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Roles of online social media platforms and artificial intelligence in diffusing the impact of COVID-19 as scientists find a cure

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17.1 Introduction
The recent global threat faced by nations worldwide is coronavirus disease 2019 (COVID-19). On January 30, 2020, the World Health Organization (WHO) declared that the outbreak constitutes a “Public Health Emergency of International Concern” [1]. The origin of COVID-19 is traced back to its outbreak in the city of Wuhan located in China, where it was first reported and from where the spread began [2,3]. International Committee on Taxonomy of
Virus on February 11, 2020 announced the name of the present virus as “severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)” [4]. On the basis of metagenomics, SARS-CoV-2 shows close resemblance to SARS-CoV and MERS-CoV and is showing its evolutionary traits from bat and pangolins (as intermediate host) [3]. Coronavirus is a zoonotic disease and is continuously mutating. Within the last 6 months, the virus has spread to more than 216 countries resulting in 16,523,815 confirmed cases with 655,112 deaths worldwide (as of July 29, 2020) [5]. People infected with the coronavirus usually suffer from mild-to-moderate respiratory symptoms. Geriatric patients and those with medical history of diabetes, cardiovascular disease, chronic respiratory diseases, and cancer are at higher risk of getting infected by COVID-19 which may be fatal [6]. Pandemic conditions like H1N1, flu, COVID-19, and so on require specialized measures to be undertaken by the healthcare sector to provide basic knowledge and information to the common people to prevent risk exaggeration and dramatization [7,8]. Social media and online networks are of greater importance during such conditions of pandemic [9]. They have universal availability, transcend, and a considerable impact on the information available to the public [10,11]. During the pandemic outbreak of COVID-19, social media is participating actively in making people aware about the deadly virus by creating information hubs. Various applications are deployed to alert people about the health crisis and provide information from credible sources [12]. Many social platforms have partnered with the WHO in tackling the menace of misinformation and reducing the panic caused by the spread of harmful information from nontrusted sources [13]. Social media is also penetrating into deep fundamentals of healthcare in fighting psychology-associated issues by employing its feature of pooling and analyzing sentimental data and coming up with suggestive measures of combating the problem by introducing dedicated websites and chatbots with the assistance of artificial intelligence (AI) [14]. By employing advanced technologies of AI and deep learning, social media is being exploited to its full potential in tracking the spread of virus [15]. Owing to the lockdown imposed in several nations, a surge in the social media activity is being noticed as majority of people are looking up to social media for latest updates on the virus. In this situation, social media influencers are playing a major role in convincing people to exercise the social distancing measures as suggested by governments [16].

This chapter potentially focuses over the role of various social networking platforms as informers in creating awareness, its methodologies of filtering the information, its role as a psychological aid, and as an efficient tool for tracking the spread of the virus along with the brief role played by social media influencers. The basic objective is to review their applicability in healthcare systems to fight against the pandemic situation of COVID-19 and emerge as an efficient tool for the future.
17.2 Emergence of social media

With colossal changes in societies, consequent changes in disease patterns are seen. These changes require efficient systems to locate and mutate the information drawn from them into a database or repositories which can be used as a tool against this vicissitude nature of society and disease patterns [17]. With the evolution of media from 14th century, encompassing knowledge in forms of newspapers and press releases, till date not only the form of media changed but also advancements in technology drove the entire process. Till now, newspapers have dedicated columns on reliable and correct information as the press releases are under the control of the government. As advancements took place, people proceeded to acquire fast and unfiltered information from televisions which came in 19th century. The end of the 19th century saw a booming phase of the internet. The most recent form of media is the internet, which is termed “social media” [18]. Social media now has several platforms that mainly include Wikipedia, Facebook, microblogs (Twitter), Instagram, and WhatsApp [19]. Data scientists and IT professionals are using their immense knowledge in creating headway to come up with technology that will involve social media in the healthcare industry [20]. Social media is a diverse and rapidly developing technological platform that offers online communal spaces for the public or a group of people to interact, coordinate, exchange information, discuss, or coproduce.

