

1. INTRODUCTION

Indonesia is nicknamed the "Ring of Fire", based on the country's geographical location where three tectonic plate points meet, namely the Indo-Australian plate, the Eurasian plate, and the Pacific plate. Therefore Indonesia is a country prone to natural disasters. Natural disasters are phenomena caused by a series of natural events such as earthquakes, tsunamis, volcanic eruptions, floods, droughts, tornadoes, and landslides.[1][2][4] This phenomenon occurs due to nature's efforts to balance ecosystems damaged by humans or due to natural processes.[2] According to BNPB data, in 2021, a total of 5,402 disasters occurred in Indonesia.[2][3] Of these, 1,794 events were floods, followed by 1,321 landslides, then 1,577 extreme weather events and 24 earthquakes, which claimed as many as 728 deaths throughout 2021.[2][3][7] The many natural disasters that have occurred in Indonesia have not been spared from people's tweets on social media Twitter.[1][7]

Twitter is a social media site developed by Twitter, Inc., with unique writing characteristics, formats, and symbols with special rules limited to 140 characters. The number of daily Twitter users is increasing every year. According to a Statista report, there were 18.45 million active Twitter users in Indonesia as of January 2022. This achievement places Indonesia as the fifth country with the most Twitter users worldwide, followed by Brazil with 19.05 million. The United States occupies the highest position, with 76.9 million active users.[5] Twitter social media is often used to convey public opinion about specific topics so that this information becomes the latest trending topic. [5]

Many Twitter users make this social media a favourite for the digital community to discuss social studies such as public interest, social interaction, political sentiment, and many other public opinions. Apart from matters related to social studies, studies related to the field of disaster have also been carried out on Twitter social media, especially in Indonesia, as in research [1][4][7][10][25]. Studies related to disasters still need to be carried out in Indonesia, even though Indonesia is a country with a high level of disaster vulnerability. Indonesia is also a country that is very suitable for conducting research on disaster management with rapid technological, social and cultural advances.

Tweets related to natural disasters can be used as information to determine assistance according to the needs of victims.[7] Not only that, information obtained through public sentiment on Twitter can often speed up disaster recovery.[4] The public's sentiments, both from disaster victims and non-victims, through tweets on Twitter greatly determine the success of disaster management and the recovery process.[4][7] So sentiment analysis on data collected from Twitter is carried out to understand the community's response to disaster management that has been and will be carried out by the government. [4][7][10]

Sentiment Analysis is a study that analyzes human opinions, sentiments, evaluations, attitudes and emotions, which are applied in almost every business and social domain because opinions are the centre of almost all human activities.[9][10] Sentiment analysis is divided into two processes: Sentiment Extraction and Sentiment Classification. Sentiment Extraction is an aspect extraction process that has been evaluated. Sentiment classification groups various aspects, namely positive, negative, or neutral.[9][16][20] Sentiment Analysis is divided into two parts: the Coarse Grain Sentiment Analysis and the Fine Grain Sentiment Analysis. Coarse Grain Sentiment Analysis performs an analysis process at the document level. Sentiment grouping focuses on positive, negative or neutral documents as a whole. Meanwhile, Fine-grained Sentiment Analysis focuses on classifying sentiments in just one sentence.[9][10][13]

One of the methods used in sentiment analysis is BiLSTM with word2vec feature extraction and CBOW architecture.[6][16][17] The BiLSTM method is considered a good method for classifying data compared to other methods in calculating accuracy.[6][9][17] According to Dong, Y., Fu, Y., Wang, L., Chen, Y., Dong, Y., & Li, J. in their research which compared the results of the accuracy of several methods, BiLSTM produced an accuracy rate of 79.30% which is higher than CNN which produces an accuracy of 76.10%, SVM of 76.14%, and LSTM of 75.90%.[9] Aulia, R.I., Agus S., and Yohanes S. researched that the Bidirectional Long Short Term Memory (BiLSTM) method and word2vec extraction were used to detect hate speech with CBOW architecture with epoch 10, learning rate 0.001 and 200 neurons resulting in an accuracy of up to 94.66%, precision 99.08%, recall 93.74% and F1-score 96.29%.[6] In Pratiwi, R. W., Sari, Y., & Suyanto, Y.'s research, it was also proven that the use of word2vec with the CBOW architecture and the addition of an attention layer to the Long Short Term Memory (LSTM) method obtained an accuracy of 78.16%. BiLSTM produced an accuracy of 79.68%. While the FSW algorithm is 73.50% and 73.79% FWL.[8]