

كوفيد-19 وديناميات تويتر في دول مجلس التعاون الخليجي: تحليل كمي ونوعي

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ملخص

هدف الدراسة: تهدف هذه الدراسة إلى تحليل آراء الجمهور على تويتر حول لوائح الحكومات المتعلقة بكوفيد-19، والتي تُعرف بشكل غير رسمي بين الناس بـ "الوضع الطبيعي الجديد في دول الخليج العربي"، وذلك للتوصل إلى فهم أفضل لمواقف الجمهور ومخاوفهم تجاه سياسات كوفيد-19. **المنهجية:** تعتمد هذه الدراسة على منهجية متعددة الأساليب، تجمع بين التقنيات الكمية والنوعية لتحليل بيانات تويتر المتعلقة بجائحة كوفيد-19 في دول مجلس التعاون الخليجي. ويتسم التصميم بالطابع الاسترجاعي، حيث تم استخدام بيانات تويتر المتاحة للجمهور والمجمعة خلال الفترة من يناير 2020 إلى ديسمبر 2021. تم جمع بيانات تويتر المتعلقة بجائحة كوفيد-19 منذ يناير 2020. وقد تمت الاستعانة بمكتبة "Snsrape" بغية استخلاص التغريدات، فضلاً عن حزمة "AraNet"، وهي أداة تعلم عميق لمعالجة النصوص العربية على وسائل التواصل الاجتماعي، لأجل القيام بتحليل للمشاعر والانفعالات. **النتائج:** أشارت النتائج إلى أن المحتوى النصي للتغريدات الذي يعكس مشاعر الناس يتغير مع تبني الهيئات الرسمية في دول الخليج العربي سياسات ولوائح جديدة متعلقة بجائحة كوفيد-19. ينبغي تقييم تحليل التغريدات المرتبطة بآراء الجمهور كي تعتمد الحكومات إلى جانب استطلاعات الرأي ووسائل قياس المواقف الشعبية التقليدية. **الخلاصة:** تركز الدراسة على جانب أساسي من لوائح كوفيد-19 وكيفية تعبير الناس عن أنفسهم (إيجابياً، أو بشكل محايد، أو سلبياً) على منصة تويتر.

المصطلحات المفتاحية: تويتر، دول الخليج العربي (GCC)، كوفيد-19، حزمة AraNet، وسائل التواصل الاجتماعي.



COVID- 19 and Twitter Dynamics in GCC Countries: A Quantitative and Qualitative Analysis

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Abstract

Objective: This study aims to analyze public opinions on Twitter regarding COVID-19 governments' regulations, which are informally referred to as "the new normal in the GCC" in order to better understand public attitudes and concerns about COVID-19 policies.

Methodology: This study employs a mixed-method approach, integrating quantitative and qualitative techniques to analyze Twitter data related to COVID-19 in the countries of the Gulf Cooperation Council (GCC). The design is retrospective, utilizing publicly available Twitter data collected during the period from January 2020 to December 2021. "Snsrape" library was used to scrape tweets as well as the "AraNet" package, which is "a deep learning toolkit for a host of Arabic social media processing", to carry out sentiment and emotion analysis.

Results: The results suggested that the textual content of the tweets reflecting people's emotions is changing with the adoption of the official bodies of GCC of new COVID-19 policies and regulations. Twitter analysis of public opinions should be evaluated to be adopted by governments alongside polls and other traditional ways of measuring popular attitudes. **Conclusion:** The paper focuses on an essential aspect of COVID-19 regulations and how people express themselves (positively, neutrally, or negatively) on Twitter.

Keywords: Twitter, Gulf Cooperation Council (GCC), COVID-19, AraNet Package, Social Media.

