FAKE NEWS DETECTION ABOUT SARS-COV-2 PANDEMIC USING NEUTRAL NETWORKS AND DETECTION ALGORITHMS

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Abstract
Fake news has an extremely high impact on society, spreading quite simple and fast through social media, TV, internet, press, and other means of communication. The false news about the new coronavirus is blocked by the authorities, according to the decree for establishing a state of emergency. The misinformation of the population and the placement of fake news is two inevitable consequences in times of crisis, these being amplified by two other elements, which feed each other: fear of illness, which can cause deaths, but also uncertainty or lack of information on how to manage the crisis and what is involved. The need to stop the spreading of fake news, it's paramount and this paper proposes to recognizing truthful information from false information during the pandemic COVID-19 through a guide learning method. This guide implies a model for distinguishing false messages in the online environment, such as Machine Learning algorithms, which can have an accuracy of over 95%.

Key words: *Fake news, COVID-19, machine learning, social media*

JEL Classification: *Q55, C11, C38, O35*

I. INTRODUCTION

Over time, the fake news spread extremely fast, often even faster than real news from various fields of activity. Thus, false information becomes increasingly viral on social media, sometimes causing division and even hatred in society. When a major event takes place, individuals discuss that event, especially on social networks. Sometimes, the very large amount of information on a certain topic, generates rumors, so that people are tempted to create false news, which generates conspiracy theories, information that confuses, often creating controversy (Vian, McStay, 2018). Also, when unforeseen events occur, they usually create confusion due to the nature of the event.

The consumption of information has changed over time with the introduction of social networks. Young people opt for information obtained from the online environment so that Facebook or Twitter are social networks through which news is distributed in all forms. Although this is an advantage in terms of easier communication, extremely much false news is spread through social networks (Newman et al., 2019). Through this research, we aim to identify the factors that contribute to the spread of fake news, and for proper identification of them, it is necessary to understand the mechanisms that allow their proliferation.

Most of the time, fake news creates confusion, which is quite difficult to detect. The global pandemic generated by the Covid-19 virus is an example of an event that led to false news. Thus, the presence of a totally unknown virus, which causes disease and sometimes even death, leads to conspiracy theories, misinformation, or all sorts of apocalyptic scenarios. Most theories have revolved around the fact that the SARS COV-2 virus is just a common flu, so in this case, it is about misinformation because this information is demonstrably false (García, Prieto et al., 2020). At the same time, it has been speculated that the virus is a weapon, which was designed by an X State against another Y State, in this case, there is no basis for such a statement. A third hypothesis was that we can be cured of the Covid-19 virus if we use X or Y medicine, this information being false because a vaccine or medicine against the virus has not been invented yet. Thus, misinformation is fueled by two factors, which are correlated: fear (either of illness or death) and uncertainty (due to lack of information on how to manage the crisis) (Zubiaga, Aker et al., 2018).

In the case of false news about the new coronavirus, misinformation is an inevitable process because, as the number of victims increases, people's fear and anxiety to react emotionally, by finding the culprits, to express their inner anxiety and to embrace Various explanations is indispensable (Shearer, Matsa, 2018).

Through this paper, we will propose several methods by which false news can be detected much easier. We will achieve this through the Naïve Bayes method.

II. LITERATURE REVIEW

Rumors have been studied since ancient times, but false news has begun to be analyzed relatively recently, leading to a number of definitions and determinants in addition to rumors. Fake news is defined as a

series of information that mimics a media product in the form of news, but not the organizational process of media content (Lazer, Benkler et al., 2018). At the same time, the rumor is defined as a belief, which is part of a spread of information without being officially verified (Robert Knapp, 1994). In other words, the rumors represent a series of important information, but which are not true because they do not have a confirmation. Most of the time, rumors are used as misinformation of the population, meant to mislead people, to create division in order to obtain financial or political gains.

Research on fake news focuses on what everyday problems people face, whether it's anxiety or security, because fake news can affect people's social behavior to some extent, and can lead to a media crisis. via the Internet (Kim, Kim 2020). In order to be able to understand and identify false content, one can use linguistic analysis, following the structure of the text because a certain frequent use of words, as well as the patterns used, can indicate the veracity of media content.

