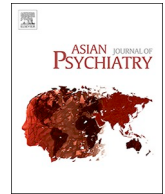




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Letter to the Editor

Psychological fear and anxiety caused by COVID-19: Insights from Twitter analytics



The novel corona-virus (2019-nCoV) or COVID-19 has globally infected 8,939,762 people and 467,146 people have lost their lives while battling with this deadly virus (Coronavirus Pandemic, 2020). These numbers are increasing at an alarming rate and newer epicentres of this deadly virus are emerging every day. Till date, this virus has infected 213 countries and territories worldwide (Zandifar and Badrfam, 2020). Even the countries which were fortunate to survive the first wave of COVID-19 are now witnessing a second and even more threatening wave of COVID-19 (COVID-19 Second Wave, 2020). Overall, this pandemic has become the greatest threat to the survival of mankind since the World War II (Brahmi et al., 2020). Due to its highly infectious nature, COVID-19 has created a fearful environment among people throughout the world (Rajkumar, 2020; Tandon, 2020). The fear, anxiety and nervousness have even prompted the people to commit suicide (Goyal et al., 2020). The psychological fear exists because of the non-availability of any precise and dedicated treatment in the absence of any vaccine for this precarious virus. The only solution from this deadly virus is social distancing and nationwide lockdown. Almost all the countries adopted this policy of lockdown in order to minimize the spread of COVID-19 (Barkur and Vibha, 2020). During this period the people turned towards social media, to express their opinions based on their current state of mind and communicate their feelings with their near and dear ones.

Social media has become an integral part of everyone's life and acts as a virtual platform for people to discuss their topics of interest with likeminded people across the world; hence breaking the geographical barrier (Kapoor et al., 2018). During this COVID-19 pandemic, people extensively used Twitter to express their feeling about COVID-19 and the related topics. Fig. 1(a), shows tweet sample, tweeted by a person expressing fear and hardship being faced by them during COVID-19. Taking motivation from this extensive use of Twitter by the people all around the world, this research aims to map people's opinion during COVID-19 pandemic.

For experimentation, a comparatively short sample of 10,403 tweets was collected using the keywords (CORONAVIRUS and COVID-19) from March 29, 2020 to March 31, 2020 (3 days). These tweets were pre-processed in order to remove any noise or any unwanted stuff, and got

filtered data for different data mining task (Singh et al., 2020a). Once, the tweets were pre-processed, the process of sentiment analysis was applied (Singh et al., 2018). Sentiment analysis is process of extracting sentiment from a given piece of text. It consists of polarity analysis and e-motion analysis (Singh et al., 2020b). In polarity analysis, tweets are classified into positive and negative tweets, based upon the context of the tweet. Fig. 1(b), shows the results of polarity analysis, depicting an overall negative sentiment among the people globally, due to fear and anxiety of losing wages, freedom to socialize created by COVID-19. Then e-motion analysis was applied to the filtered tweets. In e-motion analysis, the words are classified into eight e-motions namely (anger, anticipation, disgust, fear, joy, sadness, surprise, trust), where the four e-motions (anger, disgust, fear, sadness) are related to negative sentiment while the remaining four e-motions (anticipation, joy, surprise, trust) are associated with positive sentiment. The results of e-motion analysis are shown in Fig. 1(c), clearly depicting more prevalence of negative e-motions in tweets, thus highlighting the psychological fear among the users caused by COVID-19.

Though, the healthcare professionals and scientists are working around the clock to find a suitable vaccine for this dreaded virus, yet in absence of any reliable vaccine, people are tremendously living with psychological fear and anxiety throughout the world. This is also evident from the results of this study, that negative sentiments are dominating the tweets posted by people during this tense situation. Technologies like artificial intelligence, internet of things (IOT), cloud computing etc can not only be helpful for the healthcare professionals and scientists to find a suitable cure for human survival in this pandemic, but also can be used by the government to monitor this social media data to provide an immediate relief to its citizens.

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Declaration of Competing Interest

None.