Introduction

COVID-19 is a respiratory disease caused by a novel coronavirus (SARS-CoV-2) first reported in Wuhan, China. On 11 February 2020, WHO declared the outbreak a pandemic. As of March 24, 2020, the number of confirmed cases has exceeded 8 million globally, while over 500,000 deaths have been attributed to the virus (WHO, 2020). Social media is crucial in capturing how the public feels about certain issues like COVID-19. This study intends to assess the attitudes and feelings of Twitter users in 6 different countries concerning COVID-19. During the COVID-19 pandemic, social media played a major role in disseminating updated health-related information and making it easily accessible to the public (Wang et al., 2020); based on relevant research, during the COVID-19 pandemic, there were approximately 468 million tweets on social media. COVID-19 impact on the Gulf cooperation council (GCC) was analyzed based on the tweets collected from the six GCC countries. This COVID-19 outbreak, along with the decline of international oil demand due to price increases, caused a healthcare crisis and commodity market disruption in the GCC nations, resulting in a 4.8% GDP loss in 2020. The GCC has managed to control the pandemic situation by evaluating the previous year and limiting the disease outbreak's economic impact, mainly by speeding up the process of acquiring vaccines. Nevertheless, GCC countries needed to improve their public sector budgets; during the pandemic, message propagation and social relationship were used due to the development of social media (Gu et al., 2019). The biggest challenge caused by social media outlets during COVID-19 was the proliferation of misinformation about pandemics which was called an infodemic (Zarocostas, 2020). Most of the information discussed on Twitter during the COVID-19 pandemic involved issues related to quarantine, prevention, staying home, loan salary, cleaning services, and curfew. The economic difficulties caused by COVID-19 were also discussed as an essential topic on Twitter. Five-day prayers and mobility supplications were the other attributes associated with COVID-19 on Twitter (Faour-Klingbeil et al., 2021).

Since social media platforms such as Facebook and Twitter were used by huge numbers of people, the Munich security conferences in 2020 highlighted that the world was not only fighting against COVID-19 but also against the infodemic spread of information on social media (Zarocostas, 2020). The Ministry of Health and the Centers for Disease

Control promoted the credibility of COVID-19 information by including direct links to the World Health Organization (WHO) website for verification purposes. Sharot and Sunstein (2020) stated that in Kuwait individual psychology and behavior were affected due to the dissemination of infodemic about COVID-19. According to Depoux et al., (2020), the infodemic was considered a threat to human community during COVID-19 since it spreads faster than the spread of COVID-19 virus. People of the GCC countries thought that Twitter was the best means of communication during the imposed social distancing restrictions. To communicate rules and regulations related to the pandemic, including social distancing, travel restrictions, and vaccination requirements, GCC governments created official Twitter accounts managed by their Ministries of Health. The study was mainly focused on people's reactions to the tweets quoted by GCC ministers of health in the period of COVID-19 pandemic from January 2020 to December 2021. The following were the objectives of finding out the people's perceptions of Covid-19:

- To examine the influence of public announcements by official bodies on Twitter to see the public reaction towards COVID and pandemic information
- To assess the degree of people's trust in official bodies such as the Ministry of health and the decisions and protocols of their ministers and councils.

Significance of the Current Study

The significance of this study extends beyond its immediate focus on the COVID-19 pandemic. While the analysis is centered on understanding public sentiment and emotional responses during this global health crisis, the findings hold broader implications. The methodologies and insights derived from this research can be applied to similar large-scale events, such as natural disasters, wars, economic crises, or other public health emergencies. By analyzing real-time social media data, this study provides a framework for understanding how populations react to crises, how public sentiment evolves in response to governmental policies, and which communication strategies resonate most effectively with the public. Such insights are invaluable for policymakers, health authorities, and crisis management teams, as they offer guidance on how to better engage with communities, tailor interventions, and mitigate negative emotional and

psychological impacts during future emergencies. In essence, this study not only contributes to the growing body of literature on COVID-19 but also establishes a scalable and replicable approach for leveraging social media data in understanding and managing human behavior and sentiment in times of crisis.