The truthful information is surrounded by credibility, promptness, accuracy, correctness, but often, the truthful information is distorted and turned into false news. Through the mix of truthful and erroneous information, false news appeared. The avalanche of false news can influence the population through propaganda both politically, economically, and socially. Misinformation has been defined as a way of falsifying incoming messages, which can cause threats to human safety. Most researchers who have analyzed the phenomenon of spreading false news have come to the conclusion that it can be discovered through emotions and language (Conroy et al., 2015).

False news, in addition to disinformation, produces negative social, economic, and psychological effects, so it is essential that the information provided by the media be clear, concise, and truthful so as not to cause chaos. The economy can be affected by the widespread promotion of false information because it casts a doubt on the minds of the population about the products and services about which information circulates in a negative way. In 2012, fake articles were written in China about a company that allegedly lost state-owned assets and started using illegal sales, providing false financial reporting. The company's reputation has deteriorated, leading to a sharp drop in share prices. When the author of the fake news was discovered and arrested, he admitted that he had been paid to write it. A similar problem existed at the beginning of the COVID-19 pandemic, with the Corona beer brand, when a series of false associations and news appeared, highlighting the fact that the brand is can be associated in terms of name with the new coronavirus. A series of jokes and memes circulated on Facebook about the name association between the beer brand and coronavirus (COVID-19), appearing news that said that this caused decreases in the company's sellers. Initially, a report was presented with false statements, according to which, 38% of Americans no longer consume Corona Beer due to the association of the name with the new coronavirus. At the corresponding moment, the owner of the Corona beer business offered a series of statements according to which, he denied the statements that were made to his brand, stating that his business continued and continues to function as well. The case of the Corona beer brand caused false rumors, but the company treated things in a very natural way, thus gaining the admiration of consumers on the Internet (Baghadia, 2020).

Regarding the situation generated by COVID-19, the false news was widespread, thus appearing many theories of conspiracy, but also false treatments, such as gargling with baking soda, lemon, or saltwater (WHO, 2020). Regarding conspiracy theories related to COVID-19, have appeared films, which have spread erroneous information, with extremely many views, but also theories according to 5G networks would be able to exacerbate the symptoms of COVID-19 (euvsdisinfo.eu, 2020). Also in April, a lot of false information about the pandemic was circulated in online Russian publications. At that time, the European Commission had identified about 2700 fake articles on the pandemic, divided into 110 main topics (Commission Europeenne, 2020). In the UK, theories of conspiracy related to coronavirus have spread on the internet, creating rumors about 5G technology, so that people have resorted to burning poles. At that time, the British government had to react quietly to the population, providing assurances that there was no connection between the 5G network and the new coronavirus. In Romania, a series of news circulated according to which Vitamin C administered intravenously would be the miracle cure that could cure people of COVID-19 (The Guardian, 2020). In Romania, the Strategic Communication Group restricted access to platforms that spread false news.

The widespread false news greatly affects society, causing instability or fear among the population. Economic instability is also a consequence of false news because negative advertising can lead to a drastic decrease in purchasing power and therefore to a decrease in production. False news can be of three kinds: fabricated news, satire, and hoax. The fabricated news is shaped around a false story, which is often intentional lies, which reach several sources, being dependent on clickbait. On the other hand, satires are untrue news presented as true, but in the form of a joke (Tanvir, Mahi et al., 2019). When people are unfamiliar with the subject, credibility can be reached. The third type of fake news is cheating. This type of fake news uses a number of methods to fool people through social networks or blogs.

False writing is detected on a number of approaches, such as those based on style, knowledge, propagation, or position. Style-oriented detection is based on objectivity and deception, thus following the objective elements of the news, as well as misleading statements in the news. Knowledge-based detection aims

to verify news through external sources, focused on crowdsourcing (Munger, 2019). Detection of false news focused on propagation uses social networks to indicate the veracity of the information provided. Also, the verification of false news focused on position uses the social factor, through points of view.

The detection of false news is done following a series of lexical, semantic, propositional, and psycholinguistic characteristics. Lexical features follow the frequency of the keywords used in the text, as well as the punctuation marks, speech parts, and sentence parts used. The semantic features use the signature aspect of the text as well as a series of data. On the other hand, the propositional features focus on the existing parts of speech in the text, this mode of detection being used especially in the classification of news. At the same time, the psycholinguistic characteristics are based on the number of words existing in the text, introducing a dictionary software for extracting the text (Baptista, Gradim, 2020).

