

# The Role of Social Networks in the Formation of Social Lifestyle Changes Caused by the Covid-19

Fatemeh Dehghan Khangahi, Farzad Kiani



**Abstract:** Today, the outbreak of the coronavirus has become a major global crisis and has affected many countries. One of the consequences of the spread of this virus is the creation of social panic and rapid changes in people's lifestyles, which the social networks are noticing. The impact of social media, which plays an effective role even in people's lifestyles, is being examined in the Covid-19 Pandemic. The purpose of this paper is to investigate the role of social networks in lifestyle changes in the coronavirus pandemic period. The present research is quantitative in terms of approach and in terms of type and nature, it is a descriptive survey. The data collection tool was assumed to be the Twitter social network. A total of 100,000 cases have been investigated based on the support vector machine (SVM) method and its results have been compared with decision tree and naive Bayes methods. Data processing is done using Python software. The trained model of SVM has a success rate on accuracy as near to 97% and also has 92% in the F1 score. The results show that social networks have about a 30% effect on lifestyle changes and stress during the pandemic periods. In order to form logical and desirable behaviors instead of dramatic behaviors such as fear and social stress in the use of social networks, social agents have their priority in organizing information and knowledge and informing the target community about the constructive and harmful cases of these networks and place different social roles and activities in society. Accordingly, providing the right news and information through trusted and responsible channels and platforms can play an important role in the proper management of society.

**Keywords:** Classification, Covid-19, Social networks, Support vector machine.

## I. INTRODUCTION

With the rapid advancement of today's technologies, Covid-19 disease and its effects on the human's lifestyle is significantly different from epidemics in previous years [1]. This virus was declared an emergency epidemic by the World Health Organization (WHO) on March 11, 2020 [2]. Medical science and innovative technologies are at the forefront of these advances. It is an indication of this that events and news

are just one button away from us, instead of being late. As the use of devices such as smartphones has increased, the effect and role of social media has become inevitable in people's lives [3]. So much so that social media channels are used more than watching news sites and TVs. It would not be wrong to say that social media, which has the largest population in the world, has become a super power for itself. Among the social media programs, Facebook, Twitter, Instagram, WhatsApp and Telegram are among the most popular and users. Almost everyone in the world uses these programs and many effective projects are signed. Of course, good issues may not always be trending, and misinformation can cause false perceptions, create chaos in a society, and conceive actions that can result in bad results. In particular, this information can have even worse results if it is published on purpose or unknowingly by public figures and a large number of high-profile followers. Social media can have an even greater impact in chaotic situations and environments such as war and epidemics, causing contaminated information to spread [4]. Outbreaks appear to be exacerbated during pregnancy and in children. However, pregnant women, families with children, the elderly, the sick with previous backgrounds, people with disabilities, and low-income people are more likely to suffer from disproportionate damage in epidemics and natural disasters. In the global COVID-19 pandemic, governments and non-governmental organizations find themselves in an uncharted territory, devising responses and trying to deliver programs and services to protect their health and safety. Overcoming this and unprecedented challenge, more than ever, can depend on the collaboration and direct participation of each individual. As the situation progresses, it is critical to monitor the attitudes, perceptions and behaviors of all individuals. For this, analysis of social media and networks can guide the way. Social networks are observed to have a very important role in the social and economic dimensions of the COVID-19 crisis [4], [5]. In this study, a multidisciplinary study was taken into consideration and the data of individuals were collected from engineering and social networks and analyzed and interpreted from the social dimension. The rest of this paper is organized as follows. Section 2 describes the related works. Section 3 explains the detail of the proposed methods with results. Finally, conclusion and future works are given in the last section.

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## II. RELATED WORKS

Social media platforms have the ability to increase emergency alerts, crisis response actions [5], search and publish information [6], fundraising [7], or non-hierarchical collaboration [8]. As a matter of fact, the Internet has given a voice to all of its users, but it is up to the people to use this facility.

