

1. Introduction

The rapid growth of the internet has enabled social media users to express their views, feelings, and thoughts, which can be analyzed through sentiment analysis, a computational study of emotions, judgments, and opinions [1]. Prinz identifies four basic human emotions: joy, sadness, fear, and anger [2]. According to Datareportal, with over 18 million active Indonesian users on X (Twitter) in 2022, the platform provides a space for emotional expression through text. Social media has become essential for expressing emotions and opinions, making emotion classification a critical task with applications in mental health support, public sentiment monitoring, and customer feedback analysis. However, indirect communication on social media often includes informal language, slang, and contextually ambiguous expressions, making it more challenging to identify emotions compared to face-to-face interactions. Addressing these challenges is vital for improving sentiment analysis systems, enabling their use in real-world applications such as detecting public distress during crises, tailoring marketing strategies based on customer emotions, and enhancing tools for mental health interventions. This highlights the need for robust classification systems capable of accurately analyzing emotions from social media data [3].

The focus of this research is about the emotion classification using the classification algorithms. There are some of classification algorithms that are commonly used, such as Decision Tree and Random Forest [4]. Decision Tree is an effective algorithm for doing classification and prediction. This algorithm has the ability to describe the conditions of different facts in the form of a decision tree structure [5]. A decision tree is a structure used to break down the large amounts of data to convert it into smaller groups of data [6]. This provides an understanding of which factors that influence the classification results, this making it suitable for emotion classification. On the other hand, the Random Forest algorithm was chosen as its ability to randomly combine a number of decision trees, which are then selected to determine the classification result [7]. Using this two algorithms, it's expected that more accurate emotion classification results can be obtained.

Several previous studies have demonstrated the effectiveness of Random Forest and Decision Tree models in classification tasks, but they often focus on limited scenarios, leaving gaps in understanding their performance under varying conditions. For instance, Setiawan et al. [8] utilized the Random Forest algorithm for sentiment analysis on GoFood review data, achieving an accuracy of 98.6% by focusing on binary sentiment polarity classification within a specific domain. This narrower focus simplifies the task compared to multi-class problems, where distinguishing between multiple categories introduces greater complexity. Similarly, Keskar et al. [9], applied a Decision Tree classifier for fake news detection on Twitter, achieving an accuracy of 70% by employing unigrams and TF-IDF for feature extraction. However, their study did not explore the impact of combining multiple feature extraction techniques, addressing data imbalance, or varying parameter settings.

These gaps underscore the need for further research to evaluate how these models perform under diverse testing scenarios. Specifically, there is a lack of studies examining the effects of different data split ratios, feature extraction methods such as TF-IDF, Bag of Words, Word2Vec, and their combinations, resampling techniques to handle imbalanced datasets, and parameter optimization. Exploring these factors is essential for more complex tasks like multi-class emotion classification in noisy, informal social media data, where these elements could significantly influence model accuracy and robustness. By addressing these gaps, this study seeks to provide a more comprehensive understanding of the factors that affect the performance of Random Forest and Decision Tree models in such challenging contexts.

By addressing this gap, the main objective of this research is to implement the Random Forest and Decision Tree models for emotion classification from uploaded tweets to X social media, and to compare the performance of both algorithms in terms of efficiency and accuracy. In addition, this research is also focuses on evaluating the factors that influence classifying emotions based on users' uploading patterns on social media X. Therefore, this research will not only examine the application of the models, but also comparing their performance and the classification of the upload patterns into emotion classification.