III. METHDOLOGY

Naive Bayes method can be used to detect false news for classification and misinformation messages on Facebook. In this case, the probability of the hypothesis is denoted by P, the data collected from Facebook can be denoted by F, the data class denoted by (Cy), and in this case, y represents the variables and invariables. The probability of the F data can be calculated as follows:

$$P(Cy|F) = \frac{P(F|Cy) \times P(Cy)}{P(F)}$$

Naive Bayes was applied to the mentioned data, providing an accuracy of 75%. Over time, several researchers have tried to detect and differentiate between false and truthful news. (Aphiwongsophon & Chongstitvatana, 2018) applied the Naïve Bayes method to detect false news on Twitter on various topics of natural phenomena. To apply the method, a series of key attributes were followed, such as Twitter ID, Username, symbols and characters in English, Thai, and other languages, as well as the profile picture with the URL.

The purpose of this paper is to intensify and understand the characteristics of fake news, by analyzing the news distributed online, more specifically on Facebook during COVID-19. Since the beginning of the pandemic, since December 2019, a lot of erroneous information has been circulating about the origin of the virus, its symptoms and especially, about the treatment of the new coronavirus. In other words, the analyzed data are those posted between March 2020 and September 2020.

Through the Facebook API, raw data was collected, such as name, profile photo, number of friends, number of followers, hashtags, posts, events, groups, page management, page ratings.

IV. RESULTS

Although Facebook has many advantages due to the fact that it allows easy communication, up-to-date information, being a real exchange market, however, the platform has contributed, especially in the first two quarters of 2020 to the spread of false information related to the COVID-19 pandemic. Over 3.8 billion views made posts about COVID-19, so Facebook acted as a vector, especially on people who believed in conspiracy theories (Kim, Kim, 2020). From this perspective, misinformation is harmful due to the fact that people ignore the restrictions imposed by the authorities on the pandemic and refuse to protect themselves properly. In the case of 80 sites viewed, which contained fake health news, they were taken over by Facebook, and the increased interest in such news has been on an upward slope since the pandemic began to spread around the world, reaching its peak in April 2020. Since then, the number of views for such sites has decreased because the authorities have also intervened, by restricting this news that spread erroneous information. Worryingly, the number of views from these sites has been much higher compared to official sites, and Facebook is the main means of informing and communicating with people, the platform being for more than 10 years a leader in the network market socializing.

Through the literature, we illustrated in Figure 1 a series of methods and linguistic features in order to classify COVID-19 news distributed on Facebook as true or false. The linguistic investigation is one of the techniques used in detecting false news, as is the Naive Bayes method.

Through the Naive Bayes method, over time, researchers have developed a number of false news detection systems, so that, through Facebook, one can see how people act in a certain area of reference, thus classifying articles in true news and false news, using a series of techniques through which user data can be obtained. This algorithm can help you understand how individuals behave, how they react, and how users react when they interact with fake news on Facebook. In this way, one can understand the connection between the initiator of false news, their recipients, as well as the locations where this news is. In addition to the Naïve method, it was implemented by a number of researchers and the Machine vector support method, through which we can count the frequency of the document on the social platform, as well as extracting key features in the classification of fake news (Petkar, Sonawane, 2020).

The detection of false news can be achieved through several techniques, so that, using the Naïve Bayes method, the linguistic feature can identify false users and news that is not true. Also, through the model of the signature feature, false news from the virtual space can be identified. For accuracy of the model, the conceptual theory focused on semantic-syntactic models is extended, and the implemented project has the ability to detect false news by combining the text at the semantic level with the syntax. At the same time, in order to be able to make a comparison regarding the detection of false news and their characteristics found on Facebook, two more methods can be used, besides Naïve Bayes, being in this case Perceptron and Rocchio. Figure 1 shows the process of classifying fake news, starting primarily from the Internet because this is the space where news is growing.