Literature Review

The Influence of Official Bodies' Twitter Statements on the Public

In the Arab region, Twitter is one of the famous social media platforms where the Arabic language is one of the most dominant languages according to Alshaabi et al.,(2021). The government has the duty of preventing the spread of anonymous and harmful messages on social media during the COVID-19 pandemic. By searching Twitter, people could obtain the latest information regarding COVID-19 from the Ministry of Health. By following certain Gulf official websites, nearly 123 million tweets were collected by Chen et al., (2020). By considering the time of writing, nearly 152 million tweets were collected by Banda et al., (2020). Situational information regarding COVID-19 and its spread was collected from tweets by Li et al. (2020). In addition, tweets containing misinformation about COVID-19 were categorized by Huang and Carley (2020). Also, rumor amplification tweets were collected by Cinelli et al., (2020). Related to COVID-19, a large dataset of Arabic tweets was combined by Alqurashi et al., (2020). Arabic tweets against COVID-19 were gathered by Haouari et al., (2020).

Day by day, Twitter received hundreds of millions of tweets. Initially, Twitter data were used to track the spread of diseases such as Ebola (Roy et al., 2020), Zika (Vijaykumar et al., 2018), and influenza. Tweets posted by official authorities were analyzed to capture the dynamics of these diseases and related global events. Additionally, understanding the structure and characteristics of diseases, as well as their development and impact on people, helped authorities make informed decisions. On Twitter, the first Arab tweet about the first novel case of COVID-19 drew the attention of many people in Gulf countries. On their Twitter accounts, the governments of Gulf countries published general information and day to day statistics about the diseases, and carried out regular updates. Precautions and restrictions of the government were the hot topics tweeted

in the initial stages of COVID-19. Based on the API twitter search nearly 2.7M tweets from Arabic were considered for research purposes. In the Arabic world, a discussion of the topic of COVID-19 stretched over the entire year. Focusing on geographical, temporal, and topical aspects made it possible to carry out a preliminary analysis of the ArCOVID-19(Arabic) dataset. The extracted dataset contained not only the original data but also the misinformation. Since January 2020, during COVID-19, Twitter has been an important medium for sharing information about the pandemic. Alqurashi et al. (2020), Banda et al. (2020), Chen et al. (2020), Dashtian and Murthy (2021), Gao, Tian, et al. (2020), Gao, Yada, et al. (2020), Lopez et al. (2020), and Qazi et al. (2020) pointed out that analyzing the raw set of data available on social media facilitated the process of conducting research about Twitter dataset. Alqurashi et al. (2020) stated that the tweets that were considered were based only on the Arabic Twitter dataset released from January 2020 to December 2021. The collection of retweets in the dataset was avoided to exclude duplicate tweets.

Government Communication of COVID-19 Precautions Through Social Media in the Gulf Countries

To avoid spreading fake news on social media, the governments of Gulf countries officially launched a Twitter account and tweeted all COVID-19 related details on their official website to create awareness about COVID-19 on Twitter. The ministries of health departments in Gulf countries utilized a combination of various methods and procedures to overcome COVID-19 and face the challenges caused by both national and international problems in Gulf countries (Alshammari et al., 2020). To prevent the spread of the virus, it was recommended to follow the implemented method regularly.

There were many precautions in Gulf countries as stated by Alandijany et al. (2020). These precautions mainly focused on the prohibition of the celebration of liberation days; all employees were supposed to have paid holidays except those working for certain departments such as the Ministry of Interior and the Ministry of Electricity. Also, strict measures were taken by the governments such as imposing curfews and mandatory facemasks. Accordingly, people were not allowed to leave their homes unless it was necessary. Moreover, grocery shops were responsible for providing people with masks, gloves and sanitizers. Finally, governments warned the public

that necessary action shall be taken to prevent the spread of fake news.

Identification of Rumors and Misinformation on Twitter

Up to this point, there was no specific definition of misinformation found on Twitter as stated by Pierri et al., (2020). According to Zubiaga et al., (2018), the term misinformation was defined as the act of spreading false information on social media. In other words, if false information was shared on social media and it went viral then this could be termed as misinformation. If the veracity of the message was not verified before sharing it on Twitter, then this could be labeled as a rumor according to Zubiaga et al., (2018). Based on research, it was stated that both misinformation and rumors convey the same meaning. Instead of focusing on biological viruses during the spread of COVID-19, the epidemiological model concentrated on creating information as stated by Goel et al., (2016) and Serrano et al., (2015). Individuals who receive the information from the original source and spread it via broadcasting is considered as another way of information going viral. The primary aim of epidemiological modeling was to analyze data based on specific assumptions (Goel et al., 2016).

