

## I. INTRODUCTION

The general election represents a fundamental expression of the people's sovereignty, providing a platform for citizens to assess and select members of the People's Representative Council. It also serves as a means of upholding and distributing the fundamental human rights of individuals [1]. Elections in Indonesia have been held since 1955 to elect members of the legislature. However, it was not until 2004 that the Indonesian people were given the opportunity to directly elect their president [2]. The presidential election is a democratic process designed to elect the President and Vice President. This election involves choosing the head of state through political parties [3].

Twitter is a social media platform where users frequently share their opinions on products, services, celebrities, events, and various other topics of interest. [4]. Social media platforms, including Twitter, are widely used for expressing sentiments and play a significant role in political campaigns, promoting social and developmental initiatives, and voicing opinions about elections. One of the earliest uses of social media for a political campaign occurred during the 2008 U.S. election [5]. With the rapid growth of the World Wide Web, people are increasingly using social media platforms, with a population of over 250 million, Indonesia has a vast number of social media users, making platforms like Twitter significant channels for expressing sentiments and influencing political and social discourse [6], [7],

Given its importance in understanding people's thoughts and attitudes, Twitter-based Sentiment Analysis (TSA) has garnered significant interest [8]. Sentiment analysis is the computational examination of individuals' opinions, attitudes, and emotions toward a particular entity[9]. It can also be viewed as a field encompassing machine learning, data mining, natural language processing, and computational linguistics, while also integrating elements of sociology and psychology [10].

Previous research on sentiment analysis using the CNN-LSTM algorithm showed very good performance compared to single CNN and LSTM models, achieving an accuracy of 91% [11]. Another study [12] The study revealed that the CNN-LSTM model achieved varying degrees of accuracy and F1-Score across different scenarios. Specifically, for split data, it reached an accuracy of 74.53% and an F1-Score of 74.29%; for maximum feature adjustment, the accuracy was 73.41% and the F1-Score was 73.00%; for feature expansion, the accuracy increased to

75.34% and the F1-Score to 75.13%; and for hyperparameter tuning, the accuracy was 75.75% with an F1-Score of 75.42%. These findings suggest that the CNN-LSTM model outperforms the individual CNN and LSTM approaches in several scenarios, particularly in feature expansion and hyperparameter tuning.

Additionally, the study demonstrated more accurate feature extraction using the Word2Vec and CNN methods. The proposed model achieved an accuracy of 99.07% for the training sample and 82.19% for the testing sample [13].

. In the study, the use of genetic algorithm optimization enhanced the earlier GloVeLSTM approach, achieving an accuracy rate of 87%. The best individual parameters included 111,170, 0.398, and 93, among others, with the highest fitness score being 0.8724 [14] A comparison with leading methods in the field showed that this approach can achieve an accuracy of up to 96.984%. Additionally, the approach is automated, making it user-friendly even for those without in-depth knowledge of CNNs or GAs [15].

This research aims to analyze public sentiment regarding the 2024 General Elections in Indonesia through social media. To achieve this, a CNN-LSTM hybrid model will be employed for sentiment analysis, selected for its proven performance in previous study [12], [16]. The CNN-LSTM approach utilizes CNNs for feature extraction and LSTMs for capturing temporal dependencies, thereby enhancing sentiment analysis accuracy. The study will also incorporate genetic algorithm optimization and Word2Vec feature expansion to improve the model's precision and efficiency. While similar techniques have been explored, the innovative integration of the CNN-LSTM model with genetic algorithms and Word2Vec in this research is specifically tailored to the context of the 2024 elections. This unique combination aims to provide deeper insights into political discourse and advance sentiment analysis techniques, offering a more nuanced understanding of public opinion.