

I. INTRODUCTION

Elections are a democratic process in which citizens freely choose their representatives who will represent the people in the legislative and executive branches of government [1]. Elections enable citizen participation in government decisions and sustain democracy by voting in decisions to achieve societal goals. Twitter, now renamed X, is widely used as a platform for users to post and interact with each other [2]. X is among the top microblogging sites used to express their opinions and provide valuable information to the public and even the government [2]. Unfortunately, the existence of false information poses a serious challenge, demonstrating the dependence of society on social media as a main source of information, especially for news. The rapid spread of false information through social media platforms makes it difficult for people to distinguish between true news and hoaxes [3]. This has the potential to become a source of inaccurate information that threatens the integrity of elections and democracy. Therefore, a system is needed that is able to detect the credibility of information, so that information management can be relied upon to maintain public trust.

Credibility detection involves identifying common indicators of credibility through in-depth analysis of features related to the source and content of news articles, in order to distinguish between fake and real news [4], [5]. Analysis using public data shows that fake news can be identified from factual news based on certain characteristics of the source and content. Although some features show significant differences between fake news and factual news, not all of these features are effective in improving the accuracy of fake news prediction [4]. Recently, establishing the credibility of content on Twitter, especially during emergencies, has been highlighted due to the difficulty of manually identifying tweet credibility, so several approaches have been presented to automatically predict tweet credibility [6].

Some research related to the development of credibility detection systems, such as research conducted by Sato et al. [1] which involves analyzing heterogeneous data blending from Twitter and credible external data sources to assess the credibility of the event detection process. The goal was to improve accuracy and credibility by considering the event detection results from Twitter as well as the number of articles associated with the event. The experimental results indicate that the method successfully improved the average event detection accuracy by 26.8%, reaching an accuracy of 92.3%.

Previous research shows that Bi-GRU, which processes information from two directions, achieves high performance in deep learning [7]. Khoo et al. stated that Bi-GRU with an attention mechanism achieved 90.49% accuracy, outperforming other methods due to its better context capture ability [8]. Y. Fang et al. also showed that Bi-GRU with one layer achieved 87% accuracy, a 1.6% improvement over the single-layer GRU model, emphasizing the importance of considering past and future information [9]. In a research by M. Ghasemi et al. [10], Firefly Algorithm (FA) is described as a metaheuristic algorithm that mimics the behavior of fireflies to solve optimization problems. The use of FA in deep learning algorithms can improve the optimization of model parameters efficiently due to its ability to adjust parameters flexibly and improve the overall performance of the model.

Research by M. Tambunan et al. showed that the hoax classification model using TF-IDF for weight calculation achieved the highest accuracy of 86.41% [11]. M. Alkaff et al. emphasized that feature extraction is an important step in text classification, where the important features of the raw text are converted into numerical representations [12]. On the other hand, unique vectors for each term can be considered as input features that are useful in noncontextual embedding such as GloVe [13]. Research by I. Kaibi et al. showed that GloVe as a word embedding on Twitter dataset achieved an average accuracy value of about 80% [14].

This research proposes an information credibility detection system using Bidirectional Gated Recurrent Unit (Bi-GRU) combined with feature extraction and feature expansion. The main contribution of this research is the integration of both in the Bi-GRU deep learning model optimized with Firefly Algorithm which can significantly improve the accuracy and efficiency of the information credibility detection system. This research aims to streamline the application of the Bi-GRU method for information credibility detection on X social media platform, particularly in the context of general elections in Indonesia. As far as we know, there is no information credibility detection system that uses the concept of the method. This research will conduct various experiments, including the selection of split data ratio, TF-IDF tuning, GloVe, and FA. The proposed system is expected to underline the significance of accuracy in detecting information credibility, especially in Indonesian elections, so that people can get credible information properly.

This paper is divided into several sections. Section II discusses related research that has been done before. Section III provides a brief overview of the research method used. Section IV presents the experiment results of the proposed scenario. Section V states the conclusion of this research.