Twitter did not engage in debunking rumors. By self-correction process, inaccurate information was corrected to make it reliable. The increasing interest in conspiracy content was linked to debunking posts, as corrective efforts require a significant amount of time (Zollo et al., 2017). Differentiating between true and false information was one of the key challenges on Twitter. The need to investigate the credibility of information on Twitter arose during the COVID-19 pandemic, as most sources of information were driven from Twitter. After sharing the information on social media, fake news that spread following the post is called retweets. It is important to analyze the tweets to find the difference between partially false tweets and false tweets. To classify popular Twitter accounts and bot detection, Twitter API was used. Several false tweets made people confused during the COVID-19 pandemic. False information regarding COVID-19 rules of quarantine made some health workers follow the tweeted information, but discovering later that it was false information caused a serious problem in the health care domain. Twitter accounts behind the tweets must be investigated to gain a better understanding of the information. Twitter API is a bot program that operates on a Twitter account. Tweeting, following, liking, disliking, were automatically recorded by the bot. Some of the bots were trained to track the spread of misinformation on social media through Twitter (Shao et al., 2018).

Hashtags and Emoji during COVID-19

Twitter was not only used for sharing information but also for discussing this information using hashtags that help to get enormous information about the COVID-19 pandemic (Shahi et al., 2021). The interpretive and statistical approach was used for the analysis of data found on Twitter (Huang et al., 2010). Twitter hashtags once created can be used for many days based on demand. To convey emotions, emojis were used on Twitter to attract others and to spread information; emojis play an important role on Twitter. Emojis were used to show the impressions about the week's tweets (Shahi & Majchrzak, 2021); emojis expressing doubts were frequently used during the COVID-19 pandemic and laughing emojis were used to make fun of the posted information. Overall, general COVID-19 tweets were considered distinctive terms on Twitter accounts. To decide whether the information displayed in the posted tweets about COVID-19 is true or not, authorized government twitter accounts that belong to Kuwaiti Ministry of Health twitter account must check these tweets to verify their credibility. References to antibody prevalence during COVID-19 were manually inspected for both the Bay Area and Santa Clara. The spread of misinformation about the epidemic was reported to manipulate people's emotions (Claire Wardle & Hossein Derakhshan, 2017). To estimate the relative frequency of words used in the tweets, the LIWC technique was used for this purpose (Tausczik & Pennebaker, 2010).

To measure proxy in the tweeted messages, LIWC was also used. Several research methods were conducted to find the misinformation tweeted during the spread of COVID-19. The propagation of misinformation tweeted was limited by using Twitter API. The major problem with retrieving twitter messages from Twitter API was related to the fact that Twitter API did not contain tweeted replies. Hence, to check public reactions, Twitter API was used. Twitter launched endpoint services to help real-time researchers collect information about COVID-19 tweets. Twitter also provided additional support to retrieve COVID-19 information, but it didn't help in predicting the truthfulness of the posted information. As more people were increasingly using the Twitter account dataset for replies, this led to a tremendous increase in retweeting as well. The analysis of the data posted on Twitter posed another challenge for the data analysis module. By checking the organization of tweets, the truthfulness of the information posted can be ensured; false or fake information was posted for the sake of

manipulating people's emotions. Allen et al. (2020) stated that the quick spread of misinformation on Twitter was found to expose fake news on other media portals. The next limitation depended on the corpus. Based on analysis and research, it was found that COVID-19 misinformation was spread with the help of other languages. The spread of misinformation was limited by the usage of hashtags and emojis. Interpretations based on time, age, and gender were included in Twitter analyses to help limit the spread of misinformation (Miller et al., 2021).

Methodology

Study Design

This study employs a mixed-method approach, integrating quantitative and qualitative techniques to analyze Twitter data related to COVID-19 in the Gulf Cooperation Council (GCC) countries. The design is retrospective, utilizing publicly available Twitter data collected during the period that stretched from January 2020 to December 2021. The purpose of this design is to explore public sentiment, emotional responses, and thematic trends in tweets, as well as to assess how governmental policies and announcements influenced public discourse during the pandemic.