The world has witnessed various pandemics to date, but at that time, the healthcare sector was working alone to fight the menace. This can be attributed to our lack of technological advancement and preparedness back then. It was during the pandemic of H1N1 virus that the potential of social media in combating the pandemic was discovered. Facebook played a major role by implementing its “preventive health tool.” After that pandemic, humans started to work toward gathering all the literature and strengthening their database. Currently, social media and networks are playing an indispensable role during the COVID-19 outbreak by acting as a tracking tool, creating awareness through information hubs, tackling misinformation hazards, and providing psychological aid during self-isolation [19]. Thus, we can say that the integration of technological advancements like the social media platform and healthcare sector can help us fight the pandemic in a more structured and prepared manner by contributing efficiently toward health communication.

17.3 Role of social media in pandemic

17.3.1 Role as informer

When several nations are struck by the pandemic, people rely on media for the latest information. Media has always been a step ahead in creating cognizance among the public by utilizing its resources in the most efficient way possible. Online social media which comprises of social sites and social applications,
which reaches the population faster than any other media, often disseminate relatable information. Various situational information which includes advice, caution, circulars, notifications, and information related to the COVID-19 diffusion, symptoms, and treatments are continuously updated and flashed on the official government sites and are being made accessible in the public domain. Social media is playing an active role in being a single and strong point of contact between health authorities and the general public. One such case study is of “Prince of Wales” hospital, wherein during the spread of SARS-CoV pandemic, the department utilized its technical knowledge and in situ simulation in creating an infographic of airway infection management in different dialects and published it across social platforms like Twitter, WeChat, and on the department website. The rapid uptake and exchange of information occurred just in time and helped in the period of the pandemic [21]. Another such initiative encompassing the dynamics of online social media and telemedicine was practiced by the Iranian Society of Radiology. A panel of competent doctors was set up to resolve issues related to the diagnosis of COVID-19 and help the fellow physicians on reporting of CT scans, radiographs, and even patient counseling [22].

Apart from this, many social platforms have joined hands in bolstering the available information sources in credible ways [8]. Various governments across nations are taking enormous steps on creating information hubs to spread awareness among a wider population about the virus outbreak. WHO is involved in religiously posting health updates about the pandemic along with interactive health infographics and figures in multiple dialects [23]. Following online social media platforms are coming up with their own ways of tackling the pandemic outbreak by providing credible information and their initiatives are listed below in Table 17.1.

Various educational platforms like Google Scholar notify readers about top-notch journals providing information about COVID-19 epidemiology and innovations in the field of research associated with the virus. The Elsevier publishing house has taken responsibility to make free resources, including

| Platforms   | Initiative                     | Role                                                                 |
|------------|--------------------------------|----------------------------------------------------------------------|
| Google     | SOS alert system               | Providing news, safety tips, and information from credible sources like WHO [24]. |
| WhatsApp   | Coronavirus information HUB    | Chatbot services partnered with WHO providing virtual support against virus outbreak [25]. |
| Twitter    | #Medtwitter, #COVIDFOAM        | Dissemination of medical information to clinicians [26]. |
textbooks and articles associated with COVID, accessible to the wider public thus contributing to research [27]. LinkedIn which is a professional platform has a separate page dedicated to information related to coronavirus. Social media is actively involved in spreading plausible information. Online social networking is helping to shape this knowledge into a powerful weapon by playing an important role in disseminating credible information to the public.

17.3.2 Social media and misinformation—a double-edged sword?

Humans have been known to make use of every luxury at their disposal in two ways—positively and negatively. Similarly, social media is not only being used for its social connecting advantages but also can be misused many times. Currently, three things are spreading like wildfire—coronavirus, information, and misinformation about coronavirus. Nations worldwide are held under total lockdown situations and the common public is anxious about the facts of the virus. In such conditions, people try to seek any kind of information from social media and networking platforms [16,28].

