term will be represented as a positive and negative word cloud.

Figure 3. Research stages using Naïve Bayes Classification

Table 1. Crawling data using the keywords

| Username   | Tweet                                                                                                                                 |
|------------|-------------------------------------------------------------------------------------------------------------------------------------|
| @PolresBoyolali1 | Pembelajaran tatap muka yang sudah berlangsung dimulai wajibkan pelajar untuk melakukan vaksinasi sebelum bisa masuk ke sekolah #ProkesMenjubelIndemi |
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Figure 4. Wordcloud positive and negative
A study conducted in September 2021 found that 54% of those polled had a poor view of face-to-face learning while just 32% had a favorable one.

Figure 5. Sentiment analysis results

CONCLUSION

In this study, sentiment analysis was conducted using Twitter data with the keywords 'sekolah' (school) and 'tatap muka' (face-to-face) on tweets in Indonesian in September 2021. During that period, research revealed that 32% of people were positive, 54% were negative, and 14% were indifferent. Negative attitudes are more prevalent because of worries about the dangers associated with the use of face-to-face learning.

Some tweets express worry over the phrase's "danger" and "coercion," which are frequently used in the discourse during this time. More studies will be conducted to employ new algorithms to achieve more accurate findings in opinion analysis.

REFERENCE

Baety, D. N., & Munandar, D. R. (2021). Analisis Efektivitas Pembelajaran Daring Dalam Menghadapi Wabah Pandemi Covid-19. EDUKATIF: JURNAL ILMU PENDIDIKAN, 3(3), 880–989. https://doi.org/10.31004/edukatif.v3i3.476

Chang, T.-Y., Hsu, M.-L., Kwon, J.-S., Kusdhanay, M. L. S., & Hong, G. (2021). Effect of online learning for dental education in asia during the pandemic of COVID-19. Journal of Dental Sciences, 16(4), 1095–1101. https://doi.org/10.1016/j.jds.2021.06.006

Chauhan, P., Sharma, N., & Sikka, G. (2021). The emergence of social media data and sentiment analysis in election prediction. Journal of Ambient Intelligence and Humanized Computing, 12(2), 2601–2627. https://doi.org/10.1007/s12652-020-02423-y

Dewantara, J. A., & Nurgiansah, T. H. (2020). Efektivitas Pembelajaran Daring di Masa Pandemi COVID 19 Bagi Mahasiswa Universitas PGRI Yogyakarta. Jurnal Basicedu, 5(1), 367–375. https://doi.org/10.31004/basicedu.v5i1.669

Fahmi, I. (2021). Drone Emprit Academic: Software for social media monitoring and analytics. Drone Emprit Academic. academic.droneemprid.id

Flowriza, E., & Rahmiati, R. (2021). Evaluation of Implementation of Learning Practices During Pandemi Covid-19 Coating and Beauty Education Study Program. Jurnal Pendidikan Teknologi Kejuruan, 4(3). https://doi.org/10.24036/jptk.v4i3.19323

Ganefri, Yulastri, A., Ambiyar, Jepriyansyah, & Suryadimal. (2020). Need analysis development of learning model based on production in multimedia materials in higher education. Journal of Physics: Conference Series, 1481(1), 012114. https://doi.org/10.1088/1742-6596/1481/1/012114

Irmayani, D., Edi, F., Harahap, J. M., & ... (2021). Naives Bayes Algorithm for Twitter Sentiment Analysis. Journal of Physics ... https://iopscience.iop.org/article/10.1088/1742-6596/1933/1/012019/meta

Lazuardi, D. R., Munandar, T. A., Harsiti, H., Mutaqin, Z., & Hays, R. N. (2020). Sentiment analysis of public opinions on the welfare of honorary educators using Naive Bayes. IOP Conference Series: Materials Science and Engineering, 830(3), 032018. https://doi.org/10.1088/1757-899X/830/3/032018

Mustaqim, A. (2021). Nadiem Fokus Kembalikan Anak Tatap Muka di Sekolah. Msn.Com.

Nurhayati-Wolff, H. (2020). Average time spent on online learning each week in Indonesia as of August 2020. Statista2. https://www.statista.com/statistics/1189274/indonesia-time-spent-learning-online-weekly/

Sahir, S. H., Ayu Ramadhana, R. S., Romadhon Marpaung, M. F., Munthe, S. R., & Watrianthos, R. (2021). Online learning sentiment analysis during the covid-19 Indonesia pandemic using twitter data. IOP Conference Series: Materials Science and
Samala, A. D., Ambiyar, Syahril, Fadhilah, Ranuharja, F., Dewi, I. P., Watrianthos, R., & Indarta, Y. (2021). Learn Algorithm and Programming in Higher Education Using E-Learning During the COVID-19 Pandemic: Students’ Perspective. *Proceedings of the 8th International Conference on Technical and Vocational Education and Training (ICTVET 2021)*, 608, 97–102. https://doi.org/10.1088/1757-899X/1156/1/012011

Samsir, Irmayani, D., Edi, F., Harahap, J. M., Jupriaman, Rangkuti, R. K., Ulya, B., & Watrianthos, R. (2021). Naives Bayes Algorithm for Twitter Sentiment Analysis. *Journal of Physics: Conference Series*, 1933(1), 012019. https://doi.org/10.1088/1742-6596/1933/1/012019

Shaleh, M., & Anhusadar, L. (2021). Kesiapan Lembaga PAUD dalam Pembelajaran Tatap Muka pada New Normal. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 5(2), 2158–2167. https://doi.org/10.31004/obsesi.v5i2.1139

Watrianthos, R., Hasibuan, R., Rimbano, D., Jalinus, N., & Abdullah, R. (2021). Effectiveness Blended Learning During Pandemic in Indonesia: A Meta-Analysis. *Jurnal Pendidikan MIPA*, 22(2), 270–278. https://doi.org/http://dx.doi.org/10.23960/jpmpi/pa/v22i2.pp270-278

Xhelili, P., Ibrahimi, E., Rruci, E., & Sheme, K. (2021). Adaptation and Perception of Online Learning during COVID-19 Pandemic by Albanian University Students. *International Journal on Studies in Education*, 3(2), 103–111. https://doi.org/10.46328/ijonse.49