

Sentiment analysis of face-to-face learning based on social media

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<https://doi.org/10.24036/jptk.v4i3.22623>

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.

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

I. 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).

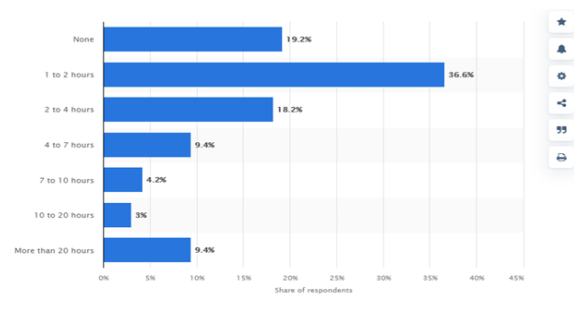


Figure 1. Weekdays spent online schooling in Indonesia in August 2020

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.

II. METHODS

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).

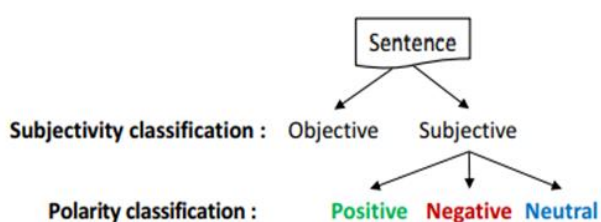


Figure 2. Sentiment analysis workflow

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 Naive 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).

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]:

$$P(Y|X) = \frac{P(x|y) P(Y)}{P(X)} \quad (1)$$

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. Research stages using Naïve Bayes Classification

Table 1. Crawling data using the keywords

Username	Tweet
@PolresBoyolali1	<i>Pembelajaran tatap muka yang sudah berangsur dimulai mewajibkan pelajar untuk melakukan vaksinasi sebelum bisa masuk ke sekolah</i>
@ainunnajib	<i>#ProkesMenujuEndemi 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.</i>
@ProfesorZubairi	<i>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.</i>
@detikcom	<i>Ribuan siswa terinfeksi COVID-19 saat sekolah tatap muka. Dari seluruh jenjang, siswa SD dilaporkan paling banyak tertular COVID-19. https://t.co/a6ZI77fhXA</i>

Figure 3 depicts an opinion mining strategy utilizing the Nave 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 *stopwords* to remove useless 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 utilized during the sentiment classification and interpretation stages of sentiment analysis.

III. RESULTS

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.

Table 2. Process Case Folding

Before	After
Ribuan siswa terinfeksi COVID-19 saat sekolah tatap muka. Dari seluruh jenjang, siswa SD dilaporkan paling banyak tertular COVID-19. https://t.co/a6ZI77fhXA	Ribuan siswa terinfeksi COVID-19 saat sekolah tatap muka. Dari seluruh jenjang, siswa SD dilaporkan paling banyak tertular COVID-19.

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

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