In the earlier days, the only means of spreading information was by the word of mouth, because of which it could be filtered before presenting anything to the public, but with the advent of new technology, many new ventures have been created which have been used for spreading information and misinformation [29]. AI, machine learning, filter bubbles, text mining approach, and various filtering algorithms are being used to refine and strain out fake or wrong information from social platforms [30]. Misinformation can be made to spread deliberately or accidently because of the flaws present in the filtering algorithms [31]. Social media is a very fast and far-reaching mode to disseminate information because of which fake news, as well as misinformation spread to a huge audience in a very short time. Misinformation on social media regarding the origin, treatments, cure, spread, and mortality rates of the virus has created a situation of infodemic (havoc due to the spread of wrong information during pandemic conditions), which is making it difficult for the public to distinguish between credible and untrustworthy sites because the signal-to-noise ratio decreases.

It was studied and found that misinformation campaigns are being arranged to create a state of miscommunication and misbeliefs in the minds of the common public. Such campaigns lead to disruption of social trust and engage the human brain into emotions of fear, hatred, anxiety, and disbelief. These very emotions lead to the viral spread of fake messages. Such news first is updated on marginal sites but they spread like a wildfire because of the likes, clicks, and views they gain especially from fake profiles [32]. Such misinformation that spreads on social media has depredated law systems worldwide.

The epidemic of panic and fake news hit India even before the first case was reported. People all over India had erupted into a state of panic and thus resulted in buying and hoarding of groceries, masks, or sanitizers. Fake news
of the spread of the virus through the air and lack of proper knowledge of the use and disposal of masks led to the amplification of this wave of the pandemic. Misinformation about the use of few herbal drugs for acquiring immunity against the virus was also spread on social media. The impact of fake news on social media fueled with ignorance, lack of education, and proper regulations was clearly exhibited and studied in India during this pandemic situation [33].

Incidents like panic buying of groceries and masks [34] or the case of intake of chloroquine overdose by people in Nigeria and Brazil [13,35] or racism toward Chinese people [35,36] have all been evoked because of the spread of fake news on social media platforms during COVID-19 pandemic. Many computational models are trying to assess the effects of such fake news during conditions of pandemics. In one such study, it was revealed that alternate media (output seen on Facebook pages collected from the German database) has the potential to spread essentially not lies, but not even the actual facts [37].

In such conditions, it is inevitable to take a few alarming steps to curb the spread of misinformation and reduce panic. WHO along with the government of the United Kingdom has started an awareness campaign called “Stop the Spread” [38]. This campaign aims at educating people about the consequences of trusting misinformation and inviting and encouraging them to seek help only from trusted sources such as the WHO site or government public health authorities.

Few steps that were taken by online social networking media for fighting the problems of fake news and misinformation are stated in Table 17.2.

### 17.3.3 Role as psychological aid

With the rise of the COVID-19 pandemic throughout the world, several nations have imposed lockdown on trades, markets, and public spaces to minimize the virus spread among people. This lockdown has several implications on the

| TABLE 17.2 Various steps taken by social platforms to prevent fake news translation through media platforms. |
|---|---|
| Platforms | Steps taken |
| Facebook | Users or government officials can flag the posts with fake news or misinformation [31]. |
| WhatsApp | Put restriction on the number of people to whom a message can be forwarded at a single time [39]. |
| Twitter | Tweets with fake news and misinformation are banned [31]. |
lives of individuals both physically and psychologically. Self-isolation methodology is being imposed by governments across countries addressing people to quarantine themselves from the deadly communicable virus. Self-isolation can help in breaking the virus spread chain. This has caused a major change in psychological behavior of individuals with accelerated negative emotions of stress, anxiety, fear, and distress associated with the pandemic situation [40].

The mental health of individuals is a crucial concern of every nation. Till date, no clear understandings are established related to disease-linked psychiatric repercussions [41]. However, many scientists are involved in using digital technology involving social media platforms to monitor and estimate the psychological determinants and their implications on the pandemic outbreak.