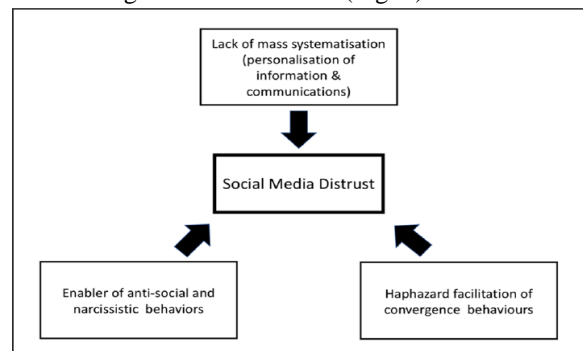
While some share correct information, others may share misleading and erroneous information. As it shares false information (example: retweet), it causes false propaganda to spread in the society. Social media channels are very advantageous for these groups. In the literature, this topic has been dealt with in various dimensions. Previous studies highlight the strategies behind the dissemination of this content [9]. The reasons for this may be parameters such as money and political power, and the main purpose may be to deceive local or global people with false information. By making a transaction with its social network, it can reach all societies in a more rapid fashion [10]. In addition, fake news spreads more rapidly and may cause money by becoming trending [11]. In today's societies, the use of social media has become a necessary daily activity. These media are typically used for social interactions and access to news and information. In this context, in line with the information obtained from these channels, individuals make decisions, make comments, pass on to their friends and give advice. Media researchers believe that the most important changes that force the media to use methods to attract the attention of their followers in the dissemination of information, is due to changes in consumption habits, and users spend most of their information on networks they republish socially [12], [13]. Therefore, the functioning effect of social media is increasing more and more compared to traditional media and it is now becoming an adopted application [14]. The growing influence of social media helps the characteristics and adoption of innovations perceived by individuals. For this reason, it has an effect on various parameters. Comparative advantage, complexity, consistency, flexibility, and visibility [15]. The levels of adoption reflect the fact that innovations can be different. The decision to adopt or reject these innovations is up to users. Thus, education level, welfare level and many parameters have an effect. These parameters are also directly related to the sharing rates of fake or real news. In a study on Covid-19, the subject of liberate was discussed and the Twitter platform was used. Various protests took place due to mandatory social restrictions and sometimes slackness brought with the start of Covid-19. In addition, unfair resource allocation and behavior managed to ignite the issue. In this study, the authors held massive protests in June 2020 over the murder of African-American George Floyd [16] and used their social platforms strongly in this. In addition to this death, the protesters also tried to express their objections about Covid-19 (both on the street and on social media) [17], [18]. Another study in the literature focused on the subject of Sense-making. The term meaning formation was introduced by Darwin and his colleagues in 1986 and is an individually created information process [19]. External signs show what each situation means by individuals. Today, social media plays a similar role in this regard. In this study, crisis

management based on this method and social media effect are discussed. The key factor in successfully responding to a crisis is the sharing of information between individuals and organizations in an effective and coordinated model, regardless of their location [20]. Twitter seems to be a popular social media platform for research on crisis management and interpretation. The main reason for this is that comments have been made for its instant and current status [21]. Therefore, in this study, we based on Twitter data and it was included in the analysis in approximately 100 thousand Twitter data about Covid-19.

## III. METHOD AND MATERIAL

Due to the increasing interest in social media platforms, calculations and analysis methods in this field are increasing more and more, and have become a new field of research in recent years. The analysis and calculation of large-scale data generated by users has become a phenomenon. Social networks such as Facebook and Twitter can be given as examples within this conjuncture. In this study, Twitter platform is discussed. This platform can be a productive tool for model formation and analysis as it is used by people of different cultures and individuals with opposing views.