Data Source and Selection Criteria

We collected a sample of Twitter data related to COVID-19 from January 2020 onwards (the first confirmed case). We used Snsrape library to scrape tweets and then the AraNet package, "a deep learning toolkit for a host of Arabic social media processing," to carry out the sentiment and emotion analysis (Abdul-Mageed et al., 2020). Tweets were collected between January 2020 and December 2021.

The total data collected was around 200k tweets from 6 different countries, specifically the Kingdom of Saudi Arabia (61,637), Kuwait (54,676), Qatar (36,035), Bahrain (33,073), the United Arab Emirates (32,709), and Oman (22,686). All the tweets were in the local language of these countries. We then carried out the study's analytical procedure. To improve the accuracy of the results, the data was cleaned before the analysis was conducted. As shown in Table 1, the number of collected tweets by country was limited to 5000 tweets for each search combination.

Table 1*Number of collected tweets by country*

Country	Number of Tweets	
	Original Set	Cleaned Set
Kingdom of Saudi Arabia	61,637	59,532
Kuwait	54,676	51,120
Qatar	36,035	32,052
Bahrain	33,073	29,630
United Arab Emirates	32,709	29,751
Oman	22,686	20,253

To conduct sentiment and emotion analysis, we used the social media platform, Twitter, as the source of data related to the COVID-19 pandemic. The text of each Arabic tweet was collected in addition to the date on which the tweet was posted, the tweet ID for future reference, and the user ID. To implement that, Snsrape, an open-source Python scraper for social networking services, was used. Snsrape works by receiving an inquiry that includes a search term structured as follows, keyword + #country + time period of the search (see Table 1).

كوفيد #الكويت , since:2020-01-01 until:2021-12-29

الحجر الصحي #قطر , since:2020-01-01 until:2021-12-29

كمامة #الامارات , since:2020-01-01 until:2021-12-29

To conduct the analysis, the Arabic name of each country was used (see Table 2) preceded by a '#' along with each keyword (see Table 3). Since many of COVID-19 related policies and regulations were announced and imposed during the period of January 1, 2020 through December 29, 2021, a time limit was set to only choose tweets posted at this specific period.

Table 2*Arabic Countries' Names Used in the Analysis*

English Translation	Search term
Saudi Arabia	#السعودية
Bahrain	#البحرين
Kuwait	#الكويت
Qatar	#قطر
United Arab Emirates	#الإمارات العربية المتحدة
Oman	#عمان

Table 3*Keywords Used in the Analysis*

كورونا	كوفيد- 19	كمامات	كمام	كمامة	تباعدا اجتماعي
Corona	Covid-19	masks	Mask	mask	Social distancing
احتراز	ضيق التنفس	الحجر الصحي	الحجر	حجر	حجر
Ehteraz application	Shortness of breath	Quarantine	Quarantine	Quarantine	Quarantine
جائحة	الفيروس التاجي	تعقيم	متر ونص	التباعدا الاجتماعي	العزل
Pandemic	Corona virus	Sanitization	One meter and a half	Social distancing	Quarantine
ترصد	غسل اليدين	حرارة	ووهان	الصين	Be aware application
Tarasud applicationn	Hand-wash	Fever	Wuhan	China	تطبيق كن على دراية
حصن	فعاليات الحجر	تفشي	وباء	منتشر	كحة
Hosen applicationn	Curfew activities	Spreading	Epidemic	Spreading	Coughing
				توكلنا	اشلونك
				Tawaklana application	shloniok application

Analytical Framework

During the pre-processing stage, duplicate tweets within each country's data were deleted, as shown in (Table 1); no other procedure was needed during the pre-processing stage because the tool to be used to process the tweets and then analyze them, AraNet, had already been developed for the purpose of social media text analysis. AraNet is a collection of deep learning Arabic social media processing tools, which can predict age, gender, emotion, irony, dialect, and sentiment. To accomplish this, the developer of AraNet used pre-classified datasets to train a BERT model. On the developer test set, AraNet achieved an accuracy of 77.3% for predicting sentiments and an accuracy of 62.38% for detecting emotions (Abdul-Mageed et al., 2020). Target keywords for this analysis are shown in (Table 3).

