

I. INTRODUCTION

These days, social media has rapidly evolved into a medium for the swift and effective dissemination of information [1]. Social media is often used as a reference to obtain information from various fields [2]. In the healthcare sector, social media can serve as a platform for individuals to share information during the COVID-19 pandemic due to strict social distancing measures [3]. In the political realm, social media can be utilized to encourage the younger generation to participate in elections [4]. Candidates can also leverage social media to do a campaign without meeting voters in person [5]. This can be observed in the Indonesian presidential election of 2024. Presidential candidates can build online trust by effectively utilizing social media to create quality, consistent, and transparent content [6]. The success of building online trust depends on how optimally the candidates leverage social media [6]. From these examples, the spread of information on social media can pose new challenges in verifying the truthfulness of the information. Not all information circulating on social media is factual, there is also a significant amount of hoaxes and rumors [7]. X (formerly known as Twitter), one of the most popular social media platforms, has a higher level of fake news than other social media platforms due to many buzzers and bot accounts [8]. Therefore, research needs to be conducted to detect the credibility of information on the social media platform X.

The credibility of information can be defined as the degree to which it is perceived as believable and trustworthy [9]. In this study, the credibility of information can be determined based on the source of the information and its content. Credible information has several characteristics, such as conveying facts rather than personal opinions and the information presented is in line with the competence of the source [9], [10]. The first previous study to address the issue of information credibility on social media was by Castillo et al. [9]. The study stated that many social media users, especially inexperienced users, cannot determine the credibility of information on social media [9]. This is particularly concerning during critical events. The research by Gupta et al. [11] analyzed the credibility of information on Twitter during high-impact events. Only 17% of tweets were found to be credible [11]. This research also mentioned that detecting information credibility on Twitter can be done automatically [11].

The method that will be used in this study to detect information credibility is the Convolutional Neural Network (CNN). CNN is a machine-learning method that falls under deep learning [12]. Deep learning is distinguished by having many layers between the input and output layers [13]. With deep learning, data features can be learned automatically, allowing it to handle large amounts of data [14]. CNN is one of the most well-known deep learning methods [15]. One of the advantages of CNN compared to other methods is its ability to automatically detect important features without human direction [16]. The CNN method was used by Verma et al. [17] to develop a framework for detecting fake news called MCred. The use of CNN can produce better accuracy compared to RNN and LSTM [17]. The research conducted by Fadhli et al. [18] also used CNN as one of the methods employed to detect information credibility on Twitter. CNN provided better results compared to LSTM in this study [18].

In this research, we propose an information credibility detection model on social media X using methods to enhance the performance of CNN. The main contributions of this study include implementing feature expansion using Word2Vec, adding semantic features using RoBERTa, and optimizing CNN parameters using the Bat Algorithm. By expanding features using Word2Vec, we aim to capture the feature values of abbreviated or varied vocabulary. Adding semantic features with RoBERTa enriches the contextual understanding of information. Finally, optimizing CNN using the Bat Algorithm allows for fine-tuning the model to achieve optimal performance.

The rest of the paper is organized as follows: Section 2 reviews the related works pertinent to this research. Section 3 explains the methodology used in this study. Section 4 shows the results of the experiments conducted. Finally, Section 5 discusses the conclusions drawn from this research.