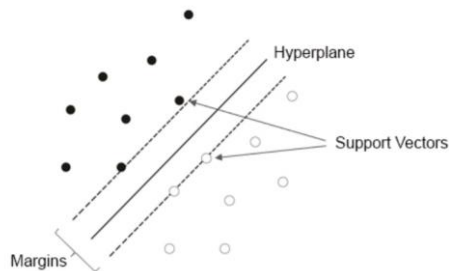
Social media platforms can inevitably cause insecurity due to the reasons and examples mentioned earlier [1]. Currently, its effectiveness and scope for use in informal collective decision-making in crises is limited (Fig. 1).



**Fig. 1. Factors contributing to social media distrust [1], [22].**

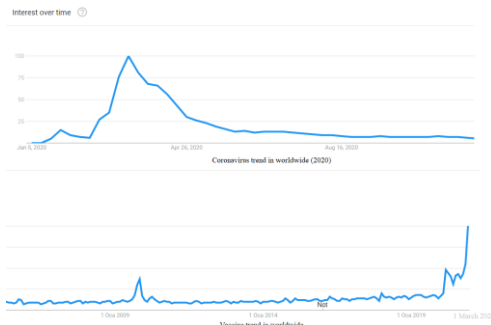
In this study, we focus on support vector machine (SVM) [23] to data analysis of Covid-19, which were reached by Twitter. The SVM method is based on statistical learning theory [24] and basically classifies the model, class and tags in this method into two different groups and its purpose is to create optimal hyper planes and increase the flexibility of the relevant model [25]. SVM is used to solve classification problems, find the sub plane with the largest separation space (delimited by margins) among the categories of the selected variable. Fig. 2 shows the general representation of an SVM. The lower plane is the equation that separates the two classes, while the support vectors are the data points closest to the margin boundaries. In this context, randomly selected tweets and individuals are discussed from international societies. In order not to be mistaken for the model to be created and the machine to be learned, news containing fake information were also included.

The fake news can consciously or unconsciously endanger online users in the ecosystem for a variety of harmful content [27]. As mentioned before, in this study, Twitter data was taken up and included in the analysis. In terms of effective role features on Twitter in emergency news and crisis is very important that are generally handled by agencies management organisms and multicast information to society.



**Fig. 2. Represented SVM by showing the support vectors, hyperplane and margins [26].**

The data was obtained through a self-developed browser based on the Social Media Analysis Framework (Stieglitz et al., 2018) and using the Twitter4J open source library. Between 1 April 2020 (0:00 UTC) - 1 May 2020 (23:59 UTC), and 20 August 2020 (0:00 UTC) - 20 September 2020 (23:59 UTC) a total of 100 thousand Twitter data were collected for two separate periods. The searched keyword was "Covid-19", "Coronavirus", "Coronavirus Vaccine", "Sars-Cov-2", and "Cov". The used datasets have been presented in Table I, II, and III. The trend statuses of coronavirus in all search engines in 2020 is presented in Fig. 3.



**Fig. 3. Coronavirus and its vaccine search trend in worldwide in 2020 [28].**

The purpose of this is to compare the nature of the tweets made in the months of the first Tuesday with the second interval and analyze the reactions and approaches of people regarding this epidemic. These data are classified with a SVM to analyze the negativity rates in people's lives. The general working mechanism of our proposed method in the study is presented in Fig. 4.