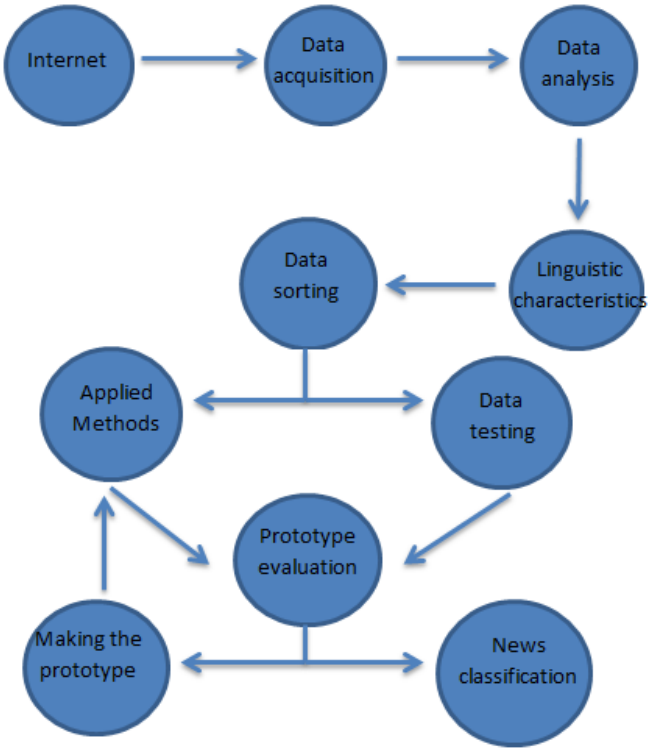

Figure 1 – The process of fake news classification

Facebook appeared in 2004, being made to give people the opportunity to get in touch with close or unknown people, even from a distance. Facebook is one of the most used social networks in the world, being considered the second site, after Google in terms of visits made by users. Through this social network, users can exchange views, but can also receive official information from the competent institutions of a state. This method gives Facebook the opportunity to be used as a marketing tool for companies around the world, but it also offers the possibility of delivering content to media institutions. Usually, Facebook users have the opportunity to post almost anything, regardless of how they spend their free time, professional environment, hobbies, or content that is informative. As early as 2010, when social networks were gaining momentum, the spread of false news began to spread, using distorted information on a particular topic. When people are exposed to false information on a daily basis, they tend to accept it. Both Facebook and Twitter are tools for disseminating information, which over time have tried to reduce fake content as much as possible by introducing reporting features, but nevertheless, identifying fake news has become increasingly difficult. , requiring a series of methods designed to end this phenomenon.

We also identified a number of subjects that referred to the COVID-19 topic. These were identified as fake news because the content of this news was not supported by the literature. By analyzing a number of 50 articles based on both science and fake articles, it was possible to observe the topic of this news accompanied by erroneous information.

The COVID-19 keyword in search engines was accompanied by a number of terms, depending on the most searched topics in the fake news. Among the most used words, next to the term COVID-19, in Romanian were the terms: "origin of COVID-19", "Conspiracy", "5G", "Vitamin C", "Garlic", "Gargle". Figure 2 shows the most searched topics related to COVID-19 on the internet, as well as the main keywords related to the SARS-CoV-2 virus.

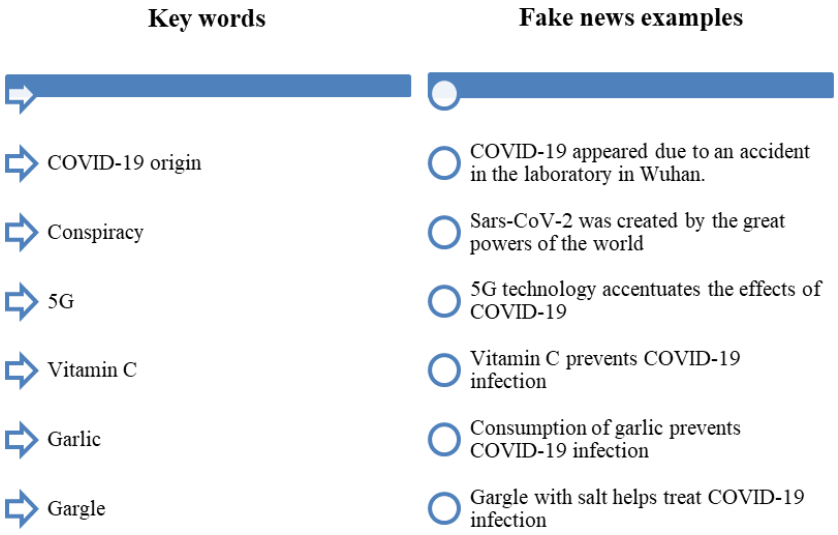

Figure 2 – The most common topics related to COVID-19 in the online environment

During the COVID-19 pandemic, communication was visibly affected by fake news, so that the studies conducted aimed at quantitatively evaluating fake news and explaining the mechanisms holding the spread of misinformation on social networks. False content can be distinguished by a short title, which is based on clickbait, the use of photographs and images to attract attention, and their purpose is to attract an audience as numerous as possible for various economic, political, or cultural reasons. The third figure shows how people might react to false news and how they might act later.