One such case study used the Weibo dataset for analyzing the negative emotions based on principles of big data and deep learning. Weibo is a popular platform used by Chinese citizens in order to socialize with the larger population. This study made use of the Online Ecological Recognition technique to pool the negative psychological determinants of stress, anxiety, fear before and after COVID-19 was declared (January 20, 2020). The Text Mind digital system was used along with features of the Chinese word segmentation tool and psychoanalytical dictionary. These tools helped in breaking and sorting the words in text messages to identify the negative emotions among the public. This prediction model was successful in identifying the emotional indicators and focused on understanding the concept of deterioration of mental health of individuals during such crisis period which recorded a statistically significant increase in negative emotions after declaration of COVID-19 outbreak [42].

In order to help people cope up with psychological distress, various social media platforms are playing an enigmatic role to curb the menace of unstable psychological health. WHO has a separate dedicated space to deal with psychological issues and has a supplementary tool in Question and Answer format. It also has displayed a helpline number and website for contact purposes. Mental Health Europe (MHE-SME) has launched a site that is specifically catering to people seeking psychological help wherein clicking on countries automatically provides information on medical helpline and contact information of that particular country [43]. Similarly, many countries are flashing their medical outreach contact information and website details, thus helping people to cope up with mental illness during lockdown. Telemedicine and telehealth services are much in demand now than usual. China has introduced telemental health services which include public counseling and psychoeducation using social media platforms and also protecting the privacy of the patient simultaneously. The Australian Government on the other hand has widened its teleservices to rural and low socioeconomic zones, thus safeguarding the mental health of patients [44]. Strategies involving virtual chatbots and messaging applications, which will help in understanding the mental status of individuals and reducing the misconceptions about the virus,
can be a possible solution to the problem which will involve social media platforms and networking. Twitter is taking steps to help people fight with anxiety by allowing them to have access to courage stories of frontline healthcare workers which will create a positive mindset of people in this harsh time [26]. Social media will never be able to replace human connections, but will provide resilience in the period of the pandemic when social distancing is necessary.

17.3.4 Social media as a tracking tool

A larger population uses social media as a platform to connect and mingle with the outside world. Ever since COVID-19 was declared a pandemic by WHO, social media platforms are being used for tracking the spread of the virus by pooling the population mobility globally [45]. People travel from one part to another and so does the virus along with them. Using technologies and big data-driven algorithms to track the global spread is beneficial to know the spread pattern of virus from one region to another. One such initiative is taken by UNICEF along with other digital partners by launching the “magic box” which is a big data initiative that uses smartphone information of individuals in tracking their spatial mobility around the world. During the initial study, it was found that a majority of people travelled from China to Egypt which provided an alert of virus transfer across nations. Soon UNICEF shifted its focus from live tracking to identify the success of “sit-at-home” initiative portraying a reduction in travel histories of individuals from the time of the announcement of global lockdown [46]. Various countries are using the knowledge of AI and deep learning tools to create mobile applications which aid in the tracking of the virus in close proximity. Countries like China, Taiwan, and South Korea are using GPS and mobile tracking approaches [47], whereas Germany and Europe are using an anonymous data tracking system. Denmark has recently come up with an innovative technological application “Mobile Proximity App” which uses the principle of estimating the distance between two mobile applications which would signify the close proximity of two individuals. If the distance estimated is less than 6 feet, applications exchange the unique identifiers. If the user doubts that he/she has been in close proximity to an infected individual, he/she can ask the central authority of “Mobile Proximity App” system to provide details about the health status of the individual suspected of infection [48,49]. World’s leading countries and their technological applications are listed in Table 17.3.

Social media-based platforms in partnership with start-ups and digital technology-based junctures are employing data mining procedures into big data algorithms. These semantics from data science and deep neural network services can direct us toward interesting findings and future research plots which can be exploited to deal with the pandemic crisis. Various technologies of social platforms used to track the spread of the virus are listed in Table 17.4.
Irrespective of success stories of tracking technologies, we cannot ignore the fact that this technology cannot surely guarantee the spread of virus as a considerable proportion of people are not equipped with smartphone and android-based technologies. Further research in this field can fuel the knowledge of data tracking and its usage in times of pandemic.