Data Analysis

Sentiment analysis, or opinion mining, is the computational study of opinion, sentiments, and emotions. Most of the work in this field has been focused on finding the polarity of a sentiment, whether negative or positive. Nevertheless, sentiment analysis is used to identify more complex classifications, including subjectivity, emotions, and other criteria within a text. In our paper, we use sentiment analysis to assign a polarity score (positive or negative) and identify the underlying emotion of each tweet.

We conduct sentiment and emotional analysis to

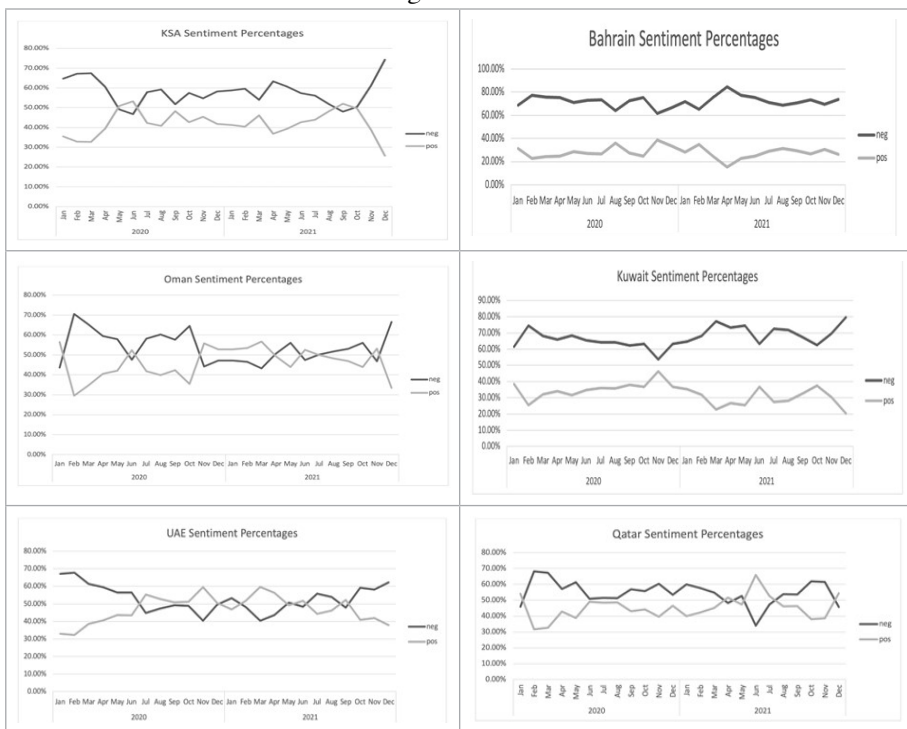
- Find how many people shared positive or negative sentiments towards COVID-19
- Get an idea of how people are reacting towards COVID-19 (focused on emotions)
- Find the similarity between the patterns of emotion and sentiment in all 5 countries.
- Estimate the effect of decisions taken by the government on their public sentiment.
- Identify the keywords and phrases that best represent what people said around COVID-19
- Visualization all our findings.

Results

Overall, the statistical analysis, as illustrated in Figure 1, indicates that there is a limited stability in the sentiment score during the years of 2020 and 2021. The average ratio (60%) of negative sentiments of residents in GCC countries was quite higher, ranging from 40% to 79% in 2020 and from 33% to 81% in 2021 whereas the positive sentiments ratio was below 61% in 2020 and 68% in 2021. Most of those communities reached the peak at the beginning of the pandemic and around the availability of booster dose)February, 2020 and December, 2021(. However, it is surprising that the positive sentiment ratio in both Bahrain and Kuwait did not exceed the negative sentiment ratio in the entire period.