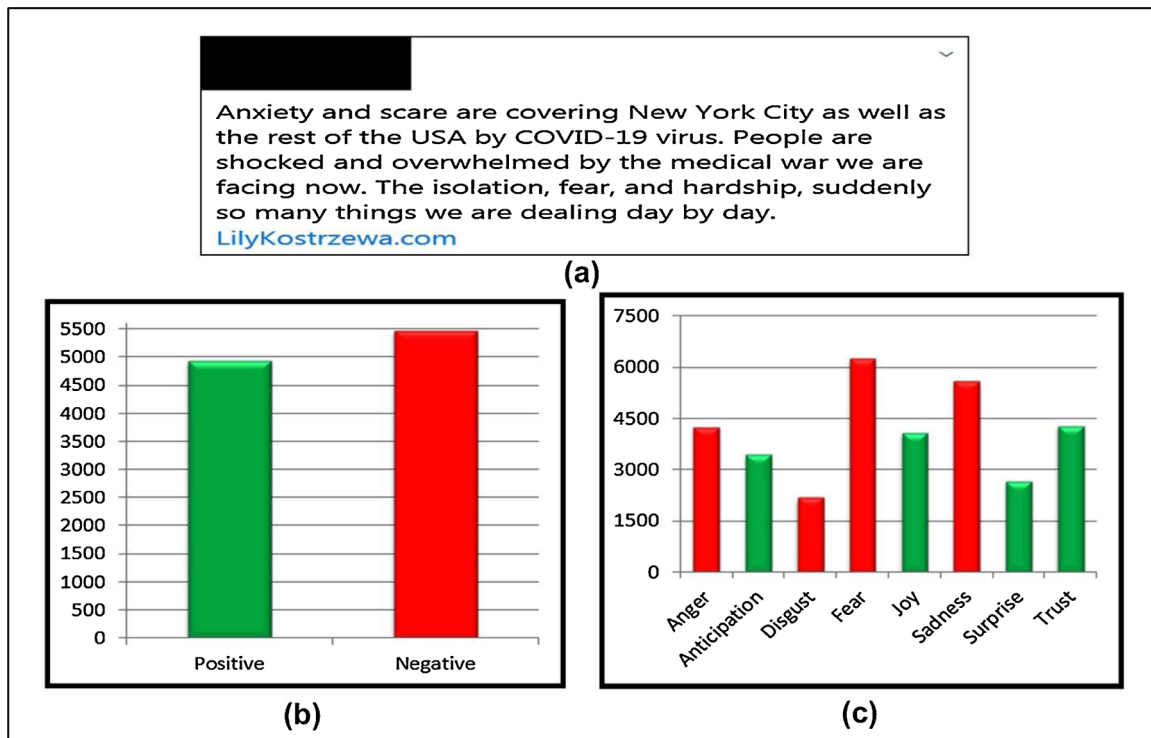


Fig. 1. (a) Sample tweet related to COVID-19, (b) Results of polarity analysis, (c) Results of e-motion analysis.

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References

- Barkur, G., Vibha, G.B.K., 2020. Sentiment analysis of nationwide lockdown due to COVID 19 outbreak: evidence from India. *Asian J. Psychiatr.* Coronavirus Pandemic (2020), <https://www.worldometers.info/coronavirus/> (Accessed on June 21, 2020).
- COVID-19 Second Wave (2020), <https://www.india.com/news/india/amid-fears-of-second-wave-of-covid-19-infection-in-china-over-1200-beijing-flights-cancelled-4060533/> (Accessed on June 22, 2020).
- Brahmi, N., Singh, P., Sohal, M., Sawhney, R.S., 2020. Psychological trauma among the healthcare professionals dealing with COVID-19. *Asian J. Psychiatr.*, 102241. <https://doi.org/10.1016/j.ajp.2020.102241>.
- Goyal, K., Chauhan, P., Chhikara, K., Gupta, P., Singh, M.P., 2020. Fear of COVID 2019: first suicidal case in India!. *Asian J. Psychiatr.* 49, 101989.
- Kapoor, K.K., Tamilmani, K., Rana, N.P., Patil, P., Dwivedi, Y.K., Nerur, S., 2018. Advances in social media research: past, present and future. *Inf. Syst. Front.* 20 (3), 531–558. <https://doi.org/10.1007/s10796-017-9810-y>.
- Rajkumar, R.P., 2020. COVID-19 and mental health: a review of the existing literature. *Asian J. Psychiatr.*, 102066.
- Singh, P., Sawhney, R.S., Kahlon, K.S., 2018. Sentiment analysis of demonetization of 500 & 1000 rupee banknotes by Indian government. *ICT Express* 4 (3), 124–129. <https://doi.org/10.1016/j.ict.2017.03.001>.
- Singh, P., Dwivedi, Y.K., Kahlon, K.S., Sawhney, R.S., Alalwan, A.A., Rana, N.P., 2020a. Smart monitoring and controlling of government policies using social media and cloud computing. *Inf. Syst. Front.* 22, 315–337. <https://doi.org/10.1007/s10796-019-09916-y>.
- Singh, P., Dwivedi, Y.K., Kahlon, K.S., Pathania, A., Sawhney, R.S., 2020b. Can twitter analytics predict election outcome? An insight from 2017 Punjab assembly elections. *Gov. Inf. Q.* 101444. <https://doi.org/10.1016/j.giq.2019.101444>.
- Tandon, R., 2020. The COVID-19 pandemic personal reflections on editorial responsibility. *Asian J. Psychiatr.*
- Zandifar, A., Badrfam, R., 2020. Iranian mental health during the COVID-19 epidemic. *Asian J. Psychiatr.* 51, 101990.

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