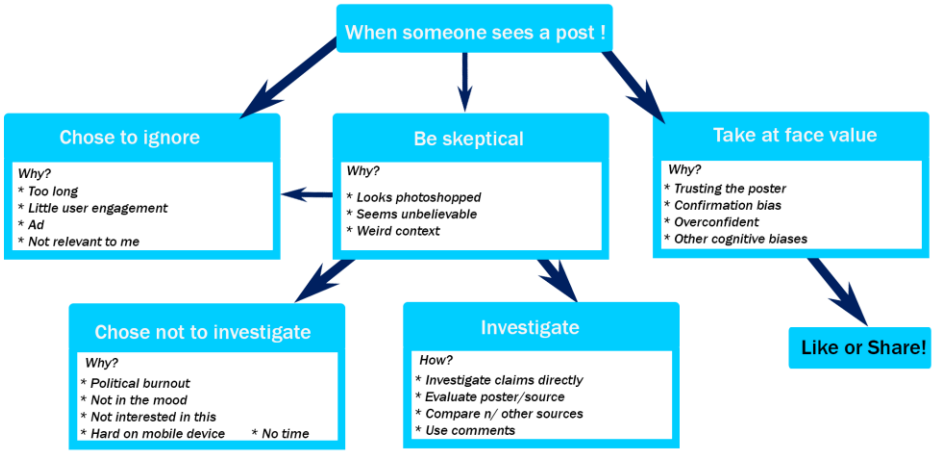

Figure 3 – Possible reactions of people to viewing fake content

When some persons see a fake news item, they may adopt different attitudes towards that post, or they may choose to ignore it for various reasons, or the content is too long, or it contains ads or they do not find the relevant content. There is also the possibility of being skeptical for various reasons, either the photos look as if it has been modified or photoshopped, or the content is irrelevant and hard to believe, so there is a possibility that that news may be ignored or the persons are not interested in that post because of the content or choose to investigate the news, evaluating the sources where the information comes from, compares it with other sources, reads various comments on the subject. At the same time, when a person seeing fake news, there is the possibility that the person has 100% confidence in what is written in that article, these things often depend on the education, the degree of information of that person, and his values.

Psychological studies show that susceptible, vulnerable people, those prone to depression, people with a religious foundation can more easily accept false content and can come to believe it (Munger K., 2019). At the same time, social networks, through the possibility of repeatedly distributing a certain content, with a simple title create a feeling of familiarity, which determines the acceptance more easily of false content. The possibility of recognizing and understanding the phenomenon of false news on social media can be done through health literacy, and this should be formed at the level of society.

V. CONCLUSION

Nowadays, in the information age, people have unlimited access to information, as technology advances and communication platforms develop more and more, but among all this useful information, which has beneficial purposes in life, is skimming and fake news. They cause many problems in today's society, and it is necessary to make efforts to identify and annihilate them. More and more researchers have tried in recent years to find solutions to detect fake news on various social networks, whether it is Facebook, Twitter or Google, so new features have been added to social platforms to combat fake news.

This article analyzed the process of detecting fake news on Facebook through the Naive Bayes method, which provides a series of answers to the information provided by certain sites, recognizing the fake news with the help of parameters. Studies show that machine learning can provide very good results in terms of the accuracy of false news discoveries, so the model could be a good solution for an extremely large number of users of social networks.

False news studies indicate that fake news affects fewer people compared to truthful news, which provides accurate information about a particular event, but the negative impact of fake news on society is nevertheless known. False news, therefore, has the ability to capture the attention of a large number of people on social media, especially because of the headlines that are used and through simplistic, persuasive, and emotional content. Social media misinformation is created to obtain certain benefits, financial, political, cultural, or ideological, if they are widely spread and accepted by the population. Fake content is similar to traditional and truthful content, but the difference is that fake news distorts the truth, falsifies actions, and manipulates so that the topic becomes more surprising, incites the public, and in this way, fake content can go viral much faster than original content.

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