Figure 1

Arabic Countries' Sentiment Percentages in 2020 and 2021

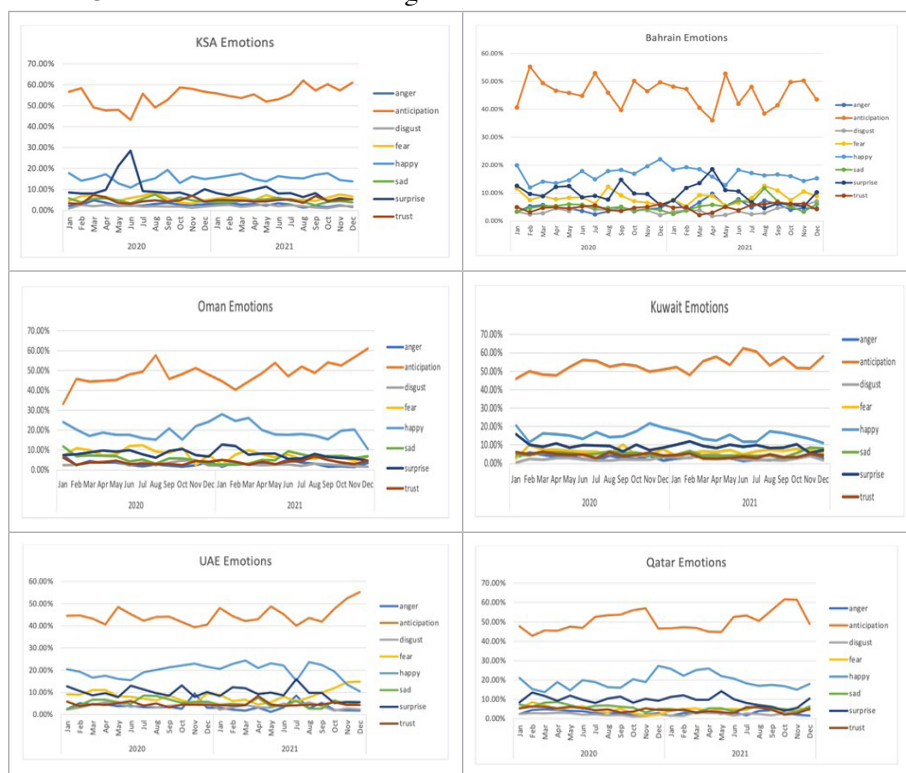


A closer inspection of the chart below (see Figure 2) shows that participants seem more likely to express anticipation considering urgent decisions taken by health authorities. This was followed by happiness (the average: 18%), surprise (the average: 9%), fear (the average: 7%), sadness

(the average: 5%), trust (the average: 4%), disgust and anger (the average: 3%). It is also important to note that, in 2021, the average ratios of trust and happiness, as positive sentiments, increased, whereas the average ratios of sadness and anger, as negative sentiments, decreased by at least half a point; for instance, the average ratio of sadness in Saudi Arabia dropped from 5.17% in 2020 to 4.39% in 2021.

Figure 2

Arabic Countries' Emotions Percentages in 2020 and 2021



Discussion and Conclusions

After the Fourth Industrial Revolution, the public has become more likely to resort to one of social media platforms to satisfy self-desire and respond to various events. Rufai and Bunce (2020) found that Twitter is considered a fertile environment for immediate communication between individuals during public health crises; it can inform, encourage morale, and even politicize. Such channel has certainly become an essential

medium for sharing information about the pandemic (Alqurashi et al., 2020; Banda et al., 2020; Chen et al., 2020; Dashtian & Murthy, 2021; Gao, Tian, et al., 2020; Gao, Yada, et al., 2020; Lopez et al., 2020; Qazi et al., 2020). However, the major setback that emerged from social media during COVID-19 was the infodemic, where a countless amount of false information about pandemics was posted (Zarocostas, 2020).

Communities in the Gulf countries as others were affected by the chaos and the infodemic, especially at the beginning of the epidemic, that required an immediate intervention from health authorities; each health department launched a formal Twitter account to inform the public of the latest news about the COVID-19 pandemic, update them about the situation, and issue warnings not to follow or spread rumors. It is somewhat surprising that users tended to express their negative sentiments towards published information even though the annual growth of users' satisfaction with and trust in health authorities and their issued regulations increased by at least half a point. The reason for this is not clear yet, but it may be relevant to the strict regulations and urgent decisions taken by the health authorities.