**Table- I: Dataset of two groups**

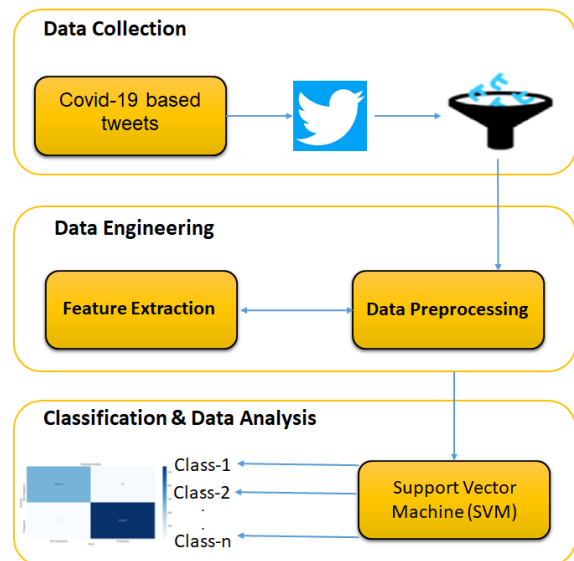
Role Kind	Total Tweets	Total Tweets (first half)	Total Tweets (second half)
Private Persons	34.919	20.417	14.502
Government officials	28.478	18.172	10.306
Celebrities	5.496	4.780	716
Health doctors / professionals	31.107	17.124	13.983

**Table- II: Dataset of user category at April-May**

Role Kind	Total Tweets (first half)	Post rate	Retweet or share rate
Private Persons	20.417	%20	%80
Government officials	18.172	%70	%30
Celebrities	4.780	%45	%55
Health doctors / professionals	17.124	%55	%45

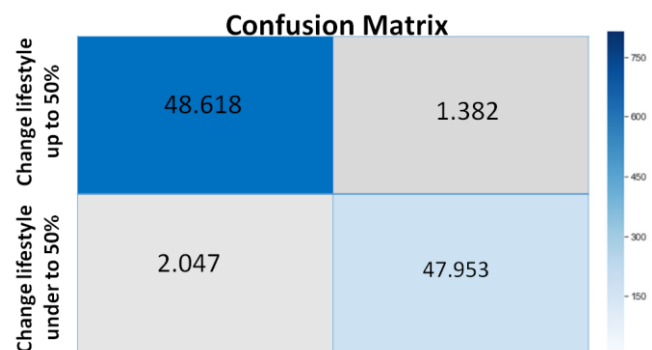
**Table- III: Dataset of user category at August-Sept.**

Role Kind	Total Tweets (second half)	Post rate	Retweet or share rate
Private Persons	14.502	%10	%90
Government officials	10.306	%67	%33
Celebrities	716	%25	%75
Health doctors / professionals	13.983	%60	%40



**Fig. 4. Proposed system for identifying changing lifestyle rate on online social networks.**

The confusion matrix of the machine learning algorithm is shown in Fig. 5. We performed ten times cross validation to validate our work. In addition, it is observed that there was neither under-fit nor over-fitting during the training and testing of the proposed model. After analyzing, we analyzed the change rate of COVID-19 in the lifestyle of individuals according to tweeter data.



**Fig. 5. Confusion matrix of SVM**

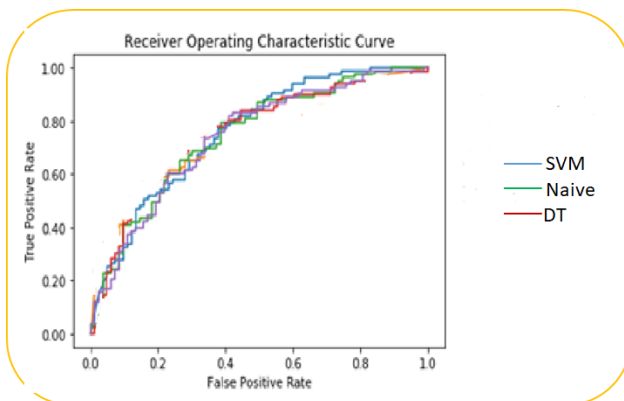


The results of our method are presented in Table IV. As a comparison with other two machine learning methods (decision tree and naïve Bayes). In this comparison for discussing has been used six parameters.

They are maximum accuracy, mean of accuracy, standard deviation, area under the curve rate, average precision rate and F1 score. The comparison of three methods are also presented in Fig. 6.