### 17.3.5 Social media influencers

Emerging pandemic requires unique techniques and routes to be adopted by the health and education agencies to tackle the global issue [8]. Social media is the foremost option available with the public to fetch current information about the pandemic. Thus, governments have resorted to making full use of this platform available. They have partnered with social media platforms for dedicated spaces to provide uninterrupted and credible information to the public. Influencers and content creators have proved to be useful during such situations. Any person who has established credibility and belongs to a particular industry having utmost knowledge of the respective field with a

| Countries          | Mobile applications               |
|--------------------|-----------------------------------|
| United Kingdom     | COVID symptom tracker [50]        |
| South Korea        | Corona 100 m [51]                |
| India              | Aarogya Setu [52]                |
| Australia          | COVIDSafe [53]                   |
| China              | Close contact detector [54]       |
| Singapore          | TraceTogether [55]                |

| Platform           | Technology          | Implications                                |
|--------------------|--------------------|---------------------------------------------|
| Facebook           | Data for good      | Population mobility data [56]               |
| Microsoft-bing     | COVID-19 tracker   | Tracking severe cases and infected people [27] |
| Twitter            | COVID-19 project   | Complete testing data of individuals [57]   |
huge audience can coax the public to take few actions and can be termed an influencer [58,59]. In terms of conditions like pandemics, it can be said that these influencers have a very positive impact on the minds of the common public [16]. In the current situations of coronavirus and subsequent lockdown faced by different countries, it is seen that these influencers are taking steps and are trying to spread awareness about the situation and to reduce havoc [16]. It is found that the influencers are encouraging the common people to stay at their homes and follow the rules put forth by the government. They have been sharing their home workout regimen such that people can stay physically fit and mentally healthy in their homes. Many actors, singers, and public figures are joining hands and producing encouraging videos and speeches and trying to contribute their part toward the world [60].

17.4 Conclusions and future perspectives

Social media platforms and social applications are a new-age tool in health communication and are proving to be useful to tackle the current COVID-19 pandemic situation. This chapter briefly summarizes the role of social media platforms and technological applications in translating credible information about coronavirus as well as different strategies employed by the social platforms to avert the spread of false information. Social media aims toward fostering the mental well-being of individuals having psychological troubles of anxiety, fear, and stress, due to conditions of lockdown, by integrating with sentimental analysis and deep learning tools. Tracking spread of the virus is one of the most eminent roles played by social media to mine data of global mobility and present it to the health authorities in helping them to plan future strategies about the virus outbreak. Social platforms come with the feature of social media influencers who are helping in escalating the awareness related to the COVID-19 outbreak to much larger population. Despite the success stories of social media, they are often faced with certain grey areas which question their utility in pandemic crisis. Although with the launch of information centers and active steps taken by social media to create awareness, there still is a need to maneuver the population toward credible sources and requires more renowned strategies to enter deep into the public domain. Advance technological tools should be implemented along with social platforms with a feature of notifying the user of fake information which will help individuals to imbibe only credible information from a trusted source. While using social media to help psychologically weak individuals, providing them with a sense of confidentiality should be the utmost concern. Features of chatbots and websites should be publicized more in order to target larger groups. Using social media to track the spread of the virus has loopholes of accuracy in tracking the exact proximity of people rather than application proximity. This calls for hot areas of research in the field of technology development. Social media influencers, who are the face of media, should partner with governments to exercise
their social power for the noble cause toward society. Better integration of social media platforms with governments will help in generating authenticity of these platforms and will help the government to reach a wider population. The pandemic situation calls for the need for social media to be vigilant and trustworthy enough so as to help the health communication sector and society to fight against such crisis in the near future.

**List of abbreviations**

AI  Artificial intelligence  
COVID-19  Coronavirus disease 2019  
GPS  Global positioning system  
ICTV  International Committee on Taxonomy of Virus  
IT  Information technology  
MERS-CoV  Middle East respiratory syndrome coronavirus  
MHE  Mental Health Europe  
ML  Machine learning  
OER  Online ecological recognition  
PHEIC  Public Health Emergency of International Concern  
SARS-CoV  Severe acute respiratory syndrome coronavirus  
UK  United Kingdom  
UNICEF  United Nations International Children’s Emergency Fund  
WHO  World Health Organization

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