Unlike other GCC countries, the positive sentiment ratio in both Bahrain and Kuwait remained the same and did not exceed the negative sentiment ratio during the entire period. The latter result may indicate the dissatisfaction of the people of Kuwait and Bahrain with the restrictions; such dissatisfaction may lead to disappointment and negative thoughts. As known, Kuwait is one of the countries that imposed very strict curfew; Bahrain, however, had some issues regarding the vaccines as people there did not trust the Chinese vaccine due to the many rumors that spread about its side effects (Baraniuk, 2021; Cyranoski, 2020; Mallapaty, 2021; Woertz & Yellinek, 2021). The unavailability of vaccines such as "Pfizer" or Oxford" might have caused some concerns among the people of Bahrain.

The theoretical implications of this study arise from applying sentiment and emotion analysis during the COVID-19 pandemic, which helped in analyzing the perceptions of people from the six Gulf countries. This helps to identify the influence of public announcements made by official bodies on Twitter through examining people's reactions in the Gulf countries. Additionally, the study empirically revealed the positive and negative sentiments of tweets and eight emotions on how these announcements

affected people's perception of COVID-19 and the official bodies that made them. This study also introduced some practical recommendations, which may guide governments of the Gulf countries and decision-making bodies on how to respond in a timely manner and take necessary actions to handle any disease outbreaks in the future.

During the COVID-19 epidemic, the twitter resource provided in this study proved to be extremely useful. With a broad set of needs, it's critical that certain information be made public to get the highest attention and help other researchers from the groups who do not usually approve the usage of social media statistics. The twitter dataset was used in this research to analyse the different perspectives of the Gulf countries citizens. The dataset was collected from six different countries taking into consideration three major conditions. The present COVID-19 pandemic safety procedures taken by state authorities and observed by residents in the Gulf countries were examined. The inhabitants of Gulf countries were questioned about the government officials' understanding of the use of masks, acceptance of new lifestyle, use of suitable sanitizers, and maintaining of correct social distance. The citizens of KSA were effectively following the COVID-19 pandemic safety procedures required by government authorities. The tweets for the researched Gulf countries analyse the healthy proposals offered by the Ministry of Health and the Minister's Commission. Based on the tweets gathered, the vaccine history of Gulf countries was examined. Qatar was ranked as the most vaccinated country. The people's diverse perspectives were analysed using a rating system. The rating system was tested using pandemic data and safety precautions. The State of Kuwait was leading in the star ratings based on accepting the different epidemic perspectives.

Limitations

The first limitation of this study is related to data collection; since the data about COVID-19 related issues was only collected from tweets written in Arabic, the sample may not represent all COVID-19 social media communications related to the pandemic as there were many different languages in the original dataset. Regarding language use, slang expressions in the tweets may have obscured the intended meanings, potentially affecting the results by producing the opposite sentiment direction. Finally, the data analysis method used in the emotion analysis has been limited to only eight different emotions excluding sarcasm and

irony in emotional expressions.

Even though Twitter is the most popular social media platform, concentrating only on Twitter data in this research may not reflect the attitudes of the entire population of Gulf countries, as many people in the Gulf countries are not active users of Twitter. Consequently, our study doesn't represent a comprehensive insight into the entire Gulf countries.

Future Directions

The methods used in this study to explore Twitter users' perception of COVID-19 can be applied to other social media platforms such as Facebook and the results can be compared with those reached in this study. Our study has concentrated only on positive and negative sentiments; researchers, however, can apply different sentiment techniques, such as hybrid fuzzy-deep learning-based techniques to get various sentiment scores of the Gulf countries, which can provide rich information about the sentiments of a population. Moreover, new techniques in multilingual sentiment analysis, such as BabelSenticNet, a multilingual concept-level resource for 40 different languages, can be used to increase the quality of the translated versions. Other machine learning models may provide interesting results, such as 'Textblob', lexicon-based algorithms.

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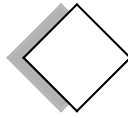
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