**Table- IV: Results and Comparison**

Classifier	Max Acc	Mean Acc	Std	AUC	AP	F1 Score
SVM	0.97	0.95	0.03	0.94	0.96	0.92
Decision Tree	0.92	0.88	0.05	0.85	0.88	0.87
Naive Bayes	0.91	0.88	0.06	0.87	0.89	0.88



**Fig. 6. Comparison of Proposed system with Naïve Bayes and decision tree method**

## IV. ANALYSIS AND DISCUSSION

According to the results obtained, people living in different cultures and countries were seriously affected by fear and restrictions in the first place, but after a few months, the cases decreased, the weather got warmer, the management and specialist doctors learned how to cope with a disease and the success in vaccination has sparked people's hopes and the fear rate decreased and the tendency to return to normal lives increased. Furthermore, when tweets made according to two different time periods are analyzed, it is seen that people in the second half (August-Sept.) experience less stress and panic compared to the first half. In other words, they somehow accepted that they had to live side by side with this pandemic and accepted that they had to adjust their lifestyle accordingly. It is also possible to provide an overview of the issue in terms of the concept of risk society, which emerged in the 1980s and gained popularity in the 1990s. The concept of risk, which is the defining feature of post-modern societies, has been discussed by many authors. Among them, the German thinker Ulrich Beck can be mentioned [29]. Modernization, the focus of Beck's theory, produced industrial society by eliminating the feudal society in the 19th century. According to Beck, modern society is separate from pre-industrial and even industrial societies. Industry prevents floods with dams built by humans, produces and grows food by expanding agricultural land, prevents deadly diseases with the medicines it produces, and thus manages to overcome natural disasters. However, new man-made products

themselves lay the groundwork for various dangers. For example, nuclear energy, weapons of mass destruction, HIV, BSE, global warming caused by the reckless use of fossil fuels, terrorism, etc. issues put the planet at risk of extinction. At this point, it is now witnessed that the risks become threatening to all humanity, from local to universal, from North to South and from East to West. However, individuals have focused on customizing their personal activities in order to avoid and survive major risk scenarios.

The Covid-19 Pandemic, which has been an example of global risk that has swept the world for nearly a year, continues to have various effects on people and nature. In this study, when looking at human behavior in two processes (1 April- 1 May), an approach with high uncertainty and anxiety is followed in the first process. In the second phase (20 August-20 September), the activities focusing on vaccination studies, which are mostly seen as a salvation way around the world, gained momentum. However, it is possible to talk about the formation of a life style of learning and a kind of 'coping' effort, either as a result of the policies followed by the administrations in the way of "normalization", and in the direction of the information people obtain individually or socially. The main purpose in a risk society, which is a side effect of modernity, is the aim of survival, which can be called security and stability rather than profit. In other words, dealing with risks has become not only a social action but also an individual action. However, personal decisions can also have international consequences. In this process, the emergence of uncertainty regarding the future has affected the environmental life as well as human and society. As seen in the announcement of Covid-19 as a worldwide Pandemic, the responsibility of the individual in the society is frequently emphasized and it is highly important to create an awareness in this direction. This can be effective in creating a global thought and impact in our age where technology and communication tools such as Twitter are widely used.

## V. CONCLUSION

In this study, tweets in two different time periods related to Covid-19 were based on a total of 2 months. The aim is to analyze how the news and information shared about the pandemic on social media have impacts on people's normal lives. Three different machine learning methods (Support Vector Machine, Decision Tree and Naïve Bayes) were used on 100.000 tweet datasets. According to the results, SVM method was found to be more successful. Also, according to the analysis of the results, it seems that the panic and stress rates of individuals decrease as the pandemic months' progress. One side effect of modernity is risk society. Dealing with risks has become not only a social action but also an individual action. As seen in the announcement of Covid-19 as a pandemic worldwide, the responsibility of the individual in the society is frequently emphasized and it is extremely important to raise awareness in this direction. This has been instrumental in creating a global thought and influence on the widely used social platform such as Twitter.

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